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Big Data and Internet of Things Web Service Management to Support Salt Agriculture Automation(Article)(Open Access)

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Abstract

The integration of the internet of things in the information system application service web platform implemented in the supply chain has given rise to new formats and models, which are important manifestations of industry transformation and improvement. In the context of implementing long-term rural development plans, deep integration of the application of information technology and rural revitalization will act as a trigger that drives productivity and the development of other village business industries. The purpose of this research is to build a web service management model that can be used to manage and help optimize IoT-based salt farming production. The model built consists of software and hardware architectures and interconnections between tools. This research is divided into three stages: the first stage is to identify the data sources needed for big data needs, the second stage is to build a big data microservices model and the IoT model, the third stage is to integrate IoT data with the big data microservices. The resulting IoT device can be used to automate water distribution based on the salinity value measured using a sensor © 2022, International Journal of Advanced Computer Science and Applications.All Rights Reserved.

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Big Data and Internet of Things Web Service Management to Support Salt Agriculture Automation

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Abstract—The integration of the internet of things in the application service web information system platform implemented in the supply chain has given rise to new formats and models, which are important manifestations of industry transformation and improvement. In the context of implementing long-term rural development plans, deep integration of the application of information technology and rural revitalization will act as a trigger that drives productivity and the development of other village business industries. The purpose of this research is to build a web service management model that can be used to manage and help optimize IoT-based salt farming production. The model built consists of software and hardware architectures and interconnections between tools. This research is divided into three stages: the first stage is to identify the data sources needed for big data needs, the second stage is to build a big data microservices model and the IoT model, the third stage is to integrate IoT data with the big data microservices model that has been built. The results of this study are in the form of an IoT device that can be run with big data micro services. The resulting IoT device can be used to automate water distribution based on the salinity value measured using a sensor.

Keywords—Web service; big data; salt; IoT

I. INTRODUCTION

Big data and the Internet of things (IoT) are part of the components of the Industrial Revolution 4.0. Growing rapidly and affecting all fields, including business, technology, health, education, agriculture and increasing benefits for many other fields. IoT is contributing to the growth of large amounts of data, and high speeds, which are characteristics of big data, as described by Gartner.

Indonesia is a country that has more ocean area, so of course it is a country that can produce its own salt and even export it to other countries. In fact, Indonesia has succeeded in producing abundant salt in 2012-2015, with a surplus of up to 2.9 million tons. However, the problem occurred in early 2017 that domestic salt production decreased, so we had to rely on imports for industrial salt needs [1].

Salt is a food ingredient that is consumed by all groups which is obtained through the process of crystallization of seawater or brine from sea salt or by the mining process of rock salt [2]. The influencing factor is that salt production in Indonesia has decreased because it still uses traditional salt processing methods such as dependence on sunlight and less use of the latest technology. The Internet of Things (IoT) describes the ubiquitous connection between common objects and the Internet. IoT works by deploying thousands of smart devices in a living or industrial environment. This device collects information from the surrounding environment, performs desired processing activities on the data obtained and transmits the processed data via a secure and reliable communication channel. Recent advances in software, hardware and communication systems have significantly improved human lifestyles in terms of time, energy and cost savings [3, 4].

Digital farming is one of the key technologies that has gained support through different research initiatives in the last decade. A fundamental digital farm setup consists of a central management platform, a human-computer interface and a dedicated IoT module, which monitors the animals, their behavior and facilities [5]. All of these building blocks are connected into a common platform, using a communications network that, today, is often based on an IoT architecture combined with cloud- or edge-based functionality. A smart atmosphere is, in the digital farming scenario, a more sophisticated concept, which enables information processing from big data, combined with the current context and conditions, and adequate adaptation according to prior knowledge or decisions generated from machine learning algorithms [6].

This research is in line with the demands of industry 4.0 which is characterized by increased manufacturing digitization with four driving factors: 1) increased data volume, computing power, and connectivity; 2) the emergence of business analysis, capabilities, and intelligence; 3) the occurrence of new forms of interaction between humans and machines; and 4) improvement of digital transfer instructions to the physical world. The uniqueness and advantage of this program is that it integrates the application of Internet of Things (IoT) technology. The purpose of the proposed program is to increase salt production, both in quantity and quality through the application of IoT-based information technology.

Web service is an application of a collection of data (database), software (software) or part of software that can be accessed remotely by various devices with a certain intermediary. The use of web services is able to overcome interoperability problems and integrate different systems. In general, web services can be identified by using a URL like just a normal web (eg: www.webname.com). However, what distinguishes web services from the web in general is the interaction provided by web services [7].

This research resulted in an IoT design that can measure salt salinity, temperature and humidity. The salt salinity measure is then used to open the faucet and automatically circulate water for the next production process. The data generated by the sensors is then combined with other data related to the supply chain of salt commodities using big data architectures and application microservices.

II. BIG DATA

The term Big Data is often used to describe a variety of different concepts, from the collection and processing of large amounts of data to the various techniques used to process data [8] (Favaretto, 2020). The use of this term is often popularly used in various fields such as: health [9], geography [10], psychology [11], and social life [12]. The term Big Data has been used since the 1990s as technical and marketing jargon by silicon graphics. The use of this term in academia began to emerge in the 2000s on the topic of computer science [13] and statistics/econometrics [14]. Then, in subsequent years, as it develops, the use of big data is increasingly used, especially in conducting data analysis [15].

Weiss and Indurkhya [14] stated that a very large data set and compiled in a centralized data warehouse allows analysis using more complex techniques to analyze more comprehensive data. In theory, big data is able to provide more comprehensive conclusions. However, in practice, there are various problems that arise.

There are various definitions of big data. However, basically, big data has three attributes known as 3Vs, namely volume (large amount), velocity (fast processing), and variety (various data) [16]. Then, along with the larger amount of data, big data attributes are growing with additional attributes to the three previous attributes, such as: veracity, value and variability. Even with various definitions, big data is a large amount of data that comes from various sources [8].

One application of big data technology is in enterprise systems. For example, big data can be applied to manufacturing systems. Big data can help predict manufacturing equipment failures. Potential problems can be found by analyzing structured data (year, equipment make, and model) and unstructured data (log entries, sensor data, error messages, engine temperature, and other factors). With this data, manufacturers can maximize parts and equipment uptime and implement maintenance costs more effectively.

In the village there are several applications of big data in rural areas. For example, big data can be used to automate agriculture. Agricultural automation uses various tools connected to the internet/ internet of things (IoT). The use of various kinds of sensors and tools certainly produces various kinds of data that need to be controlled to automate agriculture [17].

III. METHODELOGY

The stages of program implementation can be divided into several parts, namely:

1) Requirements gathering and analysis: Requirements Gathering and Analysis or mapping and analysis to get needs is the initial stage of the prototype model. In this stage the system requirements are defined in detail. In the process, developers and users provide feedback to each other. At this stage the required data sources are also identified, namely:

- Internal Data, The majority of internal data will come from database systems Gadingsari Village. This data includes production data, stock data, company financial data, as well as data from various instruments contained in village business units.
- External Data, this data includes raw material prices, selling prices, weather predictions, and input from related departments. There are various data sources that can be used to support the business units that are owned. These data can be collected from various sources and then analyzed which can produce conclusions that can help village businesses. These data are generated at different times. For example: weather data can be retrieved 7 days in advance while raw material data is sometimes available 1 month later. Of course this time difference can provide imperfect comparisons between data. Data types are also different. The average external data is unstructured, where the data does not have a fixed structure.

2) Design model: The second stage is to build a microservices model and an IoT model. Creating a micro service model design that will provide a brief description of the applications contained in the web service management system that you want to create. IoT model design: namely the IoT model that will be implemented in optimizing salt production. The IoT model will then be run using the proposed web service.

3) Integration: Design of Microservice System Integration and IoT technology in Web Service management.

IV. RESULT AND DISCUSSION

At the initial stage of the design is to build a microservices model and an IoT model, at this stage it is necessary to design a microservices model which will provide a brief description of the applications contained in the web service management system that you want to create. The Webservice Model Design created can be seen in Fig. 1.



Fig. 1. Salt production webservice model design

A. Application Program Construction

Program construction is a codification process, namely building application programs based on designs that have been made at the application design stage. There are several stages in this activity, namely:

1) The first stage, the application program is to build a data ingestion application, to integrate data from various sources using the Application Programming Interface or API, as shown in Fig. 2. In this section, big data processing is carried out using several layers, such as the data visualization layer, analytical storage, analytical engine, data processing layer.



Fig. 2. Big data server architecture design

2) The second stage provides micro service services for users or business actors. At this stage, program construction is carried out to build application services. The target to be achieved is the availability of application services that can be connected to the IoT system for monitoring the salt production process, as shown in Fig. 3.



Fig. 3. Big data architecture microservice design

B. IoT Model Design

The conceptual design of the IoT model that will be implemented in optimizing salt production can be seen in Fig. 4, and the IoT design can be seen in Fig 5. The IoT model will then be run using the proposed web service. The picture shows the ESP32, which is a low-cost, low-power system on a chip (SoC) series with dual-mode Wi-Fi and Bluetooth capability! The ESP32 family includes the ESP32-D0WDQ6 (and ESP32-D0WD), ESP32-D2WD, ESP32-S0WD, and ESP32-PICO-D4 system-in-package (SiP) chips. At its heart is a dual-core or single-core Tensilica Xtensa LX6 microprocessor with a clock speed of up to 240 MHz. The ESP32 is highly integrated with a built-in antenna switch, RF balun, power amplifier, low noise receiver amplifier, filter and power management module. Engineered for mobile devices, wearable electronics, and IoT applications, the ESP32 achieves extremely low power consumption through power-saving features including smooth resolution clock gating, multiple power modes, and dynamic power scaling.



Fig. 4. Conceptual design diagram of the IoT model

Some of the functions of the IoT model design with web services are as follows:

1) The controller is an IoT tool that will automatically control the valve based on sensor conditions. All automation occurs at the controller level to save traffic going out through the modem

2) The controller will be connected to the web service via the tcp protocol. It should be noted that the controller can first connect to the local server or go directly to the web service.

3) The service data will be received. This service also allows the system to send messages to IoT devices.

4) Finally, the management system allows the use of data to and from IoT devices. The system for will also simplify the management of IoT devices



Fig. 5. IoT design

DHT22, shown in Fig. 6, is a digital relative humidity and temperature sensor. The DHT22 sensor uses a capacitor and thermistor to measure the surrounding air and output a signal on the data pin. DHT22 is claimed to have good reading quality, judged by the fast response of the data acquisition process and its minimalist size, and the price is relatively cheap when compared to a thermohygrometer [18].



Fig. 6. DHT22: Temperature and humidity module

Furthermore, the program is run based on program construction using the Python programming language as shown in Fig. 7.

from machine import Pin, ADC import network import dht import ujson import time from umqtt.simple import MQTTClient # VOID

Register All Pin
sensor = dht.DHT22(Pin(12))
pmeter = ADC(Pin(13))
pmeter.atten(ADC.ATTN_11DB) # Set Analog to 3.3V
relay = Pin(15,Pin.OUT)

Parameter to control Relay relay_state = 0

MQTT

MQTT Server Parameters MQTT_CLIENT_ID = "device1" MQTT_BROKER = "localhost"

```
MQTT_TOPIC = "iot/device/1"
print("Connecting to WiFi", end="")
sta_if = network.WLAN(network.STA_IF)
sta_if.active(True)
sta if.connect('Wokwi-GUEST', ")
while not sta_if.isconnected():
 print(".", end="")
 time.sleep(0.1)
print(" Connected!")
print("Connecting to MQTT server... ", end="")
client = MQTTClient(MQTT_CLIENT_ID, MQTT_BROKER,
port=1883)
client.connect()
print("Connected!")
    # LOOP
while True:
 # Pasive Sensor
 print("Measeuring Data....")
 sensor.measure()
 message = \{
   "temp": sensor.temperature(),
  "humidity": sensor.humidity(),
  "pmeter": pmeter.read(),
 # Some Logic Sensor
 relay_state = 0
 if(message["pmeter"] >= 1000):
  print("ook")
  relay_state = 1
 # Active Sensor
 relay.value(relay state)
 message["relay"] = relay_state
 print(ujson.dumps(message))
 print("Reporting to MQTT topic {}: {}".format(MQTT_TOPIC,
 message))
 client.publish(MQTT_TOPIC, message)
 # Looping
 time.sleep(3)
 "version": 1,
 "author": "Choirul Imam",
"editor": "wokwi",
 "parts": [
    "type": "wokwi-esp32-devkit-v1",
    "id": "esp",
"top": 0.67,
    "left": -28.67,
    "attrs": { "env": "micropython-20220618-v1.19.1" }
    "type": "wokwi-dht22",
    "id": "dht1",
"top": 7.13,
```

"left": -172.4,

"attrs": { "temperature": "-11.5" }

"type": "wokwi-slide-potentiometer",

```
"id": "pot1",
      "top": 186.68,
      "left": -331.47,
      "attrs": { "travelLength": "30" }
      "type": "wokwi-resistor",
      "id": "r1",
      "top": 58.91,
      "left": 169.7,
      "rotate": 90,
      "attrs": { "value": "220" }
"type": "wokwi-resistor",
      "id": "r2",
      "top": 56.91,
      "left": 218.18,
      "rotate": 90,
      "attrs": { "value": "220" }
      "type": "wokwi-ks2e-m-dc5", "id": "relay1", "top": -32.09,
      "left": 206.97, "attrs": {} },
      "type": "wokwi-led",
     "id": "led1",
"top": 108.25,
      "left": 219.88,
      "attrs": { "color": "green" }
      "type": "wokwi-led",
     "id": "led2",
"top": 106.41,
      "left": 177.85,
      "attrs": { "color": "red" }
  ],
   "connections": [
   [ "esp:TX0", "$serialMonitor:RX", "", [] ],
[ "esp:RX0", "$serialMonitor:TX", "", [] ],
      "esp:3V3", "dht1:VCC", "red", [ "v0" ] ],
"pot1:VCC", "esp:3V3", "red", [ "h0" ] ],
      "pot1:SIG", "esp:D13", "blue", [ "h0" ] ],
      "r1:2", "led2:A", "green", [ "h0" ] ],
   ["led2:C", "esp:GND.1", "black", ["v0"]],
["led1:C", "esp:GND.1", "black", ["v0"]],
["relay1:NO1", "r1:1", "gray", ["v0"]],
["r2:2", "led1:A", "green", ["h0"]],
    ["relay1:NC1", "r2:1", "gray", ["v0"]],
    ["relay1:COIL2", "esp:GND.1", "green", [ "v0" ] ],
     "dht1:GND", "esp:GND.2", "black", [ "v0" ] ],
"pot1:GND", "esp:GND.2", "black", [ "v0" ] ],
"dht1:SDA", "esp:GND.2", "black", [ "v0" ] ],
"esp:3V3", "relay1:P1", "red", [ "v0" ] ],
"esp:D15", "relay1:COIL1", "orange", [ "h0" ] ]
 1
```

Fig. 7. IoT program construction

Furthermore, the design of the IoT model that has been built with the Python program is run using a server with web service management (Fig. 8).



Fig. 8. Running IoT program design with web service management

The program that is run shows the results that the system design is in accordance with the expected goals. Each module of connected devices, such as temperature sensors, humidity, wifi servers can communicate with each other and provide information in the form of the desired report. This proves that the designed web service management model is running as expected.

V. CONCLUSION

The web service model with IoT has been successfully built and can be run with the Web Service management model. The web service is run using a Public IP server, making it easier to run additional applications. Application programs run well with time optimization, as expected. The test results show that the sensor valve can function automatically based on the water level measurement sensor.

REFERENCES

- Alfiani, L.F., Antinomi Peraturan Perundang-Undangan Mengenai Impor Garam Nasional. Jatiswara, 2021. 36(1), pp.24-37.
- [2] Pebrianti, S.A., Kusumah, S.H. and Yunita, N., Identifikasi Permasalahan Kualitas Garam Industri Di PT Niaga Garam Cemerlang Menggunakan Check Sheet, Pareto Chart Dan Fishbone Analysis. Jurnal Fakultas Teknik Kuningan, 2021. 2(3), pp.79-86.
- [3] Sisinni, E., Saifullah, A., Han, S., Jennehag, U. and Gidlund, M.,. Industrial internet of things: Challenges, opportunities, and directions. IEEE transactions on industrial informatics, 2018 14(11), pp.4724-4734.
- [4] Saeed, N., Alouini, M.S. and Al-Naffouri, T.Y., Toward the internet of underground things: A systematic survey. IEEE Communications Surveys & Tutorials, 2019. 21(4), pp.3443-3466
- [5] Jayaraman, P.P., Yavari, A., Georgakopoulos, D., Morshed, A. and Zaslavsky, A., Internet of things platform for smart farming: Experiences and lessons learnt. Sensors, 2016. 16(11), p.1884.
- [6] Jukan, A., Masip-Bruin, X. and Amla, N., Smart computing and sensing technologies for animal welfare: A systematic review. ACM Computing Surveys (CSUR), 2017. 50(1), pp.1-27.
- [7] Ahmad, F. and Sarkar, A., QaaS (quality as a service) model for web services using big data technologies. Enterprise Information Systems, 2017. 11(9), pp.1352-1373.
- [8] Favaretto M, De Clercq E, Schneble CO, Elger BS. What is your definition of Big Data? Researchers' understanding of the phenomenon of the decade. PloS one. 2020 Feb 25;15(2):e0228987

- [9] Raghupathi W, Raghupathi V. Big data analytics in healthcare: promise and potential. Health information science and systems. 2014 Dec;2(1):1-0.
- [10] Graham M, Shelton T. Geography and the future of big data, big data and the future of geography. Dialogues in Human geography. 2013 Nov;3(3):255-61.
- [11] Kang L, Wu C, Wang B. Principles, approaches and challenges of applying big data in safety psychology research. Frontiers in psychology. 2019 Jul 9;10:1596.
- [12] Kang L, Wu C, Wang B. Principles, approaches and challenges of applying big data in safety psychology research. Frontiers in psychology. 2019 Jul 9;10:1596.
- [13] Han J, Pei J, Tong H. Data mining: concepts and techniques. Morgan kaufmann; 2022 Jul 2.

- [14] Varian HR. Big data: New tricks for econometrics. Journal of Economic Perspectives. 2014 May;28(2):3-28.
- [15] Diebold FX. On the origin (s) and development of "big data": The phenomenon, the term, and the discipline. Pobrano z https://www. sas. upenn. edu/~ fdiebold/papers/paper112/Diebold_Big_Data. pdf. 2019.
- [16] Wang J, Xu C, Zhang J, Zhong R. Big data analytics for intelligent manufacturing systems: A review. Journal of Manufacturing Systems. 2022 Jan 1;62:738-52.
- [17] Patnaik S, Sen S, Mahmoud MS, editors. Smart Village Technology: Concepts and Developments. Cham: Springer International Publishing; 2020 Feb 7.
- [18] Abdulrazzak, I.A., Bierk, H. and Aday, L.A., Humidity and temperature monitoring. Int. J. Eng. Technol, 2018, 7(4), pp.5174-5177.



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Affiliation : Università di Camerino

Domain of Research : Mathematical Programming, Large-Scale Parallel Optimization, Transportation problems, Classification problems, Linear and Integer Programming.



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Domain of Research : Artificial Intelligence,Genetic Algorithms

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Paper 1: A Two-Step Approach to Weighted Bipartite Link

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important for sensors mounted on-board Unmanned Aerial Vehicles in the context of visual servoing, landmarks recognition and data compression for efficient storage and transmission. To this end, this paper proposes a machine learning approach for segmentation using an efficient Convolutional Neural Network (CNN) which incorporates a feature compressor and a subsequent segmentation module based on 3D convolution operations. The experimental results demonstrate that the proposed approach gives segmentation accuracy at par with conventional approaches based on Principal Component Analysis (PCA) to reduce the feature dimensionality. Moreover, the proposed network is at least 35% faster than the conventional CNN-based approaches using 3D convolutions.

Author 1: Muhammad Bilal	Author 2: Khalid Munawar
Author 3: Muhammad Shafique S	Shaikh
Author 4: Ubaid M. Al-Saggaf	Author 5: Belkacem Kada
Keywords: Hyperspectral images; CN segmentation; PCA	IN; dimensionality reduction;
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Paper 3: Design of Personalized VR Short Video Content Distribution Algorithm based on Artificial Neural Network

Abstract: In order to improve the video quality, reduce the number of video jams, and improve the video transcoding rate, a new personalized distribution algorithm of VR short video content based on artificial neural network is proposed. BP neural network is used to compress the original video and determine the execution mode and cache location of VR short video cache file; Transcoding cached high bit rate VR short video stream to generate low bit rate video stream to meet the needs of different network bandwidth; Build a video distribution model, and build a multicast distribution tree based on this model, that is, add some relay servers to minimize the video distribution cost; Finally, through the algorithm of minimizing the distribution cost of VR short video, the bandwidth loss and response delay are effectively reduced to achieve the goal of minimizing the distribution cost. The experimental results show that the video blocking times of this method are always less than six times, which effectively reduces the video blocking times. The PSNR value is high, the increase is large, up to 0.5, and the video transcoding rate is improved, up to 92%.

Author 1: Han Zhong

Author 2: Donghyuk Choi

Author 3: Wonho Choi

Author 4: Yu Zheng

Keywords: Artificial neural network; VR short video; BP neural network; video cache; cost optimization DOWNLOAD PDF

Paper 4: Modeling and Simulation of a Blockchain Consensus for IoT Node Data Validation

Abstract: The classical blockchain developed for the Bitcoin cryptocurrency has evolved since its introduction more than a decade ago. Blockchain exists in different forms for different purposes and operational contexts. There has been

a significant growth in the business use cases of blockchain which is based on the unique attributes of the distributed ledger technology. Blockchain provides peer-to-peer distribution of data in a traceable and decentralized architecture that attains data authentication using consensus protocols. Blockchain as a distributed ledger is the fusion of cryptography, peer-to-peer networking technology, distributed system technology, and consensus mechanism to assure information security and digital asset management. Consensus mechanisms are applied to the distributed ledger that operates in a peer-topeer network where message transmission between peers is validated and stored across all active peers. Reaching an agreement to validate message transmission and maintaining the correctness of the state of data in a network for critical wireless sensor networks have become a necessary requirement for networks that span several subsystems covering a large operational area. Due to the resource constrained nature of the active actors of wireless sensor networks, any cryptographic solution to be adopted must be lightweight and efficient as well. This paper proposes a blockchain-based decentralized mechanism for authentication of node data for storage onto a distributed ledger. The coloured Petri net was used to model and simulate by detailing the critical attributes of the workings of the system that is based on cyber-physical IoT architecture.

Author 1: Bismark Tei Asare

Author 2: Laurent Nana

Author 3: Kester Quist-Aphetsi

Keywords: Blockchain consensus; ripple consensus algorithm; coloured petri net; cyber-physical system; IoT architecture; node data security DOWNLOAD PDF

Paper 5: Microcontrollers Programming Framework based on a V-like Programming Language

Abstract: This paper describes the design of a programming framework for microcontrollers specially the ones with low program and data memory, using as a base a programming language with modern features. The proposed programming framework is named Aixt Project and took inspiration from other similar projects such as Arduino, Micropython and TinyGo among others. The project's name is inspired on the weasel pet of the V programming language and at the same time it is a tribute to Ticuna people who live in the Amazon rain-forest, just between Colombia, Peru' and Brasil. Aixt comes from Aixt"u or Ait u r u which means otter in Ticuna language. The proposed programming framework has three main components: the Aixt language based on the V syntax, a transpiler that turns the defined V-like source code into C, and a generic cross-platform Application Programming Interface (API). The target of this project is obtaining a cross-platform programming framework over the same language modern language an the same API, for programming different microcontrollers especially the ones with low memory resources. Aixt language is based on the syntax of V programming language but it uses mutable variables by default. V language was selected to be used as base of this project due to it is a new compiled programming language with interesting modern features. In order to turn the Aixt source code into C, a transpiler is implemented using Python and the some specialized libraries to design each part of its translation process. The transpiled code is compiled by the native C compiler of each microcontroller to obtain the final binary file, that is why the API has to be adapted for each native C compiler. The complete project is released as a free and open source project. Finally, different application test were done over the XC8 and XC16 compilers for the PIC16, PIC18, PIC24 and dsPIC33 microcontrollers families, demonstrating the correct working of the

overall framework. Those tests show that the use modern language framework to program any microcontrollers is perfectly feasible using the proposed programming framework.

Author 1: Fernando Mart'inez Santa

Author 2: Santiago Orjuela Rivera

Author 3: Fredy H. Mart'inez Sarmiento

Keywords: Microcontroller; transpiler; API; programming language V; V-lang; Aixt project

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Paper 6: Advantages of Digital Transformation Models and Frameworks for Business: A Systematic Literature Review

Abstract: Digital Transformation (DT) is a vital change in the way an organization utilizes processes, people, and technology to provide value to its ever changing customer expectations over products and services. Researchers developed models and frameworks to tackle concerns in this area, and existing literature improved our understanding of digital transformation. However, there are not enough comprehensive systematic literature reviews to picture a clear portrait of the advantages of related works and point out the major gaps for future studies. This study aims to evaluate how these models and frameworks affect business while highlighting their advantages and pointing out their gaps for future improvements and studies. A Systematic Literature Review (SLR) applied and collected and reviewed seven models and nine frameworks over five years between 2017 and 2021 from four databases of IEEE, Web of Science, Scopus, and Science Direct. These models and frameworks were reviewed and their advantages for researchers and practitioners were pointed out while picturing a clear vision of what is done in the Digital Transformation development of models and frameworks. The findings in this SLR indicated that the rising trend of DT studies has increased by 275% solely from 2020 to 2021 with 62% of those studies conducted in Europe.

Author 1: Seyedali Aghamiri

Author 2: John Karima

Author 3: Nadire Cavus

Keywords: Digital transformation; digitalization; model; framework; business; SMEs DOWNLOAD PDF

Paper 7: Dynamic Time Warping Features Extraction Design for Quranic Syllable-based Harakaat Assessment

Abstract: The use of technological speech recognition systems with a variety of approaches and techniques has grown exponentially in varieties of humanmachine interaction applications. The assessment for Qur'anic recitation errors based on syllables utterance is used to meet the Tajweed rules which generally consist of Harakaat (prolonging). The digital transformation of Quranic voice signals with identification of Tajweed-based recitation errors of Harakaat is the main research work in this paper. The study focused on speech processing implemented using the representation of Quranic Recitation Speech Signals (QRSS) in the best digital format based on Al-Quran syllables and feature extraction design to reveal similarities or differences in recitation (based on Al-Quran syllables) between experts and student. The method of Dynamic Time Warping (DTW) is used as Short Time Frequency Transform (STFT) of QRSS syllable feature for Harakaat measurement. Findings from this paper include an approach based on human-guidance threshold classification that is used specifically to evaluate Harakaat based on the syllables of the Qur'an. The threshold classification performance obtained for Harakaat is above 80% in the training and testing stages. The results of the analysis at the end of the experiment have concluded that the threshold classification method for Minimum Path Cost (MPC) feature parameters can be used as an important feature to evaluate the rules of Tajwid Harakaat embedded in syllables.

Author 1: Noraimi Shafie	Author 2: Azizul Azizan
Author 3: Mohamad Zulkefli Adam	Author 4: Hafiza Abas
Author 5: Yusnaidi Md Yusof	Author 6: Nor Azurati Ahmad

Keywords: Speech processing; short time frequency transform; dynamic time warping; human-guided threshold classification

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Paper 8: A Novel Method for Recognizing Traffic Signs using Color and Texture Properties using the ELM Algorithm

Abstract: Road accidents cause a lot of financial and human losses every year. One of the causes of these accidents is human error, and the driver ignores traffic signs. Therefore, accurate detection of these signs will help to increase the safety of drivers and pedestrians and reduce accidents. In recent years, much research has been done to increase the accuracy of panel recognition, most of which are problems that affect the diagnosis, such as adverse weather conditions, light reflection, and complex backgrounds. In the present study, considering the diversity of traffic signs' geometric shapes, the sign detection part has been done using a torsional neural network. Then, in the feature extraction section, we used LBP and HOG techniques, and at the end, the section was identified and classified using the ELM algorithm. The results obtained on 12569 images, 75% of which were used for training and 25% for experimentation, show that the accuracy of this research has improved by 95% compared to the essential work by 93%.

Author 1: Xiaoda Cao

Keywords: Traffic sign recognition; torsional neural network; HOG Feature; LBP Feature; ELM Algorithm

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Paper 9: Global Pattern Feedforward Neural Network Structure with Bacterial Foraging Optimization towards Medicinal Plant Leaf Identification and Classification

Abstract: Medicinal Plant species help to cure various diseases across the world. The automated identification of medicinal plant species to treat disease based on their structure is much required in pharmaceutical laboratories. Plant Species with a complex background in the field will make the detection and classification more difficult. In this paper, optimization of bacterial foraging technique has been employed towards medicinal plant prediction and classification architecture based on feed-forward neural network. It is capable

of identifying both complex structures of medicinal plants. Feed-forward Neural Networks are considered to have good recognition accuracy compared to other machine learning approaches. Further bacterial foraging has been implemented to minimize the feature search space to the classifier and provides optimal features for the plant classification. The experimental outcomes of the proposed approach has been analysed by employing the medley dataset and evaluating the performance of the proposed approach with respect to dice similarity coefficient, Specificity and sensitivity towards medicinal plant classification. The findings are very positive, and further research will focus on using a large dataset and increased computing resources to examine how well deep-learning neural networks function in identifying medicinal plants for use in health care.

 Author 1: Sapna R
 Author 2: S N Sheshappa

 Author 3: P Vijayakarthik
 Author 4: S Pravinth Raja

Keywords: Medicinal plant; feed-forward neural networks; linear discriminant analysis; bacterial forging **DOWNLOAD PDF**

Paper 10: Predicting Employee Turnover in IT Industries using Correlation and Chi-Square Visualization

Abstract: Employee turnover in the IT industry is among the highest compared to other industries. Knowing factors that influence the turnover may help reduce this issue in future. One of these factors is job satisfaction, which are composed of two important factors, status and seniority. In this study, the correlation and chi-square visualization are utilized to determine the factors that affect employee turnover. The experiment was carried out to predict turnover using a private IT consultant dataset comparing three classification algorithms (decision tree, Naïve Bayes, and Random Forest). The result shows that job duration and positioning are factors that influence employee turnover in a software company.

Author 1: Bagus Priambodo	Author 2: Yuwan Jumaryadi
Author 3: Sarwati Rahayu	Author 4: Nur Ani
Author 5: Anita Ratnasari	Author 6: Umniy Salamah
Author 7: Zico Pratama Putra	Author 8: Muhamad Otong

Keywords: Employee turnover; turnover factors; chi-square; classification algorithm

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Paper 11: Arabic Location Named Entity Recognition for Tweets using a Deep Learning Approach

Abstract: Social media sites like Twitter have emerged in recent years as a major data source utilized in a variety of disciplines, including economics, politics, and scientific study. To extract pertinent data for decision-making and behavioral analysis, one can use Twitter data. To extract event location names and entities from colloquial Arabic texts using deep learning techniques, this study proposed Named Entity Recognition (NER) and Linking (NEL) models. Google Maps was also used to obtain up-to-date details for each extracted site

and link them to the geographical coordination. Our method was able to predict 40% and 48% of the locations of tweets at the regional and city levels, respectively, while the F-measure was able to reliably identify and detect 63% of the locations of tweets at a single Point of Interest.

Author 1: Bedour Swayelh Alzaidi

Author 2: Yoosef Abushark

Author 3: Asif Irshad Khan

Keywords: NER; Named Entity Recognition; NEL; named entity linking; event; location; deep learning; Arabic

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Paper 12: Low Complexity Classification of Thermophilic Protein using One Hot Encoding as Protein Representation

Abstract: The laborious, and cost-inefficient biochemical methods for identifying thermophilic proteins necessarily require a rapid and accurate method for identifying thermophilic proteins. Recently, machine learning has become a more effective method for identifying specific classes of extremophiles. There is still a need for a low-cost method for identifying thermophilic proteins, despite the fact that studies employing machine learning yielded superior results to conventional methods. Here, we avoid the problem of manually crafted features, which involves experts defining and extracting a set of features using only protein sequences as input for various computational methods. This study classifies thermophilic proteins and their counterparts using only protein sequences in one-hot encoding representation and the bidirectional long short-term memory (BiLSTM) model. The model achieved an accuracy of 92.34 percent, a specificity of 91 percent, and a sensitivity of 93.77 percent, which is superior to other models reported elsewhere that rely on a number of manually crafted features. In addition, the more trustworthy and objective data set and the independent data set for evaluation make this model competitive with other, more accurate models.

Author 1: Meredita Susanty

Author 2: Rukman Hertadi

Author 3: Ayu Purwarianti

Author 4: Tati Latifah Erawati Rajab

Keywords: Thermophilic; classification; one-hot encoding; BiLSTM

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Paper 13: Comparison of Naive Bayes and SVM Classification in Grid-Search Hyperparameter Tuned and Non-Hyperparameter Tuned Healthcare Stock Market Sentiment Analysis

Abstract: This paper compares the performance of Naive Bayes and SVM classifiers classification based on sentiment analysis of healthcare companies' stock comments in Bursa Malaysia. Differing from other studies which focus on the performance of the classifier models, this paper focuses on identifying the hyperparameters of the classifier models that are significant for sentiment analysis and the optimization potential of the models. Grid Search technique is used for the hyperparameters tuning process. The performance such as precision, recall, f1-score, and accuracy of Naive Bayes and SVM before and after hyperparameters for Naive Bayes are alpha and fit_prior, while the important hyperparameters for SVM are C, kernel, and gamma. After performing

hyperparameters tuning, SVM gave a better performance with an accuracy of 85.65% than Naive Bayes with an accuracy of 68.70%. It also proves that hyperparameter tuning is able to improve the performance of both models, and SVM has a better optimization potential than Naive Bayes.

Author 1: KaiSiang Chong

Author 2: Nathar Shah

Keywords: Machine learning; sentiment analysis; opinion mining; Naïve Bayes; SVM Classifier; grid search technique; hyperparameter tuning DOWNLOAD PDF

Paper 14: Intrusion Detection System using Long Short Term Memory Classification, Artificial Raindrop Algorithm and Harmony Search Algorithm

Abstract: Nowadays, various technological advancements in Intrusion Detection Systems (IDS) detects the malicious attacks and reinstate network security in the cloud platform. Cloud based IDS designed with hybrid elements combining Machine Learning and Computational Intelligence algorithms have been shown to perform better on parameters, such as Detection Rate, Accuracy, and the False Positive Rate. Machine Learning algorithms provide effective techniques for classification and prediction of network attacks, by analyzing existing IDS datasets. The main challenge is selection of appropriate data dimensions to be used for detection of attacks, out of the high number of data dimensions available. For the selected data dimensions, Computational Intelligence Algorithms provide effective techniques for hyper-parameter tuning, by optimizing on reiterative basis. The main challenge is selection of appropriate algorithm which offers optimal performance results. In this research, Hybrid Meta-heuristic approach, which combines a Long Short Term Memory (LSTM) classification model in dimension selection, with the application of Artificial Raindrop Algorithm- Harmony Search Algorithm (ARA-HSA) for hyper-parameter tuning, in order to achieve a high performance IDS in cloud environment. The performance validation of the hybrid LSTM-ARA-HSA algorithm has been carried out using a benchmark IDS data set and the comparative results for this algorithm along with other recent hybrid approaches has been presented.

Author 1: Meghana G Raj

Author 2: Santosh Kumar Pani

Keywords: Artificial raindrop algorithm; cloud computing; harmony search algorithm; hybrid meta-heuristic algorithms; hyper-parameter tuning; intrusion detection system; long short term memory classification model

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Paper 15: Social Media Multimodal Information Analysis based on the BiLSTM-Attention-CNN-XGBoost Ensemble Neural Network

Abstract: Social media users internalise information in a multimodal context. Social media functions as a primary information source for disaster situational awareness encompassing texts, photographs, videos, and other multimodal information widely used in emergency management. Applying ensemble learning to social media sentiment analysis has garnered much scholarly attention, albeit with limited research on rescue and its sub-domain, which is characterised as a major complexity. A multimodal information categorisation model based on hierarchical feature extraction was proposed in this study. The information of multiple modes is first mapped to a unified text vector space in modelling the semantic content at the sentence and multimodal information levels in the multimodal information. Multiple deep learning (DL) models were subsequently applied to model the semantic content at the aforementioned levels. This study offers a BiLSTM-Attention-CNN-XGBOOST ensemble neural network model to acquire extensive multimodal information characteristics. Based on the empirical outcomes, this method precisely extracted multimodal information features with an accuracy exceeding 85% and 95% for Chinese-and English-language datasets, respectively.

Author 1: Ling Jixian Author 2: An Gang

Author 3: Su Zhihao

Author 4: Song Xiaoqiang

Keywords: Natural language processing; social media sentiment analysis; multimodal information processing; ensemble neural network; emergency

management

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Paper 16: Design of Human-Computer Interaction Product Interface of Intelligent Service System based on User Experience

Abstract: The current intelligent service platform for human-computer interaction products and services on the user experience is not comprehensive enough, resulting in user satisfaction cannot reach the ideal level. Therefore, a new human-computer interface of intelligent service system based on user experience is designed. Build a user experience based intelligent service system hardware platform, the introduction of the full name of hypertext markup language, so that more personalized design to be met. Design user experience PC terminal and Bluetooth/RS-485 gateway module to achieve two-way signal conversion between Bluetooth and RS-485. Based on ARM processor, the speech recognition of human-computer interaction is completed, the features of collected data are extracted, and the hand gesture recognition is completed. In order to optimize the human-computer interaction effect, Kinect is used to track and identify moving objects, and the 3D interactive image is simulated by fused texture. Experimental results show that the proposed method has a higher probability of receiving data, and the recognition rate of gesture features and recognition accuracy can reach more than 90%.

Author 1: Xiaoli Xiong

Author 2: Yongguang Hou

Keywords: User experience; intelligent service system; human-computer interaction; interface design; ARM processor; gateway module **DOWNLOAD PDF**

Paper 17: Age Estimation on Human Face Image Using Support Vector Regression and Texture-Based Features

Abstract: This paper proposed a framework for estimating human age using facial features. These features exploit facial region information, such as wrinkles on the eye and cheek, which are then represented as a texture-based feature. Our proposed framework has several steps: preprocessing, feature extraction, and age estimation. In this research, three feature extraction methods and their combination are performed, such as Local Binary Pattern

(LBP), Local Phrase Quantization (LPQ), and Binarized Statistical Image Feature (BSIF). After extracting the feature, Principle Component Analysis (PCA) was performed to reduce the feature size. Finally, the Support Vector Regression (SVR) method was used to predict age. In evaluation, the estimation error will be based on mean average error (MAE). In the experiment, we utilized the well-known public dataset, face-age.zip, and UTK Face datasets, containing 15,202 facial image data. The data were divided into the training of 12,162 images and the testing of 3,040 images. Our experiments found that combining BSIF and LPQ with PCA achieved the lowest MAE of 9.766 and 9.754. The results show that the texture-based feature could be utilized for estimating the age on facial image.

Author 1: Jesy S Amelia

Author 2: Wahyono

Keywords: Age estimation; LBP; BSIF; LBQ; MAE; PCA; preprocessing; feature extraction; Support Vector Regression (SVR) DOWNLOAD PDF

Paper 18: A Fast and Effective Method for Intrusion Detection using Multi-Layered Deep Learning Networks

Abstract: The practise of recognising unauthorised abnormal actions on computer systems is referred to as intrusion detection. The primary goal of an Intrusion Detection System (IDS) is to identify user behaviours as normal or abnormal based on the data they communicate. Firewalls, data encryption, and authentication techniques were all employed in traditional security systems. Current intrusion scenarios, on the other hand, are very complex and capable of readily breaching the security measures provided by previous protection systems. However, current intrusion scenarios are highly sophisticated and are capable of easily breaking the security mechanisms imposed by the traditional protection systems. Detecting intrusions is a challenging aspect especially in networked environments, as the system designed for such a scenario should be able to handle the huge volume and velocity associated with the domain. This research presents three models, APID (Adaptive Parallelized Intrusion Detection), HBM (Heterogeneous Bagging Model) and MLDN (Multi Layered Deep learning Network) that can be used for fast and efficient detection of intrusions in networked environments. The deep learning model has been constructed using the Keras library. The training data is preprocessed and segregated to fit the processing architecture of neural networks. The network is constructed with multiple layers and the other required parameters for the network are set in accordance with the input data. The trained model is validated using the validation data that has been specifically segregated for this purpose.

Author 1: A. Srikrishnan	Author 2: Arun Raaza
Author 3: Ebenezer Abishek. E	Author 4: V. Rajendran
Author 5: M. Anand	Author 6: S. Gopalakrishnan
Author 7: Meena. M	

Keywords: Intrusion detection system; knowledge discovery and data mining; transmission control protocol; adaptive parallelized intrusion detection; constrained-optimization-based extreme learning machine

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Paper 19: Footwear Sketches Colorization Method based on Generative Adversarial Network

Abstract: The coloring of sketches has a constant market demand in the area of research. The difficulty of the coloring sketch outline is its lack of texture and color. Take footwear design as an example, it is difficult for designers to complete a colorful sketch in a limited time, so an artificial intelligence technology for coloring shoes is required. Though we do not build a new GAN, which is based on pix2pix. We try to integrate the existing model in four ways, including generator, discriminator, loss function and comparison. In this paper, given a set of edges-to-shoes that have 50,025 shoe images, our approach produces an image with vivid shoes images. Unlike the recent research, our approach is not based on a unique adversarial training. We show that shoe sketches can be synthesized from simple lines by a GAN into a high-resolution picture. In particular, we offer a new model to synthesize high-resolution photorealistic images of shoes, and apply a multi-discriminator to train and distinguish the generated images. Our model enables the shoe designer to benefit from the colorization design.

Author 1: Xin Li Author 2: Yihang Zhang

Keywords: Footwear sketch; generative adversarial network; image to image translation; colorization

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Paper 20: Multi-Exposure Image Fusion based on Window Segmentation and a Laplacian Pyramid for Chip Package Appearance Quality Detection

Abstract: A heterogeneous material image enhancement method based on multi-exposure image fusion is proposed to address the problem of obtaining high-quality images from the single imaging of chips containing two extremely different reflectivity materials. First, a multi-exposure image fusion algorithm based on window segmentation and Laplacian pyramid fusion is proposed. Then, orthogonal experiments are used to optimize the parameters of the imaging system. Next, a method based on information entropy and average gray intensity is utilized to calculate the imaging exposure times of two heterogeneous materials, and two exposure time ranges are obtained that are appropriate for regions with high and low reflectivity. Finally, the subjective and objective experimental evaluations are conducted after the multi-exposure image set has been established. The results show that the fused image has a good visual effect, the information entropy is 6.29, and the average gray intensity is 131.56. In addition, time consumption is reduced by an average of 20.3% compared to the Laplace pyramid strategy. The heterogeneous material enhancement method based on multi-exposure image fusion proposed in this paper is effective and deserving of further research and application.

Author 1: Fei Hao

Author 2: Jiatong Song

Author 3: Jiahao Sun

Author 4: Yang Fu

Keywords: Image fusion; multi-exposure; Laplacian pyramid; window segmentation; chip package DOWNLOAD PDF

Paper 21: Image Matting using Neural Networks

Abstract: Image matting, also refers to picture matting in the article, is the task of finding appealing targets in a picture or sequence of pictures i.e., video, and it has been used extensively in many photo and video editing applications. Image composition is the process of extracting an eye-catching subject from a photograph and blending it with a different background. a) Blue/Green screen (curtain) matting, where the backdrop is clear and readily distinct between the foreground (frontal area) and background (foundation) portions. This approach is now the most used type of image matting. b) Natural picture matting, in which these sorts of photos are taken naturally using cameras or cell phones during everyday activities. These are the present known techniques of picture matting. It is difficult to discern the distinction between the frontal area and the foundation at their boundaries. The current framework requires both the RGB and trimap images as inputs for natural picture matting. It is difficult to compute the trimap since additional framework is required to obtain this trimap. This study will introduce the Picture Matting Neural Net (PMNN) framework, which utilizes a single RGB image as an input and creates the alpha matte without any human involvement in between the framework and the user, to overcome the drawbacks of the prior frameworks. The created alpha matte is tested against the alpha matte from the PPM-100 data set, and the PSNR and SSIM measurement index are utilized to compare the two. The framework works well and can be fed with regular pictures taken with cameras or mobile phones without reducing the clarity of the image.

Author 1: Nrupatunga J A

Author 2: Swarnalatha K S

Keywords: Picture matting; RGB picture; Blue/Green screen; foreground; background DOWNLOAD PDF

Paper 22: New Text Steganography Technique based on Multilayer Encoding with Format-Preserving Encryption and Huffman Coding

Abstract: Steganography is the process of hiding secret data inside other media or cover media. Balancing the requirements for capacity, security, and imperceptibility is the main challenge for any successful steganography system. In text steganography, the data hiding capacity is limited because of the lack of redundant data compared to other digital media, such as images, video, or audio. Other challenges in text steganography are imperceptibility and security. Poor imperceptibility results from the structure of the text file, which is more visually apparent in terms of syntax and grammar than in other media. Low level of security results from the sequential selection of positions for embedding secret data due to insufficient redundant data in a text file. Therefore, an attacker or a third party would notice slight changes in the text file. This paper proposes a new text steganography method that combines cryptography and compression techniques to deal with these issues. This technique is used to conceal secret data to achieve high data hiding capacity in the cover text while maintaining security and imperceptibility. Multilayer encoding and Format-Preserving Encryption (FPE) with Huffman Coding, are applied to secret data before embedding. Invisible Unicode characters are employed to embed secret data into English text files to generate stego files. Results show that the proposed method satisfies capacity and imperceptibility in the cover file by comparing it with previously developed methods.

Author 2: Rossilawati Sulaiman

Keywords: Text steganography; format-preserving encryption; Huffman coding; unicode characters

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Paper 23: Secure Palmprint Recognition based on Multispectral Sequential Capture

Abstract: The security of personal identities is a serious challenge in today's digital world, with so many daily transactions requiring secure solutions. The use of biometric characteristics of the person is presented as the reliable solution to solve this problem. Indeed, this solution is effective, but it hides a weak point which lies in the ability to reproduce certain biometric characteristics for fraud. To overcome this weak point, we propose a secure approach for palmprints that relies on the concept of merging multiple features. Indeed, these features will be extracted from multi-spectral images with different spectra, which allow the extraction of information under the skin of the palm for two different spectrums sequentially in two different times (T1, T2) but instantly. The instant fusion of these characteristics will be impossible to replicate. The images used are grayscale. To satisfy a construction of a reliable and secure system, for this kind of patterns (palmprints), we will use the Compound Local Binary Pattern method, since this method adds an additional bit for each P bits coded by LBP corresponding to a neighbor of the local neighborhood, in order to build a robust system. This feature descriptor, it uses both the sign and tilt information of the differences between the central and neighboring gray values. The reliability of the proposed approach has been demonstrated on the Casia Multi-Spectral database. The final experimental results show reliable recognition rates and these recognition rates vary between 99% and 100% for the left and right palms.

Author 1: Amine AMRAOUI

Author 2: Mounir AIT KERROUM

Author 3: Youssef FAKHRI

Keywords: Biometrics; multispectral palmprint; local features; fusion; compound local binary pattern DOWNLOAD PDF

Paper 24: Combining the Characteristics of the Buddha Statue from Photogrammetry and 3D Creation to Simulate the Combination of the Art of Creating Buddha Statue

Abstract: The creation of this research was born out of interest in creating the art of carved sandstone into Buddha statue found in the area of Phayao Province, which was part of the Lanna Kingdom that prospered during the 19th-23rd Buddhist century. In the area of Phayao province, the sandstone Buddha was created which is an art and valuable artistic feature that has been shown until now. There are five categories of sand stone Phayao Buddha style that are studied and classified which have distinctive characteristics of each Buddha statue. Nowadays, traditional techniques for making Buddha statue are becoming less and less popular as Buddha statue from stone was a difficult and laborious process. Including craftsmen in carving began to decrease in number. In this research, a tool for collecting data on Buddha statue was used

photogrammetry to store and process into 3D objects and use processes and techniques for creating 3D work that has been created, and simulating the Buddha statue by using the outstanding features of the Buddha statue collected as the main part in selecting the proportion of the Buddha statue to combine to form a new Buddha statue in 3D format by simulating the Buddha statue by such methods as a prototype to reproduce the appearance of Buddha statue for use in the creation of works of art that are an important part of history. It is also used to study the characteristics of Buddha statue in combination to create the characteristics, and a new way to preserve art by using technology to transfer and preserve these valuable works of art in another way.

Author 1: Jirawat Sookkaew

Author 2: Nakarin Chaikaew

Keywords: 3D art; 3D artifacts; creation; blending art; reconstruction artifacts DOWNLOAD PDF

Paper 25: Hardware Trojan Detection based on Testability Measures in Gate Level Netlists using Machine Learning

Abstract: Modern integrated circuit design manufacturing involves outsourcing intellectual property to third-party vendors to cut down on overall cost. Since there is a partial surrender of control, these third-party vendors may introduce malicious circuit commonly known as Hardware Trojan into the system in such a way that it goes undetected by the end-users' default security measures. Therefore, to mitigate the threat of functionality change caused by the Trojan, a technique is proposed based on the testability measures in gate level netlists using Machine Learning. The proposed technique detects the presence of Trojan from the gate-level description of nodes using controllability and observability values. Various Machine Learning models are implemented to classify the nodes as Trojan infected and non-infected. The efficiency of linear discriminant analysis obtains an accuracy of 92.85 %, precision of 99.9 %, recall of 80%, and F1 score of 88.8% with a latency of around 0.9 ms.

Author 1: Thejaswini P	Author 2: Anu H
Author 3: Aravind H S	Author 4: D Mahesh Kumar
Author 5: Syed Asif	Author 6: Thirumalesh B
Author 7: Pooja C A	Author 8: Pavan G R

Keywords: Hardware trojan; machine learning; controllability; observability; detection and mitigation

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Paper 26: Multi-Objective Optimal Path Planning for Autonomous Robots with Moving Obstacles Avoidance in Dynamic Environments

Abstract: Path planning is vital for robust autonomous robot navigation. Driving in dynamic environments is particularly difficult. The majority of the work is based on the premise that a robot possesses a comprehensive and precise representation of its surroundings prior to its starting. The problem of partially knowing and dynamic environments has received little attention. This circumstance occurs when an exploratory robot or a robot without a floor plan or terrain map must move to its destination. Existing approaches for dynamic-

path-planning design a preliminary path based-on known knowledge of the environment, then adjust locally by replanning the total path as obstacles are discovered by the robot's sensors, thereby sacrificing either optimality or computational efficacy. This paper presents a novel algorithm. A Near-Optimal Multi-Objective Path Planner (NO-MOPP), capable of planning time-efficient, near-optimal, and drivable paths in partially known and dynamic environments. It is an expansion of our earlier research contributions called "A Multi-Objective Hybrid Collision-free Optimal Path Finder (MOHC-OPF) for Autonomous Robots in known static environments" and "A Multi-Objective Hybrid Collisionfree Near-Optimal Path Planner (MOHC-NODPP) for Autonomous Robots in Dynamic environments". In the environment, a mix of static and moving dynamic obstacles are present, both of which are expressed by a hybrid, discrete configuration space in an occupancy-grid map. The proposed approach is executed at two distinct levels. Using our earlier method, A Multi-Objective Collision-free Optimal Path Finder (MOHC-OPF), the initial optimal path is found in environment that includes only known stationery obstacles at the Global-path-planning level. On the second level, known as Local Replanning, this optimal path is continuously refined by online re-planning to account for the movement of obstacles in the environment. The proposed method, A Near-Optimal Multi-Objective Path Planner (NO-MOPP), is used to keep the robot's sub-paths optimum while also avoiding dynamic obstacles. This is done while still obeying the robot's non-holonomic restrictions. The proposed technique is tested in simulation using a collection of standard maps. The simulation findings demonstrate the proposed method's ability to avoid static as well as dynamic obstacles, as well as its capacity to find a nearoptimal-path to a goal location in environments that are constantly changing without collision. The optimal-path is determined by taking into account several performance measures, including path length, collision-free path, execution time, and smooth paths. 90% of studies utilizing the proposed method demonstrate that it is more effective than other methods for determining the shortest length and time-efficient smooth drivable paths. The proposed technique reduced average 15% path length and execution time compared to the existing methods.

Author 1: Kadari Neeraja

Author 2: G Narsimha

Keywords: Autonomous mobile robots; dynamic environment; planning; collision-free; time-efficient paths

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Paper 27: Eye-Vision Net: Cataract Detection and Classification in Retinal and Slit Lamp Images using Deep Network

Abstract: In the modern world, cataracts are the predominant cause of blindness. Early treatment and detection can reduce the number of cataract patients and prevent surgery. However, cataract grade classification is necessary to control risk and avoid blindness. Previously, various studies focused on developing a system to detect cataract type and grade. However, the existing works on cataract detection does not provide optimal results because of high detection error, lack of learning ability, computational complexity issues, etc. Therefore, the proposed work aims to develop an effective deep learning techniques for detecting and classifying cataracts from the given input samples. Here, the cataract detection and classification are performed using two phases. In order to provide an accurate cataract detection, the proposed study introduced Deep Optimized Convolutional Recurrent Network_Improved Aquila Optimization (Deep OCRN_IAO) model in phase I. Here, both retinal and slit lamp images are utilized for cataract detection. Then, the performance of these two image datasets are analysed, and the best one is chosen for cataract type and grade classification. By analysing the performance, the slit lamp images attain higher results. Therefore, phase II uses slit lamp images and detects the type and grade of cataracts through the proposed Batch Equivalence ResNet-101 (BE_ResNet101) model. The proposed classification model is highly efficient to classify the type and grades of cataracts. The experimental setup is done using MATLAB software, and the datasets used for simulation purposes are DRIMDB (Diabetic Retinopathy Images Database) and real-time slit lamp images. The proposed type and grade detection model has an accuracy of 98.87%, specificity of 99.66%, the sensitivity of 98.28%, Youden index of 95.04%, Kappa of 97.83%, and F1-score is 95.68%. The obtained results and comparative analysis proves that the proposed model is highly suitable for cataract detection and classification.

Author 1: Binju Saju Author 2: Rajesh R

Keywords: Cataract detection; grade classification; CRNN; dense CNN; Aquila optimization; BE-ResNet101 DOWNLOAD PDF

Paper 28: Fast Comprehensive Secret Sharing using Naive Image Compression

Abstract: This paper presents a simple method for performing (k,n)-Secret Sharing (SS) with fast computation. It aims to reduce the computational time of the former scheme in the shadow generation process. The former scheme performs SS with the polynomial function computation by involving the color palette. The color palette transforms noisy-like shadow image into more meaningfull appearance. However, this scheme requires a high computational burden on this transformation process. The proposed method exploits naive image compression to decrease the required bit for representing a secret and cover image. It effectively avoids the color palette usage previously used by the former scheme. The proposed method produces a set of shadow images with a cover image-like appearance. In addition, the secret and cover image can be reconstructed by gathering at least k shadow images. As documented in the Experimental Results section, the proposed method yields a promising result in the (k,n)-SS with reduced computational time compared to that of the former scheme.

Author 1: Heri Prasetyo

Author 2: Kukuh Caezaocta Prayuda

Keywords: Comprehensive; image compression; naïve; polynomial; secret sharing

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Paper 29: The Effect of Blockchain using Big data and the Internet of Things in Healthcare

Abstract: Modern organizations of all sizes emphasize safeguarding sensitive consumer information. Regardless of the limits given by the degrees they choose to pursue, people are nevertheless required to possess data management skills. In addition, determine if the data should be centralized or decentralized to meet the objective of enhancing accessibility. In addition, you will need to be able to monitor who has access to your data and regulate who has access to your data.

Author 1: Bassant Nabil Mohamed Author 2: Hatem Abdelkader

Keywords: Big data; blockchain; internet of things; data security; healthcare; data processing cost; IOMCT; climate change and global warming **DOWNLOAD PDF**

Paper 30: Multi Oral Disease Classification from Panoramic Radiograph using Transfer Learning and XGBoost

Abstract: The subject of oral healthcare is a crucial research field with significant technological development. This research examines the field of oral health care known as dentistry, a branch of medicine concerned with the anatomy, development, and disorders of the teeth. Good oral health is essential for speaking, smiling, testing, touching, digesting food, swallowing, and many other aspects, such as expressing a variety of emotions through facial expressions. Comfort in doing all these activities contributes to a person's self-confidence. For diagnosing multiple oral diseases at a time panoramic radiograph is used. Oral healthcare experts are important to appropriately detect and classify disorders. This automated approach was developed to eliminate the overhead of experts and the time required for diagnosis. This research is based on a self-created dataset of 500 images representing six distinct diseases in 46 possible combinations. Tooth wear, periapical, periodontitis, tooth decay, missing tooth, and impacted tooth are all examples of diseases. This system is developed using the concept of transfer learning with the use of a different pre-trained network such as "ResNet50V2", "ResNet101V2", "MobileNetV3Large", "MobileNetV3Small", "MobileNet", "EfficientNetB0", "EfficientNetB1", and "EfficientNetB2" with XGBoost and to get the final prediction The images in the dataset were divided into 80% training and 20% images for testing. To assess the performance of this system, various measuring metrics are used. Experiments revealed that the proposed model detected Tooth wear, periapical, periodontitis, tooth decay, missing tooth, and impacted tooth with an accuracy of 91.8%, 92.2%, 92.4%, 93.2%, 91.6%, and 90.8%, respectively.

Author 1: Priyanka Jaiswal

Author 2: Vijay Katkar

Author 3: S. G. Bhirud

Keywords: Panoramic radiograph; dentistry; deep learning; ensemble classifier; multi-disease classification and prediction; oral diseases; weighted ensemble module; XGBoost

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Paper 31: Dilated Multi-Activation Autoencoder to Improve the Performance of Sound Separation Mechanisms

Abstract: Speech enhancement is the process of improving the quality of audio relative to target speaker while suppressing other sounds. It can be used in
many applications as speech recognition, mobile phone, hearing aids and also enhancing audio files resulted from separation models. In this paper, a convolutional neural network (CNN) architecture is proposed to improve the quality of target's speaker resulted from speech separation models without having any prior information about the background sounds. The proposed model consists of three main phases: Pre-Processing phase, Autoencoder phase and Retrieving Audio phase. The pre-processing phase converts audio to short time Fourier transform (STFT) domain. Autoencoder phase consists of two main modules: dilated multi-Activation encoder and dilated multi-Activation decoder. Dilated multi-Activation encoder module has a six blocks with different dilation factors and each block consists of three CNN layers where each layer has different activation function then the encoder's blocks are arranged in reverse order to construct dilated multi-activation decoder. Audio retrieving phase is used to reconstruct audio depending on feature resulted from second phase. Audio files resulted from separation models are used to build our datasets that consist of 31250 files. The proposed dilated multi-activation autoencoder improved separated audios Segmental Signal-to-Noise Ratio (SNRseg) with 33.9%, Short-time objective intelligibility (STOI) with 1.3% and reduced bark spectral distortion (BSD) with 97%.

Author 1: Ghada Dahy	Author 2: Mohammed A. A. Refaey
Author 3: Reda Alkhoribi	Author 4: M. Shoman

Keywords: Speech de-noising; speech enhancement; speech separation; short time Fourier transform (STFT); autoencoder; dilated Convolution neural network; multi-activation functions; convolution neural network (CNN); bidirectional long short memory (BLSTM)

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Paper 32: A Machine Learning Ensemble Classifier for Prediction of Brain Strokes

Abstract: Brain Strokes are considered one of the deadliest brain diseases due to their sudden occurrence, so predicting their occurrence and treating the factors may reduce their risk. This paper aimed to propose a brain stroke prediction model using machine learning classifiers and a stacking ensemble classifier. The smote technique was employed for data balancing, and the standardization technique was for data scaling. The classifiers' best parameters were chosen using the hyperparameter tuning technique. The proposed stacking prediction model was created by combining Random Forest (RF), K-Nearest Neighbors (KNN), Logistic Regression (LR), Support Vector Machine (SVM), and Naive Bayes (NB) as base classifiers, and meta learner was chosen to be Random Forest. The performance of the proposed stacking model has been evaluated using Accuracy, Precision, Recall, and F1 score. In addition, the Matthews Correlation Coefficient (MCC) has been also used for more reliable evaluation when having an unbalanced dataset, which is the case in most medical datasets. The results demonstrate that the proposed stacking model outperforms the standalone classifiers by achieving an accuracy of 97% and an MCC value of 94%.

Author 1: Samaa A. Mostafa

Author 2: Doaa S. Elzanfaly

Author 3: Ahmed E. Yakoub

Keywords: Stroke disease; prediction model; ensemble methods; stacking classifier

Paper 33: Feedforward Deep Learning Optimizer-based RNA-Seq Women's cancers Detection with a hybrid Classification Models for Biomarker Discovery

Abstract: Women's cancers, signified by breast adenocarcinoma and nonsmall-cell lung cancers, are a significant threat to women's health. Across the globe, the leading cause of death for women is a group of tumors referred to as "female-oriented cancers". The most recent researches in the classification of molecular tumors is the analysis of women's cancers using RNA-Seq data for precision cancer diagnoses. Furthermore, discovering the different genes' patterns behaviors will lead to predict the cancer-specific biomarkers to early diagnosis and detection of cancer-specific in women. An overfit model will be resulted due to the high-dimensional data of RNA-Seg from a small samples of data. In this work, we propose a filter-based selection approach for a deep learning-based classification model. In addition, hybrid classification models have been proposed to be compared with the new modified deep learning model. The Experiments' analysis showed that the proposed filter-based selection approach for a deep learning-based classification model performed better than the other hybrid models in terms of performance evaluation metrics, with an accuracy of 96.7% for RNA-Seq breast adenocarcinoma data and 95.5% for RNA-Seg non-small-cell lung cancer data.

Author 1: Waleed Mahmoud Ead

Author 2: Marwa Abouelkhir Abdelazim

Author 3: Mona Mohamed Nasr

Keywords: Women's cancers; RNA-Seq; deep learning; molecular tumor; hybrid classification models

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Paper 34: Transfer Learning for Closed Domain Question Answering in COVID-19

Abstract: COVID-19 has been a popular issue around 2019 until today. Recently, there has been a lot of research being conducted to utilize a big amount of data discussing about COVID-19. In this work, we conduct a closed domain question answering (CDQA) task in COVID-19 using transfer learning technique. The transfer learning technique is adopted because a large benchmark for question answering about COVID-19 is still unavailable. Therefore, rich knowledge learned from a large benchmark of open domain QA are utilized using transfer learning to improve the performance of our CDQA system. We use retriever-reader framework for our CDQA system, and propose to use Sequential Dependence Model (SDM) as our retriever component to enhance the effectiveness of the system. Our result shows that the use of SDM retriever can improve the F-1 score of the state-of-the-art baseline CDQA system using BM25 and TF-IDF+cosine similarity retriever by 3,26% and 32,62%, respectively. The optimal parameter settings for our CDQA system are found to be as follows: using 20 top-ranked documents as the retriever's output, five sentences as the passage length, and BERT-Large-Uncased model as the reader. In this optimal parameter setting, SDM retriever can improve the F-1 score of the state-of-the-art baseline CDQA system using BM25 by 5,06 % and TF-IDF+cosine similarity retriever by 24,94 %. Our last experiment then confirms the merit of using transfer learning, since our bestperforming model (double fine-tune SQuAD and COVID-QA) is shown to gain eight times higher accuracy than the baseline method without using transfer learning. Further fine-tuning the transfer learning model using closed domain dataset (COVID-QA) can increase the accuracy of the transfer learning model that only fine-tuning with SQuAD by 27, 26%.

Author 1: Nur Rachmawati Author 2: Evi Yulianti

Keywords: COVID-19; closed domain question answering; sequential dependence model; transfer learning; BERT **DOWNLOAD PDF**

Paper 35: A Cascaded Feature Extraction for Diagnosis of Ovarian Cancer in CT Images

Abstract: This paper proposed ovarian cancer detection in the ovarian image using joint feature extraction and an efficient Net model. The noise of the input image is filtered by using Improved NLM (Improved Non-Local Means) filtering. The deep features are extracted using Deep CNN_RSO (Deep Convolutional Neural Network Rat Swarm Optimization), and the low-level texture features are extracted using ILBP (Interpolated Local Binary Pattern or Interpolated LBP). To improve the feature extraction and reduce the error, use a cascading technique for the feature extraction. RSO also helps to efficiently optimize the DCNN features from the images. Finally, the extracted image is classified using the Efficient Net classifier, which performs a global average summary and classification of ovarian cancer (normal and abnormal). The system's performance is implemented on the Cancer Genome Atlas Ovarian Cancer (TCGA-OV) dataset. The system's performance, like sensitivity, specificity, accuracy and error rates, shows better with respect to other techniques.

Author 1: Arathi B Author 2: Shanthini A

Keywords: Ovarian cancer; deep convolutional neural network rat swarm optimization; CT image; joint feature; efficient net; improved non-local means; interpolated local binary pattern

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Paper 36: Big Data and Internet of Things Web Service Management to Support Salt Agriculture Automation

Abstract: The integration of the internet of things in the information system application service web platform implemented in the supply chain has given rise to new formats and models, which are important manifestations of industry transformation and improvement. In the context of implementing long-term rural development plans, deep integration of the application of information technology and rural revitalization will act as a trigger that drives productivity and the development of other village business industries. The purpose of this research is to build a web service management model that can be used to manage and help optimize IoT-based salt farming production. The model built consists of software and hardware architectures and interconnections between tools. This research is divided into three stages: the first stage is to identify the data sources needed for big data needs, the second stage is to build a big data microservices model and the IoT model, the third stage is to integrate IoT data with the big data microservices model that has been built. The results of this study are in the form of an IoT device that can be run with big data micro services. The resulting IoT device can be used to automate water distribution

based on the salinity value measured using a sensor.

Author 1: Muhammad Choirul Imam

Author 2: Dedi Trisnawarman

Author 3: Hugeng

Author 4: Hetty Karunia Tunjung Sari

Keywords: Web service; big data; salt; IoT

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Paper 37: Recognition of Copy Move Forgeries in Digital Images using Hybrid Optimization and Convolutional Neural Network Algorithm

Abstract: In the modern day, protecting data against tampering is a significant task. One of the most common forms of information display has been digital photographs. Images may be exploited in a variety of contexts, including the military, security applications, intelligence areas, legal evidence, social media, and journalism. Digital picture forgeries involve altering the original images with strange patterns, which result in variability in the image's characteristics. Among the most challenging forms of image forgeries to identify is Copy Move Forgery (CMF). It occurs by copying a portion or piece of the picture and then inserting it again, but in a different place. When the actual content is unavailable, techniques for detecting fake content have been utilised in image security. This study presents a novel method for Copy Move Forgery Recognition (CMFR), which is mostly based on deep learning (DL) and hybrid optimization. The hybrid Grey Wolf Optimization and African Buffalo Optimization (GWO-ABO) using Convolution Neural Network (CNN) technique i.e., GWO-ABO-CNN is the foundation of the suggested model. The developed model extracts the features of images by convolution layers, and pooling layers; hereafter, the features are matched and detect CMF. The MICC-F220, SATs-130, and MICC-F600 datasets were three publicly accessible datasets to which this methodology has been implemented. To assess the model's efficacy, the outcomes of implementing the GWO-ABO-CNN model were contrasted with those of other approaches.

Author 1: Anna Gustina ZainalAuthor 2: Chamandeep KaurAuthor 3: Mohammed Saleh Al AnsariAuthor 4: Ricardo Fernando Cosio BordaAuthor 5: A. NageswaranAuthor 6: Rasha M. Abd El-Aziz

Keywords: Copy move forgery; convolutional neural network; image authentication; deep learning; tampered images DOWNLOAD PDF

Paper 38: Event Detection and Classification Using Deep Compressed Convolutional Neural Network

Abstract: Recently, the number of different kinds of events on social media platforms show a tremendous increase in each second. Hence, event detection holds a very important role in the current scenario. However, event detection is challenging in information technology (IT). Several machine learning-based approaches are established for the event detection process, but it generates a

high error and makes various information loss, affecting the system's performance. Thus, the proposed work introduces a new detection strategy based on a deep learning architecture. In this, both text and image data are utilized for event detection. The different procedures for image and text databases are pre-processing, extraction and classification. The text data is pre-processed using four methods: lower case filter, tokenization, stemming, and stop word filter. An adaptive median filter (AMF) is utilized for preprocessing the image data. After the pre-processing stage, feature extraction is performed for text and image-based data in which most useful features are extracted. Finally, the varied events are detected and classified using the proposed Deep Compressed Convolutional Neural Network (DCCNN). The entire work is implemented using the PYTHON platform. The efficiency of the proposed model is measured by evaluating the performance metrics such as accuracy, recall, precision and F-measure. The simulation validation exhibits that the proposed classification method attains an improved accuracy of 97.1%, obtained precision is about 95.06%, recall value is 91.69%, and f-measure is 93.35%. The efficacy of the proposed deep learning method is proved by comparing the attained results with various state-of-the-art techniques.

Author 1: K. Swapnika

Author 2: D. Vasumathi

Keywords: Event detection; erosion; dilation; deep learning; deep compressed convolutional neural network; hashing; median filter **DOWNLOAD PDF**

Paper 39: Estimation of Transmission Rate and Recovery Rate of SIR Pandemic Model Using Kalman Filter

Abstract: COVID-19 is a global pandemic that significantly impacts all aspects. The number of victims who died makes this disease so terrible. Various policies continue to be pursued to reduce the spread and impact of COVID-19. The spread of a disease can be modeled in differential equation modeling. This differential equation modeling is known as the SIR Model. A differential equation can be expressed in a state-space model. The state-space model is a model that is widely used to design a modern control system. This research carried out the transmission rate and recovery rate estimates in the SIR pandemic model. Estimation of the transmission rate and recovery rate in this study poses a challenge to the value of the number of people confirmed as infected. The experimental result shows that the transmission and recovery rates can be estimated using the data for the infected and recovered persons. Estimates of infected and recovered people were conducted using the Kalman Filter.

Author 1: Wahyu Sukestyastama Putra

Author 2: Afrig Aminuddin

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Author 4: Rakhma Shafrida Kurnia

Author 5: Ika Asti Astuti

Keywords: Kalman filter; pandemic; SIR model

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Abstract: Most real-world datasets contaminated by quality issues have a severe effect on the analysis results. Duplication is one of the main quality issues that hinder these results. Different studies have tackled the duplication issue from different perspectives. However, revealing the sensitivity of supervised and unsupervised learning models under the existence of different types of duplicates, deterministic and probabilistic, is not broadly addressed. Furthermore, a simple metric is used to estimate the ratio of both types of duplicates regardless of the probability by which the record is considered duplicate. In this paper, the sensitivity of five classifiers and four clustering algorithms toward deterministic and probabilistic duplicates with different ratios (0% - 15%) is tracked. Five evaluation metrics are used to accurately track the changes in the sensitivity of each learning model, MCC, F1-Score, Accuracy, Average Silhouette Coefficient, and DUNN Index. Also, a metric to measure the ratio of probabilistic duplicates within a dataset is introduced. The results revealed the effectiveness of the proposed metric that reflects the ratio of probabilistic duplicates within the dataset. All learning models, classification, and clustering models are differently sensitive to the existence of duplicates. RF and Kmeans are positively affected by the existence of duplicates which means that their performce increase as the percentage of duplicates increases. Furthermore, the rest of classifiers and clustering algorithms are sensitive toward duplicates existence, especially within high percentage that negatively affect their performance.

Author 1: Menna Ibrahim Gabr

Author 2: Yehia Helmy

Author 3: Doaa S. Elzanfaly

Keywords: Deduplication; deterministic duplicates; probabilistic duplicates; supervised learning models; unsupervised learning models; evaluation metrices

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Paper 41: A Hybrid Optimization Approach with Deep Learning Technique for the Classification of Dental Caries

Abstract: Due to the wealth of data available from different radiographic images, detecting dental caries has traditionally been a difficult undertaking. Numerous techniques have been developed to enhance image quality for quicker caries detection. For the investigation of medical images, deep learning has emerged as the preferred methodology. This study provides a thorough examination of the application of deep learning to object detection, segmentation, and classification. It also examines the literature on deep learning-based segmentation and identification techniques for dental images. To identify dental caries, several techniques have been used to date. However, these techniques are inefficient, inaccurate, and unable to handle a sizable amount of datasets. There is a need for a way that can get around these issues since the prior methods failed to do so. In the domains of medicine and radiology, deep convolutional neural networks (CNN) have produced amazing results in predicting and diagnosing diseases. This new field of healthcare research is developing quickly. The current study's objective was to assess the effectiveness of deep CNN algorithms for dental caries detection and diagnosis on radiographic images. The Convolutional Neural Network (CNN) method, which is based on artificial intelligence, is used in this study to introduce hybrid optimal deep learning, which offers superior performance.

Author 3: Araddhana Arvind Deshmukh

Author 4: K. V. Daya Sagar

Author 5: Mohammed Saleh Al Ansari

Author 6: Ahmed I. Taloba

Keywords: Dental caries; deep learning; convolutional neural network

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Paper 42: FDeep: A Fog-based Intrusion Detection System for Smart Home using Deep Learning

Abstract: Smart Home is an application of the Internet of Things (IoT) that connects smart appliances and the Internet. The emergence of Smart Home has caused many security and privacy risks that can lead to fatal damages to the user and his property. Unfortunately, Intrusion detection systems designed for conventional networks have shown their inefficiency when deployed in Smart Home environments for many reasons that rely basically on the resources-constrained devices and their inherent intermittent connectivity. So, an intrusion detection system designed for IoT and particularly Smart Home is mandatory. On the other hand, Deep learning shows its potential in enhancing the performance of Intrusion Detection Systems. According to recent studies, Deep learning-based intrusion detection systems are deployed either on the devices or in the Cloud. However, Deep learning models are greedy in terms of resources which makes it challenging to deploy them on Smart Home devices. Besides, in the IoT architecture, the IoT layer is far from the Cloud layer which may cause additional latency and jitter. To overcome these challenges, a new intrusion detection system for Smart Home deployed in the Fog Layer is proposed, it is called FDeep. FDeep will inspect the traffic using a Deep Learning model. To select the most accurate model, three Deep Learning models are trained using an IoT dataset named TON/IIOT, also the proposed models are compared to an existing one. The obtained results show that the long short-term memory model combined with the convolutional neural networks outperforms the other three models. It has the best detection accuracy compared to other Deep Learning models.

Author 1: Tahani Gazdar

Keywords: Fog computing; smart home; deep learning; IDS; classification **DOWNLOAD PDF**

Paper 43: A Novel Approach to Cashew Nut Detection in Packaging and Quality Inspection Lines

Abstract: YOLO standing for You Only Look Once is one of the most famous algorithms in computer vision used for detecting objects in a real-time environment. The newest version of this algorithm, namely YOLO with the seventh version or YOLOv7, is proposed in the present study for cashew nut detection (good, broken and not peeled) in packaging and quality inspection lines. Furthermore, this algorithm using an efficient convolutional neural network (CNN) to be able to successfully detect and identify unsatisfactory cashew nuts, such as chipped or burnt cashews. In order to deal with the quality inspection process, a new dataset called CASHEW dataset has been built at first by collecting cashew images in environments with different brightness and camera angles to ensure the model's effectiveness. The quality

inspection of cashew nuts is tested with a huge number of YOLOv7 models and their effectiveness will also be evaluated. The experimental results show that all models are able to obtain high accuracy. Among them, the YOLOv7-tiny model employs the least number of parameters, i.e. 6.2M but has many output parameters with higher accuracy than that of some other YOLO models. As a result, the proposed approach should clearly be one of the most feasible solutions for the cashew's quality inspection.

Author 1: Van-Hung Pham

Author 2: Ngoc-Khoat Nguyen

Author 3: Van-Minh Pham

Keywords: Cashew; CNN; cashew detection; YOLOv7; computer vision

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Paper 44: Improvement Classification Approach in Tomato Leaf Disease using Modified Visual Geometry Group (VGG)-InceptionV3

Abstract: This paper presents a new method for optimizing tomato leaf disease classification using Modified Visual Geometry Group (VGG)-InceptionV3. Improved performance of VGG-16 model as a base model with InceptionV3 block reduced the number of convolution layers of VGG-16 from 16 to 10 layers, and added an InceptionV3 block that was improved by adding convolution layer from 3 to 4 layers to increase the accuracy of tomato leaf disease classification and reduce the number of parameters and computation time of the model. The experiments were performed on tomato leaves from the PlantVillage dataset of 10 classes, consisting of nine classes of diseased leaves and one class of healthy leaves. The results showed that the proposed method was able to reduce the number of parameters and computation time with and accuracy of tomato leaf disease classification was 99.27%. Additionally, the proposed approach was compared with state-of-the-art Convolutional Neural Network (CNN) models such as VGG16, InceptionV3, DenseNet121, MobileNetV2, and RestNet50. Comparative results showed that the proposed method had the highest accuracy in the tomato leaf disease classification and required a smaller number of parameters and computational time.

Author 1: Jiraporn Thomkaew

Author 2: Sarun Intakosum

Keywords: Modified VGG-InceptionV3; InceptionV3; VGG-16; tomato leaf disease classification

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Paper 45: Deep Neural Network Training and Testing Datasets for License Plate Recognition

Abstract: Modern society has made tremendous progress towards automation to increase the quality of life and reduce the margin of human error. Intelligent transportation systems are a critical aspect of this evolution. The core technology of these systems is the automatic identification of vehicles' license plates to monitor safety and control violations of traffic rules and other crimes. The research on license plate detection and recognition has gone a long way, from traditional computer vision techniques to features (color, shape, text, etc.) based classification and finally to modern deep learning structures. The deep networks comprising hundreds of layers require enormous amounts of training data. The training dataset should contain plates from different countries; otherwise, the system will be specific to only certain types of plates (from a country or province). There are several datasets collected by researchers containing large numbers of license plates from different countries. This paper provides a detailed survey of such datasets available in the public domain. Sample images from each dataset are shown, and details such as the dataset size, size of images, download link, and country of origin are provided. This survey will be a helpful reference for new researchers in the field for the tasks of training new networks and benchmarking their performances.

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Author 2: Saleh M. Alshomrani

Author 3: Muhammad Murtaza Khan

Author 4: Susanto Rahardja

Keywords: License plate recognition; deep neural networks; public datasets

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Paper 46: Prediction of Oil Production through Linear Regression Model and Big Data Tools

Abstract: Fossil fuels, including oil, are the most important sources of energy. They are commonly used in various forms of commercial and industrial consumption. Producing oil is a complex task that requires special management and planning. This can result in a serious problem if the oil well is not operated properly. Oil engineers must have the necessary knowledge about the well's status to perform their duties properly. This study pro-poses a linear regression method to predicate the oil production value. It takes into account various independent variables, such as the pressure, downhole temperature, and pressure tubing. The proposed method can accurately reach a very close prediction of the actual production value by achieving very interesting results at the end of this study.

Author 1: Rehab Alharbi	Author 2: Nojood Alageel

Author 3: Maryam Alsayil

il Author 4: Rahaf Alharbi

Author 5: A'aeshah Alhakamy

Keywords: Big data; machine learning; oil production; regres-sion model; features; prediction; PySpark

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Paper 47: A Comparison of Pathfinding Algorithm for Code Optimization on Grid Maps

Abstract: There have been various pathfinding algorithms created and developed over the past few decades to assist in finding the best path between two points. This paper presents a comparison of several algorithms for pathfinding on 2D grid maps. As a result, this study identified Jump Point Search Block Based Jumping (JPS (B)) as a potential algorithm in term of five evaluation metrics including search time. The comparisons pointed out the potential algorithm and code optimization was performed on the selected JPS(B) algorithm, and it was named JPS(BCO). This paper also explores issues regarding the JPS(B) and how to resolve them in order to optimize access to the index pointer. The presented enhance JPS(BCO) is capable to

search optimal path quicker than the original JPS(B) as demonstrated by experimental findings. An experiment of different size grid maps is conducted to validate the ability of the proposed algorithm in term of search time. The comparative study with original JPS (B) exhibits the enhancement that has more benefits on grid maps of different size in terms of search time.

Author 1: Azyan Yusra Kapi

Author 2: Mohd Shahrizal Sunar

Author 3: Zeyad Abd Algfoor

Keywords: Comparative; jump point search; optimization; pathfinding; path planning DOWNLOAD PDF

Paper 48: Integrating User Reviews and Issue Reports of Mobile Apps for Change Requests Detection

Abstract: There is abundance of mobile Apps released continuously on the App store, where developers are required to maintain these Apps to attain user satisfaction. Developers should consider all user feedback, as they are important resources for planning of next App's release. In order to consider user feedback, many platforms host mobile Apps and allow users to submit their opinions, such as: Google Play App store and Github Open-Source Development platform. The automated consolidation of user feedback from such platforms, and transforming it into a list of change requests would result in satisfying users across different platforms, and their analysis helps developer to reduce cost of time and effort to plan for the new release of the mobile App. In this paper, a framework is proposed which integrates user feedback from different sources and analyzes them using a state-of-art user reviews analysis tool to obtain a list of change requests, such list is further examined for similarity to remove duplicates and prioritize the identified change requests. A prototype is designed to implement the proposed framework and applied to AntennaPod. Consequently, the framework experimentation results show that reviews and issue reports can be analyzed almost equally despite the difference of text's nature.

Author 1: Laila Al-Safoury

Author 2: Akram Salah

Author 3: Soha Makady

Keywords: User review; feedback analysis; mobile app maintenance; text similarity

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Paper 49: Research on Quantitative Security Protection Technology of Distribution Automation Nodes based on Attack Tree

Abstract: In order to improve the security of distribution automation system nodes and ensure the safe operation of distribution network, a quantitative security protection technology for distribution automation nodes based on attack tree is proposed. This paper analyzes the factors of node risk assessment of the distribution automation system, and through the evaluation and analysis of node vulnerabilities; it discovers the faulty nodes in the distribution automation system in advance. Based on the node vulnerability evaluation results of the distribution automation system, the risk of the distribution automation system is comprehensively evaluated using the attack tree. Establish the distribution network control model under network attack, locate the fault node, and use trusted computing technology to design trusted distribution terminals. When the amount of data is large, more effective symmetric encryption algorithm SM4 is required to achieve node security protection in the distribution network automation system. The experimental results show that the method has high fault node location accuracy, low reliability calculation time, and the distribution automation system network has certain robustness, which fully verifies the application effect of the method.

Author 1: Yinfeng HanAuthor 2: Yong TangAuthor 3: Xiaoping KangAuthor 4: Hao JiangAuthor 5: Xiaoyang Song

Keywords: Attack tree; security protection; risk assessment; fault node location; trusted computing; SM4 encryption algorithm DOWNLOAD PDF

Paper 50: Analysis and Detection of Tomatoes Quality using Machine Learning Algorithm and Image Processing

Abstract: Grading of agricultural products methods based on artificial intelligence is more important. Because these methods have the ability to learn and thus increase the flexibility of the system. In this paper, image processing systems, detection analysis methods, and artificial intelligence are used to grade tomatoes, and the success rate of grading these methods is compared with each other. However, the purpose of this study is to obtain a solution to detect appearance defects and grade and sort the tomato crop and provide an efficient system in this field. A visual dataset is created, to investigate the approach of image processing and machine learning based on a tomato image. Tomato models are placed individually under the camera and samples are classified in a lighting box away from the effects of ambient light. Data sets have been used in three types of first, second, and third quality categories. It should be noted that quality category one has the best quality and quality category two has the medium quality and category three has the worst quality, Also, each data class contains 80 samples. Using tomato appearance such as size, texture, color, shape, etc. Image processing is performed for extract features. Tomato images are pre-processed for optimization. Then, to prepare for classification, the dimensions of the images are reduced by principal component analysis (PCA). Three categories of an artificial neural network, a support vector machine, and a decision tree are compared to show the most efficient support machine. The analysis is examined in two classes and three classes. The support vector machine has the best accuracy compared to other methods so this rate is 99.9% for two classes and 99.79% for three classes.

Author 1: Haichun Zuo

Keywords: Machine learning; image processing; product category; tomato quality rating DOWNLOAD PDF

Paper 51: Electricity Theft Detection using Machine Learning

Abstract: This research work dealt with the indiscriminate theft of electric power, reported as a non-technical loss, affecting electric distribution

companies and customers, triggering serious consequences including fires and blackouts. The research focused on recommending the best prediction model using Machine Learning in electrical energy theft. The source of the information on the electricity consumption of 42372 consumers was a dataset published in the State Grid Corporation of China. The method used was data imputation, data balancing (oversampling and under sampling), and feature extraction to improve energy theft detection. Five Machine Learning models were tested. As a result, the accuracy indicator of the SVM model was 81%, K-Nearest Neighbors 79%, Random Forest 80%, Logistic Regression 69%, and Naive Bayes 68%. It is concluded that the best performance, with an accuracy of 81%, is obtained by using the SVM model.

 Author 1: Ivan Petrlik
 Author 2: Pedro Lezama

 Author 3: Ciro Rodriguez
 Author 4: Ricardo Inquilla

 Author 5: Julissa Elizabeth Reyna-González

 Author 6: Roberto Esparza

 Keywords: Energy theft; non-technical losses; machine learning; support vector machine

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Paper 52: Machine Learning for Securing Traffic in Computer Networks

Abstract: Computer network attacks are among the most significant and common threats against computer-wired and wireless communications. Intrusion detection technology is used to secure computer networks by monitoring network traffic and identifying attacks. In this paper, we investigate and evaluate the application of four machine learning classification algorithms for identifying attacks that target computer networks: DDoS, Brute Force Web, and SQL Injection attacks, in addition to Benign Traffic. A public dataset of 80 features was used to build four machine learning models using Random Forest, Logistic Regression, CN2, and Neural Networks. The constructed models were evaluated based on 10-fold cross-validation using Classification Accuracy (CA), Area under the Curve (AUC), F1, Recall, Specificity, and Sensitivity metrics in addition to Confusion Matrix, Calibration, Lift, and ROC plots. The Random Forest model achieved 98% in the CA score and 99% in the AUC score, while the Logistic regression achieved 90% in the CA score and 98% in the AUC score.

Author 1: Ahmed BaniMustafa

Author 2: Mahmoud Baklizi

Author 3: Khalaf Khatatneh

Keywords: Machine learning; data mining; cyber security; computer networks; intrusion detection **DOWNLOAD PDF**

Paper 53: Fish Detection in Seagrass Ecosystem using Masked-Otsu in HSV Color Space

Abstract: Seagrass ecosystems are coastal ecosystems with high species diversity, especially fish. Fish diversity determines the abundance of communities based on the number of species. Detection of fish directly (in-situ)

and conventionally by catching them requires more energy, costs, and relatively needs time. Therefore a computer vision method is needed that can detect fish well using underwater images. The fish detection model used Masked-Otsu Thresholding, HSV color space with closing techniques in morphological operations. The dataset is in the form of 130 underwater images, divided into 80% training data and 20% testing data. The test results showed a model accuracy value of 0.92, Precision value of 0.84, Sensitivity value of 0.93, and F1 Score of 0.88. With these results, the model could detect fish in the seagrass ecosystem.

Author 1: Sri Dianing Asri Author 2: Indra Jaya

Author 3: Agus Buono

Author 4: Sony Hartono Wijaya

Keywords: Fish Detection; HSV color space; masked-otsu thresholding; morphological operation; seagrass ecosystem

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Paper 54: Prioritizing the Factors Affecting the Application of Industry 4.0 Technology in Electrical Appliance Manufacturing using a Fuzzy Analytical Network Process Approach

Abstract: The fourth industrial revolution is a technological advancement that is posing new challenges in manufacturing and services. Industries must adopt innovations to create value-added for their products and services to gain a competitive advantage and increase production efficiency. Therefore, this research aims to study the factors that influence the application of Industry 4.0 technology for managing electrical appliance production by focusing on five major factors: the internet of things, cloud manufacturing, big data analytics, additive manufacturing, and cyber-physical systems, which can be further subdivided into 23 sub-factors. The fuzzy analytic network process (FANP) technique is used to prioritize the factors to develop criteria for selecting appropriate applications of Industry 4.0 technology in manufacturing. Besides, a questionnaire based on the FANP approach is used to collect data from 82 electrical appliance manufacturers to calculate the weight of each factor. Consequently, the Internet of Things is ranked first, followed by big data analytics and additive manufacturing. While the results have indicated the importance of sub-factors as data-driven, data collection, tracking, monitoring, and automation, respectively. The benefit of this research is that manufacturers of electrical appliances can use this research as a criterion for implementing Industry 4.0 technology for long-term effectiveness.

Author 1: Apiwat Krommuang

Author 2: Atchari Krommuang

Keywords: Industry 4.0; big data analytics; internet of things; cloud manufacturing; additive manufacturing; cyber-physical systems; fuzzy analytic network process

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Paper 55: The Prediction of Pediatric Outpatient No-Show Visits by Employing Machine Learning Framework

Abstract: Patient no-show for a booked medical appointment is a significant problem that negatively impacts healthcare resource utilization, cost, efficiency, quality, and patient outcomes. This paper developed a machine learning framework to predict pediatric patients' no-shows to medical appointments accurately. Thirty months of outpatient visits data were extracted from data warehouse from January 2017 to July 2019 of the Ministry of National Guard Health Affairs (MNGHA), Saudi Arabia. The researchers retrieved the data from all healthcare facilities in the central region, and more than 100 attributes were generated. The data includes over 100,000 pediatric patients and more than 3.7 million visits. Five machine learning algorithms were deployed, where Gradient Boosting (GB) algorithm outperformed the other four machine learning algorithms: decision tree, random forest, logistic regression, and neural network. The study evaluated and compared the performance of the five models based on five evaluations criteria. GB achieved a Receiver Operating Characteristic (ROC) score of 97.1%. Furthermore, this research paper identified the factors that have massive potential for effecting patients' adherence to scheduled appointments.

Author 1: Abdulwahhab Alshammari

Author 2: Hanoof Alaboodi

Author 3: Riyad Alshammari

Keywords: No-show; machine learning; healthcare medical appointments; predictive analytics

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Paper 56: Principal Component Analysis Based Hybrid Speckle Noise Reduction Technique for Medical Ultrasound Imaging

Abstract: Ultrasound imaging is the safest and most widely used medical imaging technique available today. The main disadvantage of ultrasound imaging is the presence of speckle noise in its images that may obscure pathological changes in the body and makes diagnosis more challenging. Therefore, many techniques were proposed to reduce speckle and improve image quality. Unfortunately, variations of their performance with different scan parameters and due to their methodologies make it hard to choose which one to adopt in clinical practice. In this work, we consider the problem of combining the information from multiple speckle filters and propose the use of principal component analysis to find the optimal set of weights that would retain the most information and hence would better represent the data in the final image. The new technique is implemented to process ultrasound images collected from a research system and the outcomes are compared to the individual techniques and their average using quantitative image quality metrics. The proposed technique has potential for utilization in clinical settings to provide consistently better-quality combined images that may help improve diagnostic accuracy.

Author 1: Yasser M. Kadah

Author 2: Ahmed F. Elnokrashy

Author 3: Ubaid M. Alsaggaf

Author 4: Abou-Bakr M. Youssef

Keywords: Image quality metrics; principal component analysis; speckle reduction; ultrasound imaging DOWNLOAD PDF

Paper 57: Application of Artificial Intelligence-Genetic Algorithms to Select Stock Portfolios in the Asian Markets

Abstract: The paper's main goal is to use a genetic algorithm to find the best stock portfolio that meets the criteria of high return and low risk, allowing

investors to adjust the appropriate proportion for each share. Using the Python programming language based on the Jupyter Notebook engine, this paper introduces a model of six stock portfolios, each of 30 stocks selected with market capitalization and high liquidity criteria of six markets in the Asian region. The results show that the four portfolios created from the markets of Vietnam, Thailand, Philippines, and Singapore meet both the return and risk objectives. The Malaysian market only meets the risk target, but the portfolio's return is not close to the expected ratio. Meanwhile, the Indonesian market outperformed expectations in terms of profits, but high profits come with high risks, so this market carries a concerning level of risk when compared to the profit and loss of other markets. The suggested stock allocation levels for each portfolio are based on the above results. Finally, the author proposes several policy implications related to the management and operation of the market to limit unnecessary price fluctuations of the stock and affect the business model of companies.

Author 1: Luu Thu Quang

Keywords: Artificial intelligence; genetic algorithms; optimal portfolio; Sharpe ratio; Asian stock market

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Paper 58: Automatic Detection of Alzheimer Disease from 3D MRI Images using Deep CNNs

Abstract: Alzheimer's disease (AD), also referred to simply as Alzheimer's, is a chronic neurodegenerative disease that usually starts slowly and worsens over time. It is the cause of 60% to 70% of cases of dementia. In 2015, there were approximately 29.8 million people worldwide with AD. It most often begins in people over 65 years of age as it affects about 6% of people 65 years and older, although 4% to 5% of cases are early-onset Alzheimer's which begin before this. In 2015, researchers have figured out that dementia resulted in about 1.9 million deaths. Continuous efforts are made to cure the disease or to delay its progression. Brain imaging is one of the hottest areas in AD research. Techniques like CT, MRI, SPECT, and PET assist in disease detection and help in excluding other probable causes of dementia. Imaging helps to perceive the intended cause of the disease as well as track the disease through its course. This paper applies Image processing and machine learning techniques combined to MRI brain images to help in detection of AD and classify the case either to MDI or Dementia.

Author 1: Nermin Negied

Author 2: Ahmed SeragEldin

Keywords: Alzheimer detection; brain scanning techniques; MRI scanning; image processing; machine learning DOWNLOAD PDF

Paper 59: Multi-Modal Medical Image Fusion Using Transfer Learning Approach

Abstract: Multimodal imaging techniques of the same organ help in getting anatomical as well as functional details of a particular body part. Multimodal imaging of the same organs can help doctors diagnose a disease costeffectively. In this paper, a hybrid approach using transfer learning and discrete wavelet transform is used to fuse multimodal medical images. As the access to medical data is limited, transfer learning is used for feature extractor and save training time. The features are fused with a pre-trained VGG19 model. Discrete Wavelet Transform is used to decompose the multimodal images in different sub-bands. In the last phase, Inverse Wavelet Transform is used to obtain a fused image from the four bands generated. The proposed model is executed on Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) datasets. The experimental results show that the proposed approach performs better than other approaches and the significance of the obtained fused image is measured using qualitative metrics.

Author 1: Shrida Kalamkar

Author 2: Geetha Mary A

Keywords: Image fusion; discrete wavelet transform; computer vision; inverse wavelet transform

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Paper 60: The Optimal Route Selection Model of Fresh Agricultural Products Transportation Based on Bee Colony Algorithm

Abstract: In order to optimize the distribution route of fresh agricultural products and reduce the distribution cost, the optimal route selection model of fresh agricultural products transportation based on bee colony algorithm is constructed. After establishing the transportation road network model of fresh agricultural products and analyzing the transportation road information, the transportation road network zoning is realized by the dynamic zoning method of transportation road network based on spectral clustering algorithm, taking the unblocked area and congested area as the zoning purpose. Based on the traffic zoning information, the transportation route optimization model of fresh agricultural products with time window is constructed. Solved by bee colony algorithm to obtain the distribution route of fresh agricultural products with the lowest distribution cost and the highest customer satisfaction. The experimental results show that the model can choose the fresh agricultural products distribution route with the lowest distribution cost and the highest customer satisfaction under the two working conditions of smooth traffic and congestion.

Author 1: Qingqing Ren

Keywords: Bee colony algorithm; fresh agricultural products; transportation; optimal route selection; road network model; spectral clustering **DOWNLOAD PDF**

Paper 61: An Enhanced Face Detection System using A Novel FIS-CDNN Classifier

Abstract: A computer application that can detect, track, identify or verify human faces as of an image or video capture utilizing a digital camera is Face Recognition (FR). Few challenges like low-resolution images, aging, uncontrolled pose, illumination changes, and poor lighting conditions are not tackled even though huge advancement has been created in the Face Detection and Recognition (FDR) domain. Utilizing the Modified Tiny Face Detection (MTFD) and Fuzzy Interference System - Convolutional Deep Neural Network (FIS-CDNN) classifier, a Face Recognition System (FRS) was proposed here to tackle all complications. Primarily, Gamma correction - Based Histogram Equalization (GBHE) technique is utilized to augment the image's input in the pre-processing phase. The MTFD was employed to detect the face.

Following that, the features are extracted. The Improved Chehra (IC) landmark extraction method was employed to retrieve the landmark features. And finally, the Geometric Features (GFs) are extracted. Later, the Gaussian - centered Spider Monkey Optimization (GSMO) Algorithm was employed to choose the vital features. To recognizing the face, the chosen features are fed into the FIS-CDNN classifier. When analogized to the prevailing models, it is concluded via the experiential outcomes that higher accuracy was attained by the proposed method.

Author 1: Santhosh S Author 2: S. V. Rajashekararadhya

Keywords: Gamma correction - based histogram equalization (GBHE) technique; modified tiny face detection method (MTFD); Improved Chehra (IC) landmark extraction method; Gaussian-based Spider Monkey Optimization (GSMO) Algorithm; fuzzy interference system-convolutional deep neural network (FIS-CDNN) classifier

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Paper 62: Performance Analysis of Machine Learning-based Detection of Sinkhole Network Layer Attack in MANET

Abstract: This paper proposes an Intrusion Detection System (IDS) against Sinkhole attacks in Mobile Adhoc Networks (MANET) with mobile sinks. A sinkhole attack is where a hacked node advertises a false routing update to draw network traffic. One effect of a sinkhole attack is that it may be used to launch further attacks, such as drops or changed routing information. Sinkhole nodes attempt to forge the source-destination routes to attract the surrounding network traffic. For this purpose, they modify routing control packets to publish fake routing information that makes sinkhole nodes appear as the best path to some destinations. Several machine learning techniques, including Decision Tree (DT), K-Nearest Neighbor (KNN), Convolution neural network (CNN), and Support Vector Machine (SVM), are used to do the categorization. Furthermore, the MANET's node's characteristics, particularly speed, are used for feature extraction. Totally 3997 unique samples, including 256 malicious samples and 3604 normal samples are collected. The categorization results demonstrate the accuracy of DT, KNN, CNN, and SVM at 98.4%, 96.7%, 98.6%, and 97.8%, respectively. The CNN approach is more accurate than other methods, at 98.6%, based on the data. After that, Priority, SVM, KNN, and CNN, in that order, each denotes excellent accuracy.

Author 1: Sivanesan N

Author 2: K. S. Archana

Keywords: Sinkhole; machine learning; MANET; intrusion detection **DOWNLOAD PDF**

Paper 63: Friendly Group Architecture for Securely Promoting Selfish Node Cooperation in Wireless Ad-hoc Network

Abstract: Wireless Ad-hoc Network is characterized by a decentralized communication scheme with self-configuring nodes which has witnessed a wide range of practical wireless applications. However, this characteristic also results in various security threats in vulnerable wireless environment irrespective of presence of various routing protocols. Review of existing literature shows that there is very less emphasis towards securing Dynamic Source Routing (DSR) while majority of solutions uses encryption-based operation. Therefore, this manuscript introduces a novel non-encryption-based

scheme called as Friendly Group Architecture which intends to identify the presence of selfish node followed by presenting a method to promote the secure cooperation of it. The complete modelling is analytically designed using probability-based computation and dynamic thresholding. The simulation outcome carried out in MATLAB exhibits that it outperforms existing system with respect to energy, overhead, and security.

Author 1: Rajani K C

Author 2: Aishwarya P

Author 3: Manjunath S

Keywords: Wireless Adhoc network; selfish node; DSR; reactive; security **DOWNLOAD PDF**

Paper 64: Implementation of Fuzzy Expert System on Skin Diseases

Abstract: Skin diseases are a group of diseases affecting people of all ages, commonly caused by fungi, bacteria, parasites, viruses, and infections. The disease's main symptoms are usually itching all over the skin. Many patients are often underestimated and embarrassed to consult directly with doctors, which in the end, ignores the symptoms of skin diseases. Since they usually have imprecision symptoms, examining skin diseases is complex and challenging. Recently, many efforts have been made to utilize artificial intelligence approaches for diagnosing various diseases based on the patient's condition. This paper aims to develop a novel fuzzy-based medical expert system based on unprecise existing symptoms. The system uses the specialist Doctor's knowledge (dermatologist) to diagnose and provide the patient's severity level for the disease. We have done numerical experiments using 100 (one hundred) test problems to evaluate the performance of the developed system by comparing the result with the recommendations of doctors (dermatologists). It shows that this system succeeds in all tests with an accuracy value of 95.6%. Thus, this system is very beneficial to support doctors in the assessment of skin diseases.

Author 1: Admi Syarif Author 2: Mayda B Fauzi

Author 3: Aristoteles

hor 3: Aristoteles

Author 4: Agus Wantoro

Keywords: Artificial intelligence; expert system; fuzzy logic; skin disease

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Paper 65: Dual U-Net with Resnet Encoder for Segmentation of Medical Images

Abstract: Segmentation of medical images has been the most demanding and growing area currently for analysis of medical images. Segmentation of polyp images is a huge challenge because of the variability of color depth and morphology in polyps throughout colonoscopy imaging. For segmentation, in this work, we have used a dataset of images of the gastrointestinal polyp. The algorithms used in this paper for segmentation of gastrointestinal polyp images depend on profound deep convolutional neural network architectures: FCN, Dual U-net with Resnet Encoder, U-net, and Unet_Resnet. To improve the performance, data augmentation is performed on the dataset. The efficiency of the algorithms is measured by using metrics such as Dice Similarity Coefficient (DSC) and Intersection Over Union (IOU). The algorithm Dual U-net with

Resnet Encoder obtains a higher DSC of 0.87 and IOU of 0.80 and beats the other algorithms U-net, FCN, and Unet_Resnet in segmentation of gastrointestinal polyp images.

Author 1: Syed Qamrun Nisa

Author 2: Amelia Ritahani Ismail

Keywords: Segmentation; Medical Images; Deep Convolutional Neural Network; FCN; U-net; Unet_Resnet; Dual U-net with Resnet Encoder DOWNLOAD PDF

Paper 66: Rapid Modelling of Machine Learning in Predicting Office Rental Price

Abstract: This study demonstrates the utilization of rapid machine learning modelling in an essential case of the real estate industry. Predicting office rental price is highly crucial in the real estate industry but the study of machine learning is still in its infancy. Despite the renowned advantages of machine learning, the difficulties have restricted the inexpert machine learning researchers to embark on this prominent artificial intelligence approach. This paper presents the empirical research results based on three machine learning algorithms namely Random Forest, Decision Tree and Support Vector Machine to be compared between two training approaches; split and cross-validation. AutoModel machine learning has accelarated the modelling tasks and is useful for inexperienced machine learning researchers for any domain. Based on real cases of office rental in a big city of Kuala Lumpur, Malaysia, the evaluation results indicated that Random Forest with cross-validation was the best promising algorithm with 0.9 R squared value. This research has significance for real estate domain in near future, by applying a more in-depth analysis, particularly on the relevant variables of building pricing as well as on the machine learning algorithms.

Author 1: Thuraiya Mohd

Author 2: Muhamad Harussani

Author 3: Suraya Masrom

Keywords: Random forest; decision tree; support vector machine; rapid prediction modelling; office rental price

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Paper 67: Hybrid Modeling to Classify and Detect Outliers on Multilabel Dataset based on Content and Context

Abstract: Due to the linked various matching categories, news article categorization are a rapidly increasing field of interest in text classification. However, the low-reliability indices and ambiguities related to frequently used province classifiers restrict success in this field. Most of the existing research uses traditional machine learning algorithms. It has weaknesses in training large-scale datasets, and data sparseness often occurs from short texts. Therefore, this study proposed a hybrid model consisting of two models, namely the news article classification and the outlier detection model. The news article classification model used a combination of two deep learning algorithms (Long Short-Term Memory dan Convolutional Neural Network) and outlier classifier model, which was intended to predict the outlier news using a decision tree algorithm. The proposed model's performance was compared against two widely used datasets. The experimental results provide useful insights that open the way for a number of future initiatives.

Author 1: Lusiana Efrizoni

Author 2: Sarjon Defit

Author 3: Muhammad Tajuddin

Keywords: News article classification; machine learning; outlier detection **DOWNLOAD PDF**

Paper 68: Web based Mitosis Detection on Breast Cancer Whole Slide Images using Faster R-CNN and YOLOv5

Abstract: Histological grading quantifies the tumor architecture and the cytology deviation of breast cancer against normal tissue. Nottingham Grading System grades the breast cancer classification and allots tumor scores. Mitotic detection is one of the major components in the Nottingham Grading System. Using a conventional microscope is time-consuming, semi-quantitative and has limited histological parameters. Digital scanners scan the tissue slice into high-resolution virtual images called whole slide images. Deep learning models on whole slide images provide a fast and accurate quantitative diagnosis. This paper proposes two deep learning models namely Faster R-CNN and YOLOv5 to detect mitosis on WSI. The proposed Deep Learning models uses 56258 annotated tiles for training/testing and provide F1 score as 84%. The proposed model uses a web-based imaging analysis and diagnosis platform called CADD4MBC for image uploading, Annotation and visualization. This paper proposes an end-to-end web based Deep Learning detection for Breast Cancer Mitosis.

Author 1: Rajasekaran Subramanian

Author 2: R. Devika Rubi

Author 3: Rohit Tapadia

Author 4: Katakam Karthik

Author 5: Mohammad Faseeh Ahmed

Author 6: Allam Manudeep

Keywords: Nottingham grading system; breast cancer biomarker; whole slide image; mitosis; faster R-CNN; YOLOv5

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Paper 69: A Novel Compound Feature based Driver Identification

Abstract: In today's world, it is time to identify the driver through technology. At

present, it is possible to find out the driving style of the drivers from every car through controller area network (CAN-BUS) sensor data which was not possible through the conventional car. Many researchers did their work and their main purpose was to find out the driver driving style from end-to-end analysis of CAN-BUS sensor data. So, it is potential to identify each driver individually based on the driver's driving style. We propose a novel compound feature-based driver identification to reduce the number of input attributes based on some mathematical operation. Now, the role of machine learning in the field of any type of data analysis is incomparable and significant. The stateof-the-art algorithms have been applied in different fields. Occasionally these are tested in a similar domain. As a result, we have used some prominent algorithms of machine learning, which show different results in the field of aspiration of the model. The other goal of this study is to compare the conspicuous classification algorithms in the index of performance metrics in driver behavior identification. Hence, we compare the performance of SVM, Naïve Bayes, Logistic Regression, k-NN, Random Forest, Decision tree, Gradient boosting.

Author 1: Md. Abbas Ali Khan	Author 2: Mohammad Hanif Ali
Author 3: AKM Fazlul Haque	Author 4: Md. Iktidar Islam

Author 5: Mohammad Monirul Islam

Keywords: Compound feature; driver behavior identification; engine speed; fuel consumption; vehicle

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Paper 70: BrainNet-7: A CNN Model for Diagnosing Brain Tumors from MRI Images based on an Ablation Study

Abstract: Tumors in the brain are masses or clusters of abnormal cells that may spread to other tissues nearby and pose a danger to the patient. The main imaging technique used to determine the extent of brain tumors is magnetic resonance imaging, which ensures an accurate diagnosis. A sizable amount of data for model training and advances in model designs that provide better approximations in a supervised environment likely account for most of the growth in Deep Learning techniques for computer vision applications. Deep learning approaches have shown promising results for increasing the precision of brain tumor identification and classification precision using magnetic resonance imaging (MRI). This study's purpose is to describe a robust deeplearning model that categorizes brain tumors using MRI images into four classes based on a convolutional neural network (CNN). By removing artefacts, reducing noise, and enhancing the image, unwanted areas of brain tumors are deleted, quality is improved, and the tumor is highlighted. Several CNN architectures, including VGG16, VGG19, MobileNet, MobileNetV2, and InceptionV3, are investigated to compare or get the best model. After getting the best model, a hyper parameter ablation study was performed on that model. Proposed BrainNet-7 achieved the best results with 99.01% test accuracy and 99.21% test and validation accuracy.

Author 1: Md Harun or Rashid

Author 2: Salma Akter

Author 3: Amatul Bushra Akhi

Keywords: MRI image; image pre-processing; transfer-learning; CNN; brainnet-7

Paper 71: Research on Real-time Monitoring of Video Images of Traffic Vehicles and Pedestrian Flow using Intelligent Algorithms

Abstract: The development of urbanization has brought many traffic problems, among which the delayed feedback of traffic flow and people flow has led to traffic congestion. In order to effectively analyze the traffic flow and people flow on the traffic road, this research proposes a traffic surveillance video image object detection model based on the improved Vibe algorithm, and uses the moving historical image to track the traffic flow and people flow. Finally, the performance analysis of the algorithm shows that the loss rate of the improved Vibe algorithm proposed in the study is only 0.25%, and its detection accuracy reaches 91.25%. The above results show that the use of Vibe intelligent algorithm can significantly improve the detection effect of traffic flow and pedestrian flow in traffic monitoring video, help to improve urban traffic management ability and promote the development of urban modernization.

Author 1: Xiujuan Dong

Author 2: Jianping Lan

Author 3: Wenhuan Wu

Keywords: Urban development; object detection; traffic video; Vibe algorithm; visitors flowrate; image filtering **DOWNLOAD PDF**

Paper 72: Towards an Accurate Breast Cancer Classification Model based on Ensemble Learning

Abstract: Breast cancer (BC) is considered the most common cancer among women and the major reason for the increased death rate. This condition begins in breast cells and may spread to the rest of the body tissues. The early detection and prediction of BC can help in saving a patient's life. In the last decades, machine learning (ML) has played a significant role in the development of models that can be used to detect and predict various diseases at an early stage, which can greatly increase the survival rate of patients. The importance of ML Classification is attributed to its capability to learn from previous datasets, detects patterns that are difficult to comprehend in massive datasets, predicts a categorical variable within a predefined example and provide accurate results within a short amount of time. Feature selection (FS) method was used to reduce the data dimensionality and choose the optimal feature set. In this paper, we proposed a stacking ensemble model that can differentiate between malignant and benign BC cells. A total of 25 different experiments have been conducted using several classifiers, including logistic regression (LR), decision tree (DT), linear discriminant analysis (LDA), K-nearest neighbor (KNN), naive Bayes (NB), and support vector machine (SVM). In addition to several ensembles, the classifiers included random forest (RF), bagging, AdaBoost, voting, and stacking. The results indicate that our ensemble model outperformed other state-of-the-art models in terms of accuracy (98.6%), precision (89.7%), recall, and F1 score (93.33%). The result shows that the ensemble methods with FS have a high improvement of classification accuracy rather than a single method in detecting BC accurately.

Author 3: Amira Rezk

Keywords: Breast cancer; feature selection; classification; machine learning DOWNLOAD PDF

Paper 73: A Deep Learning-based Model for Evaluating the Sustainability Performance of Accounting Firms

Abstract: The harmonious and stable development of society is strongly related to the sustainable development of enterprises. In order to better face the challenges of environmental resources, sustainable development must be included in the development focus of accounting enterprises. The research proposes a performance evaluation model based on deep learning, improves RBMs model on the basis of deep belief network (DBN), improves the accuracy of the model through reverse fine-tuning technology, and effectively combines multiple restricted Boltzmann machines (RBMs) and Softmax classifiers to build a modular multi classification model to complete the sustainable development performance evaluation of accounting enterprises. The performance of RBM fine tuning classifier is higher than that of RBM expression and PCA (Principal Component Analysis) expression, which mainly shows the effectiveness and stability of feature extraction. The network output results of test samples are converted into prediction performance evaluation. The model is evaluated by average precision (AP), average recall (AR), and prediction accuracy. The AP, AR, and prediction accuracy of the proposed method are 86.95%, 89.74%, and 88.29% respectively, which are higher than Softmax classifiers, Back Propagation (BP) neural networks, and DBN based Softmax methods, It shows that this method is superior to other algorithms in the application of performance evaluation model for sustainable development of accounting enterprises, and it is feasible and effective, which is of great significance to the establishment of performance evaluation model for the accounting industry.

Author 1: Cui Hu

Keywords: Deep learning; RBM; performance evaluation; classification accuracy; sustainability DOWNLOAD PDF

Paper 74: A Hierarchical ST-DBSCAN with Three Neighborhood Boundary Clustering Algorithm for Clustering Spatio–temporal Data

Abstract: Clustering Spatio-temporal data is challenging because of the complexity of processing the spatial and temporal aspects. Various enhanced clustering approaches, such as partition-based and hierarchical-based algorithms have been proposed. However, the ST-DBSCAN density-based algorithm is commonly used to process irregularly shaped clusters. Moreover, ST-DBSCAN considers neighborhood parameters as spatial and non-spatial. The preliminary results from our experiments indicate that the ST-DBSCAN algorithm addresses temporal elements less effectively. Therefore, an improvement to the ST-DBSCAN algorithm was proposed by considering three neighborhood boundaries in neighborhood function. This experiment used the El Niño dataset from the UCI repository. The experimental results show that the proposed algorithm increased the performance indices by 27% compared to existing approaches. Further improvement using the hierarchical Ward's method (with thresholds of 0.3 and 0.1) reduced the number of clusters from 240 to 6 and increased performance indices by up to 73%. It can be concluded

that ST-HDBSCAN is a suitable clustering algorithm for Spatio-temporal data.

Author 1: Amalia Mabrina Masbar Rus

Author 2: Zulaiha Ali Othman

Author 3: Azuraliza Abu Bakar

Author 4: Suhaila Zainudin

Keywords: Data mining; hierarchical clustering; density-based clustering; spatio-temporal clustering

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Paper 75: Research on Asymmetry of Two-Queue Cycle Query Threshold Service Polling System

Abstract: Based on establishing the mathematical model of the system provided system parameters, using the discrete-time Markov chain and a function set by a non-negative integer random variable as Probabilistic methods, discrete time variable, two-queue different gated polling system has been fully analyzed, the low- and higher-order properties and cycle period of the system are deduced, and average queue pair length and average waiting delay for message packets are calculated accurately. The simulation experiments agree well with the theoretical calculations. The analysis further deepens the cognition of the asymmetric threshold polling system, lays a foundation for researches on the asymmetric threshold polling system, and has positive significance for a better and more flexible control periodic query polling work system.

Author 1: Man Cheng

Author 2: Dedu Yin

Author 3: Xinchun Wang

Keywords: Discrete time query; asymmetric two-queue; threshold service; second-order characteristic quantity; information packets average delay

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Paper 76: Transformer-based Cross-Lingual Summarization using Multilingual Word Embeddings for English - Bahasa Indonesia

Abstract: Cross-lingual summarization (CLS) is a process of generating a summary in the target language from a source document in another language. CLS is a challenging task because it involves two different languages. Traditionally, CLS is carried out in a pipeline scheme that involves two steps: summarization and translation. This approach has a problem, it introduces error propagation. To address this problem, we present a novel end-to-end abstractive CLS without the explicit use of machine translation. The CLS architecture is based on Transformer which is proven to be able to perform text generation well. The CLS model is a jointly trained CLS task and monolingual summarization (MS) task. This is accomplished by adding a second decoder to handle the MS task, while the first decoder handles the CLS task. We also incorporated multilingual word embeddings (MWE) components into the architecture to further improve the performance of the CLS models. Both English and Bahasa Indonesia are represented by MWE whose embeddings have already been mapped into the same vector space. MWE helps to better map the relation between input and output that use different languages. Experiments show that the proposed model achieves improvement up to

+0.2981 ROUGE-1, +0.2084 ROUGE-2, and +0.2771 ROUGE-L when compared to the pipeline baselines and up to +0.1288 ROUGE-1, +0.1185 ROUGE-2, and +0.1413 ROUGE-L when compared to the end-to-end baselines.

Author 1: Achmad F. Abka

Author 2: Kurniawati Azizah

Author 3: Wisnu Jatmiko

Keywords: Cross-lingual summarization; multilingual word embeddings; transformer; automatic summarization

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Paper 77: Analysis of Content Based Image Retrieval using Deep Feature Extraction and Similarity Matching

Abstract: Image retrieval using a textual query becomes a major challenge mainly due to human perception subjectivity and the impreciseness of image annotations. These drawbacks can be overcome by focusing on the content of images rather than on the textual descriptions of images. Traditional feature extraction techniques demand for expert knowledge to select the limited feature types and are also sensitive to changing imaging conditions. Deep feature extraction using Convolutional Neural Network (CNN) are a solution to these drawbacks as they can learn the feature representations automatically. This work carries out a detailed performance comparison of various pre-trained models of CNN in feature extraction. Features are extracted from men footwear and women clothing datasets using the VGG16, VGG19, InceptionV3, Xception and ResNet50 models. Further, these extracted features are used for classification using SVM, Random Forest and K-Nearest Neighbors classifiers. Results of feature extraction and image retrieval show that VGG19, Inception and Xception features perform well with feature extraction, achieving a good image classification accuracy of 97.5%. These results are further justified by performing a comparison of image retrieval efficiency, with the extracted features and similarity metrics. This work also compares the accuracy obtained by features extracted by the selected pretrained CNN models with the results obtained using conventional classification techniques on CIFAR 10 dataset. The features extracted using CNN can be used in image-based systems like recommender systems, where images have to be analyzed to generate item profiles.

Author 1: Anu Mathews

Author 2: Sejal N

Author 3: Venugopal K R

Keywords: Convolutional neural network; deep learning; feature extraction; accuracy; similarity DOWNLOAD PDF

Paper 78: Emotion Recognition on Multimodal with Deep Learning and Ensemble

Abstract: Emotion Recognition on multimodal dataset is a difficult task, which is one of the most important tasks in topics like Human Computer Interaction (HCI). This paper presents a multimodal approach for emotion recognition on dataset MELD. The dataset contains three modalities, audio, text, and facial features. In this research, only audio and text features will be experimented on.

For audio data, the raw audio is converted into MFCC as an input to a bidirectional LSTM, which will be built to perform emotion classification. On the other hand, BERT will be used to tokenize the text data as an input to the text model. To classify the emotion in text data, a Bidirectional LSTM will be built. And finally, the voting ensemble method will be implemented to combine the result from two modalities. The model will be evaluated using F1-score and confusion matrix. The unimodal audio model achieved 41.69% of F1-score, while the unimodal text model achieved 47.29% of F1-score, and the voting ensemble model achieved 47.47% of F1-score. To conclude this research, this paper also discussed future works, which involved how to build and improve deep learning models and combine them with ensemble model for better performance in emotion recognition tasks in multimodal dataset.

Author 1: David Adi Dharma

Author 2: Amalia Zahra

Keywords: Emotion recognition; deep learning; ensemble method; transformer; natural language processing

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Paper 79: Fault Diagnosis Technology of Railway Signal Equipment based on Improved FP-Growth Algorithm

Abstract: The rapid development of computer information technology has made various fault diagnosis and detection technologies emerge in an endless stream. As one of the main transportation vehicles, the detection efficiency of fault diagnosis of railway signal equipment has important practical significance for maintaining the overall safe operation of railways. On the basis of the traditional FP-Growth algorithm, improve the TF-IDF algorithm to realize the weight discretization of text features, and realize the improvement of the FP-Growth algorithm by adjusting the adaptive confidence and support. The FP-Growth algorithm will be improved. FP-Growth algorithm is used for performance tests and applications. The results show that the minimum running time-saving of the proposed algorithm is 1500ms, and the average accuracy of P@N exceeds 85%, which is higher than that of the FP-Growth algorithm (81.4%) and VSM algorithm (82.1%). The PR curve of the improved algorithm is closer to the upper right, which effectively ensures the processing of correlated data, and the overall average precision performance under the influence of positive and negative signal-to-noise ratio values exceeds 95%. And the signal curve generated by the algorithm. The error range of the data under the four fault types of track circuit, turnout, signal, and connecting line floats between 1% and 5%. The improved FP-Growth algorithm can effectively analyze railway fault types and data. Perform analysis and data processing to minimize diagnostic errors.

Author 1: Yueqin Yang

Keywords: FP-growth algorithm; gailway; signal equipment; fault diagnosis; relevance; frequent itemsets; vector space model

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Paper 80: A Systematic Literature Review: Internet of Things on Smart Greenhouse

Abstract: The Increasing food needs and climate instability require researchers to innovate agriculture using smart greenhouses that are integrated with the Internet of Things (IoT). The Systematic Literature Review (SLR) begins with

determining the topic keywords followed by searching the publisher link. It obtains 301 publications to be reviewed, 58 of which address the research questions posed. This study aims to collect and analyze in depth various knowledge about the Internet of Things Smart Greenhouse regarding sensors, methods used and publishers who publish the most related topics and the possibility of a research gap. The findings are as many as 12 publications that use temperature and humidity sensors and use the research and development methods integrated with Artificial intelligence methods, of which 62.1% do not use the datasets and 37.9% use the datasets. It obtains two possibilities of a research gap, namely improvising the algorithm and the dataset used and placing full control on the microcontroller development board and making IoT a supporting tool.

Author 1: Dodi Yudo SetyawanAuthor 2: WarsitoAuthor 3: Roniyus MarjunusAuthor 4: Nurfiana

Author 5: Rahmalia Syahputri

Keywords: IoT; SLR; Smart greenhouse; agriculture; research gap DOWNLOAD PDF

Paper 81: An Adaptive Texture Enhancement Algorithm for AR Live Screen Based on Approximate Matching

Abstract: In order to improve the visual effect of AR live video detail texture, an adaptive enhancement algorithm based on approximate matching is proposed. According to the local self-similarity of the original image, the best matching block of the initial super-resolution image block is obtained. After extracting its high-frequency information, the improved singular value decomposition (SVD) is used to embed the watermark into the original super-resolution gray image; And through the watermark extraction and reconstruction matrix, the effective high-frequency detail texture information is obtained, then the final super-resolution image is obtained, and the AR live video detail texture enhancement is completed. The experimental results show that the peak signal-to-noise ratio, structure similarity and feature similarity of the algorithm are high, and the reconstruction effect is good; After detail texture enhancement, the detail texture clarity and edge sharpness of AR live picture are better, and the best visual effect is achieved.

Author 1: Panpan Yang

Author 2: Lingfei Ma

Author 3: Chao Yin

Author 4: Yang Ping

Keywords: Approximate matching; AR live; picture details; adaptive; texture enhancement; matrix reconstruction

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Paper 82: Deep Primary and Secondary Fusion Transformer Based on Internet of Things Technology

Abstract: As one of the core equipment of power system, power transformer has great fault influence and complex fault causes. In order to ensure the safe and stable operation of power system, its operation state must be monitored and judged. With the increasing maturity of the Internet industry and the continuous development of sensor technology, the emergence of smart grid has contributed to the realization of intelligent transformer on-line monitoring, condition evaluation and fault diagnosis. This paper studies the deep primary and secondary fusion transformer based on the Internet of Things technology, summarizes the development status of intelligent transformer and its existing problems on the basis of relevant literature, and proposes the optimization technology of deep primary and secondary fusion transformer based on the Internet of Things technology to solve its existing problems, and conducts related experiments and fault detection research on the proposed technology. The experimental results show that this optimization technology has good feasibility, good self-state evaluation and fault diagnosis functions. The deep primary and secondary fusion based on the Internet of Things technology proposed in this study can increase the reliability monitoring of intelligent transformer operation, provide a strong technical guarantee for the normal operation of distribution network, and also provide important technical support for the next research of distribution network technology.

Author 1: Xiaohua ZhangAuthor 2: Yuping WuAuthor 3: Jianjun ChenAuthor 4: Jie DongAuthor 5: Yu Yue

Keywords: Internet of things technology; primary and secondary integration; smart transformer; fault detection

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Paper 83: Research on High Voltage Cable Condition Detection Technology based on Wireless Sensor Network

Abstract: The development and progress of modern society cannot be achieved without the support of electric power resources, and at present, electric power is the most important energy source to promote social development and maintain human life. As a key unit under the power distribution and transmission system, the high-voltage cable of the power grid will undertake the task of supplying power resources to the whole power grid. Therefore, based on the transmission line fault diagnosis framework of Wireless Sensor Networks (WSN), a high-voltage cable path condition monitoring scheme using LoRa technology is proposed. Three high-voltage cable condition monitoring periods are proposed according to the difference of high-voltage cable fault rate, and the delay and energy consumption of the high-voltage cable monitoring system are optimized by multi-objective particle swarm algorithm reality. The experimental results show that the proposed highvoltage cable detection technology can switch the working mode according to different environments, and the data communication packet loss rate is less than 5%, while the detection platform has excellent delay performance and energy saving effect. The high-voltage cable status detection solution can effectively solve the problem of blind high-voltage cable channels in high mountain areas of China. The research content has important reference value for the detection of China's power grid circuit system.

 Author 1: Yang Zhao
 Author 2: Qing Liu

 Author 3: Tong Shang
 Author 4: Yingqiang Shang

 Author 5: Rong Xia
 Author 6: Shuai Shao

Keywords: Wireless sensor; high-voltage cable; fault diagnosis; particle swarm algorithm

Paper 84: Research on the Application of Improved Decision Tree Algorithm based on Information Entropy in the Financial Management of Colleges and Universities

Abstract: In the era of information technology, the work relies on information technology to generate a huge amount of data and information. Among them, the financial data information of universities is growing exponentially, and the manual method of organizing data and extracting key information can no longer meet the requirements of financial data management of universities. Taking the financial management of higher education institutions as an example, it is difficult to grasp the progress of financial budget execution with frequent and complicated daily expenditure and income problems, and then it is difficult to execute correct decisions in the management. The study uses information entropy as the decision basis of decision tree in the financial management of higher education institutions. The higher the value of information entropy generated in financial management, the higher the prediction accuracy of the decision tree. The metric calculation method is introduced to obtain the information entropy as well as the information gain rate to predict the likelihood of problematic events. The study validates the performance of the improved decision tree with a dataset that achieves a maximum accuracy of 95% in the experiment. With the higher prediction accuracy, for the university financial management system, a decision tree for financial warning is established and the link between the current month's financial expenditure and the warning mechanism is analyzed, and finally the two common decision tree algorithms, (Iterative Dichotomiser3, ID3) ID3 and (Classification and regression tree, CART) CART, are compared with the algorithm proposed in the study. The mean square error and the sum of squared error metrics are used to conclude that the algorithm proposed in the study has better performance. By improving the existing decision tree algorithm, the study proposes a decision tree model based on information entropy, which aims to help decision makers to quickly and accurately distill relevant data and make correct decisions in a large amount of information data for more rational financial management.

Author 1: Huirong Zhao

Keywords: Information entropy; financial management; decision tree; information gain rate; C4.5 algorithm; early warning structure **DOWNLOAD PDF**

Paper 85: A Semantic NoSQL Application Program Interface for Big Data

Abstract: Complexity, heterogeneity, schemaless-ness, data visualization, and extraction of consistent knowledge from Big Data are the biggest challenges in NoSQL databases. This paper presents a general semantic NoSQL Application Program Interface that integrates and converts NoSQL databases to semantic representation. The generated knowledge base is suitable for visualization and knowledge extraction from different Big Data sources. The authors use a case study of the COVID-19 pandemic prediction and other weather occurrences in various parts of the world to illustrate the suggested API. The Authors find a correlation between COVID-19 spread and deteriorating weather. According to the experimental findings, the API's performance is enough for heterogeneous Big Data.

Author 1: K. ElDahshan

Author 3: H. Mancy

Author 4: A. AbuBakr

Keywords: NoSQL database; formatting; semantic technology; data integration; pandemic prediction **DOWNLOAD PDF**

Paper 86: Big Data Application in Forecasting Financial Investment of e-Commerce Industry for Sustainability

Abstract: With the rapid development of e-commerce, financial investment forecasting in the e-commerce industry has gradually become a concern of relevant personnel. Based on DBN, the study proposes a PVD prediction model. For training and test sample sets, the PLR_VIP algorithm is calculated and min-max normalization is applied to the original financial time series. To determine appropriate network parameters, the DBN network is trained and tested, and then Elliott wave patterns are predicted based on financial time series. The experimental results show that the MSE of the PVD model is 0.4015 and the prediction accuracy is 70.21%, indicating that it can efficiently and accurately identify the Elliott wave pattern of financial time series. Comparing the prediction results of the PVD model with the other five models, the values of the four evaluation indicators of PVD are the lowest among all models, which are 0.6336, 0.4015, 0.9052, and 29.79%, respectively. Compared with the training error changes of other models, it can be seen that the error curve of the DBN network is smoother and the training error is smaller. It shows that it has higher stability, faster convergence speed, higher reliability and accuracy, and shows excellent prediction performance, which is significantly better than other models. Experiments show that under the background of sustainable development, the PVD forecasting model proposed in the study performs well in financial investment forecasting, which provides a reference for the development of financial investment forecasting in the e-commerce industry.

Author 1: Yanfeng Zhang

Keywords: Stainable development; big data; E-commerce industry; financial investment forecast; deep belief network DOWNLOAD PDF

Paper 87: Embedded Monitoring Method of Greenhouse Environment based on Wireless Sensor Network

Abstract: Aiming at the problem of low accuracy of greenhouse environmental monitoring, an embedded monitoring method of greenhouse environment based on wireless sensor network is studied. The embedded microprocessor S3C2410 is selected as the control chip of greenhouse environmental monitoring. The wireless sensor network is composed of wireless detection node, sink node and remote-control terminal. The temperature and humidity sensor, CO2 concentration sensor and light intensity sensor are set as the detection nodes of the wireless sensor network. Each detection sensor node is configured with wireless communication module to form a wireless sensor network to realize data communication of environmental monitoring. The distribution map method is selected to eliminate the missing data of greenhouse environmental monitoring data collected by wireless sensor network, and the weighted average method is used to fuse the monitoring data

after eliminating the missing data to obtain the final greenhouse environmental monitoring results. The experimental results show that this method can effectively detect the environmental data such as temperature, humidity and light intensity of greenhouse, and the relative error of each data is less than 1%.

Author 1: Weixue Liu

Keywords: Control chip; Detection node; embedded; greenhouse environmental monitoring; missing data; wireless sensor networks DOWNLOAD PDF

Paper 88: Research on the Application of Virtual Technologybased Posture Detection Device in Swimming Teaching

Abstract: With the socio-economic development, the national demand for playing leisure sports has increased, and swimming is one of the popular choices. To help swimming beginners understand the correct swimming posture more quickly and directly, hybrid neural network algorithms based on sliding window detection and deep residual networks are designed in this study, and two corresponding virtual image classification models of swimmer's posture are designed based on these algorithms. In order to reduce the noise of the input data and reduce the cost of data collection, the virtual reality technology is used to convert the swimmer's swimming pose image into the image model in the virtual reality space as the input data of the algorithm. The performance test experimental results show that the classification accuracy of the swimmer pose recognition models based on PTP-CNN algorithm and SW-CNN algorithm designed in this research are 97.48% and 96.72% respectively on the test set, which are much higher than other comparison models, and the model built based on PTP-CNN algorithm has the fastest computation speed. The results of this research can be applied to assist participants in swimming pose recognition in teaching beginner swimmers.

Author 1: Hongming Guo

Author 2: Jingang Fan

Keywords: Virtual reality; pose recognition; swimming; neural network; sliding window

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Paper 89: Dynamic Force-directed Graph with Weighted Nodes for Scholar Network Visualization

Abstract: Through the growth of portals and venues to publish academic publications, the number of academic publications is growing exponentially in recent years. An effective exploration and fast navigation in the collection of academic publications become an urgent need to help academic researchers find publications related to their research and the surrounding community. A scholar network visualization approach is proposed to help users to explore a large number of academic publications. The approach is realized by creating a web-based interface using D3 JavaScript algorithm that allows the visualization to focus on how data are connected to each other more accurately than the conventional lines of data seen in traditional data representation. The proposed approach visualizes data by incorporating a force-directed graph with weighted nodes and vertices to give more descriptive information of millions of raw data such as author names, publication title, publication year, publication venue and

number of citations from the scholar network dataset. By introducing a weighted relationship in the network visualization, the proposed approach can give a more insightful detail of each publication such as a highly cited publication by looking at and exploring the generated interactive graph. The proposal is targeted to be incorporated into a larger-scale scholar network analytical dashboard that can offer various visualization approaches under one flagship application.

Author 1: Khalid Al-Walid Mohd. Aris

Author 2: Chitra Ramasamy

Author 3: Teh Noranis Mohd. Aris

Author 4: Maslina Zolkepli

Keywords: Force-directed graph; weighted network; citation network; D3 algorithm

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Paper 90: The Role of Machine Learning in Remote Sensing for Agriculture Drought Monitoring: A Systematic Review

Abstract: Agricultural drought is still difficult to anticipate even though there have been developments in remote sensing technology, especially satellite imagery that is useful for farmers in monitoring crop conditions. The availability of open and free satellite imagery still has a weakness, namely the level of resolution is low and coarse with atmospheric disturbances in the form of cloud cover, as well as the location and period for taking images that are different from the presence of weather stations on Earth. This problem is a challenge for researchers trying to monitoring agricultural drought conditions through satellite imagery. One approach that has recently used is high computational techniques through machine learning, which is able to predict satellite image data according to the conditions of mapping land types and plants in the field. Furthermore, using time series data from satellite imagery, a predictive model of crop cycles can be regarding future crop drought conditions. So, through this technology, we can encourage farmers to make decisions to anticipate the dangers of agricultural drought. Unfortunately, exploration of the use of machine learning for classification and prediction of agricultural drought conditions has not conducted, and the existing methods can still improve. This review aims to present a comprehensive overview of methods that used to monitor agricultural drought using remote sensing and machine learning, which are the subjects of future research.

Author 1: Aries Suharso

Author 2: Yeni Hediyeni

Author 3: Suria Darma Tarigan

Author 4: Yandra Arkeman

Keywords: Drought monitoring; exploration of the use of machine learning; Landsat imagery; remote sensing DOWNLOAD PDF

Paper 91: Research on Intellectual Dichotomiser 3 Decision Tree Algorithm Model for Financial Analysis of Colleges and Universities

Abstract: The rapid development of college information construction has promoted the processing and analysis of a large number of data in the college system. Decision tree algorithm is often used in the field of financial data analysis, but it has a bias in the selection of attributes. Aiming at the defects of the decision tree algorithm in attribute selection, ID3 algorithm in the decision tree algorithm is selected for weighted improvement, and it is optimized based on Synthetic Minority Oversampling Technique (SMOTE) algorithm and Bagging algorithm to balance the positive and negative data of its training samples, thus obtaining the DSB-ID3 financial analysis model. Using this model to analyze the financial data of a university, its G value and F value are both about 0.78, the recognition accuracy rate for normal samples is 0.7345, and the total recognition accuracy rate is 0.7893, which are the highest among the four models. Compared with other models, model designed in this study has significantly improved classification performance, and its distribution is the most centralized, showing superior stability. The experimental results show that the classification effect of model designed in this study is the best, and it shows superior accuracy and stability in the analysis of financial data. Its superior classification performance shows the potential of decision tree algorithm optimization and the feasibility and necessity of improving it. From the experimental data, it can be seen that the service life and parameters of the model designed in this study are obviously better than those commonly used in the financial analysis industry of colleges and universities. It can be seen from the overall analysis that this model provides a practical reference for the application of decision tree optimization in college financial analysis, and greatly improves the accuracy of financial system data analysis.

Author 1: Sujuan Guo

Keywords: Financial analysis; ID3; Decision tree; model; colleges and universities; machine learning DOWNLOAD PDF

Paper 92: Clustering-based Automated Requirement Trace Retrieval

Abstract: The benefits of requirement traceability are well known and documented. The traceability links between requirements and code are fundamental in supporting different activities in the software development process, including change management and software maintenance. These links can be obtained using manual or automatic means. Manual trace retrieval is a time-consuming task. Automatic trace retrieval can be performed via various tools such as Information retrieval or machine learning techniques. Meanwhile, a big concern associated with automated trace retrieval is the low precision problem primarily caused by the term mismatches across documents to be traced. This study proposes an approach that addresses the term mismatch problem to obtain the greatest improvements in the trace retrieval accuracy. The proposed approach uses clustering in the automated trace retrieval process and performs an experimental evaluation against previous benchmarks. The results show that the proposed approach improves the trace retrieval precision.

Author 1: Nejood Hashim Al-walidi

Author 2: Shahira Shaaban Azab

Author 3: Abdelaziz Khamis

Author 4: Nagy Ramadan Darwish

Keywords: Requirements traceability; information retrieval; term mismatch problem; trace retrieval; TraceLab; clustering

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Paper 93: Application of Multi-Scale Convolution Neural Network Optimization Image Defogging Algorithm in Image Processing

Abstract: To improve the ability to detect and identify smog images in complex road traffic scenes, smog images need to be defogged, and an optimized image defogging algorithm on the basis of multi-scale convolutional neural network (MCNN) is proposed. The physical model of road traffic scene smog scattering is constructed, and the image is divided sky area, road surface area and road sky boundary area. The road sky boundary line is the boundary line between road surface and sky area. The dark channel of traffic scene smog image is established by Canny edge detection and MCNN optimization, and the smog image is subjected to detail compensation and gray enhancement processing through prior knowledge. After substituting the atmospheric light value and transmittance map into the atmospheric scattering model (ACM), the MCNN learning model is combined to realize the filtering processing and defogging optimization of smog images in complex road traffic scenes. The color saturation, defogging degree, peak signal-to-noise ratio (PSNR), texture effect as well as other aspects of the image are taken as test indexes for the simulation experiment. The simulation results show that the color saturation, defogging degree and image definition of the defogged haze images in complex road traffic scenes are higher by using this method, which improves the output PSNR of the defogged haze images in complex road traffic scenes, and has a good application value in image defogging.

Keywords: Multi-scale convolution neural network; complex road traffic scene; Image defogging; dark passage; Gray enhancement DOWNLOAD PDF

Paper 94: Data Clutter Reduction in Sampling Technique

Abstract: Visualization is a process of converting data into its visual form as such data patterns can be extracted from the data. Data patterns are knowledge hidden behind the data. However, when data is big, it tends to overlap and clutter on visualization which distorts the data patterns. Data is overly crowded on visualization thus, it has become a challenge to extract knowledge patterns. Besides, big data is costly to visualize because it requires expensive hardware facilities due to its size. Moreover, it is timely to plot the data since it takes time for data to render on visualizations. Due to those reasons, there is a need to reduce the size of big datasets and at the same time maintain the data patterns. There are many methods of data reduction, which are preprocessing operations, dimension reduction, compression, network theory, redundancy elimination, data mining, machine learning, data filtering and sampling techniques. However, the commonly used data reduction technique is sampling technique that derives samples from data populations. Thus, sampling technique is chosen as a study for data reduction in this paper. However, the studies are scattered and are not discussed in a single paper. Consequently, the objective of this paper is to collect them in a single paper for further analysis in order to understand them in great detail. To achieve the objective, three interdisciplinary databases which are ACM Digital Library, IEEE Explore and Science Direct have been selected. From the database, a total of 48 studies have been extracted and they are from the years 2017 to 2021. Other than sampling techniques, this paper also seeks information on big data, data visualization, data clutter, and data reduction.

Author 1: Nur Nina Manarina Jamalludin

Author 2: Zainura Idrus	Author 3: Zanariah Idrus

Author 4: Ahmad Afif Ahmarofi

Author 5: Jahaya Abdul Hamid

Author 6: Nurul Husna Mahadzir

Keywords: Sampling technique; probability sampling; non-probability sampling; data clutter; big data; data visualization; data reduction

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Paper 95: Research on the Optimization Problem of Agricultural Product Logistics based on Genetic Algorithm under the Background of Sharing Economy

Abstract: China's national development and reform commission issued the "logistics industry adjustment and revitalization plan" in 2009 to support the development of agricultural product logistics and distribution centers. China's agricultural product logistics and distribution have entered a stage of rapid development. With the rise of the sharing economy, logistics has become a bottleneck restricting the further development of agricultural product distribution. In order to realize the effective cooperation among the main body of agricultural product logistics distribution, improve the distribution efficiency and reduce the distribution cost, a logistics distribution optimization model based on the two-layer planning idea and genetic algorithm is proposed. A twolevel programming model is constructed by combining qualitative and quantitative methods, theory and examples, and insertion and deletion operators are introduced to optimize the genetic algorithm. The research results show that the optimized genetic algorithm has a 54.55% increase in convergence speed, 1.08% in performance, and a 54.231% reduction in path length compared to the benchmark algorithm. It effectively improves the efficiency of path planning and saves the planning cost, and the final target value is reduced by 48.19%.

Author 1: Na Wang

Keywords: Sharing economy; two-level programming; genetic algorithm; path optimization

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Paper 96: Application Research of Trademark Recognition Technology based on SIFT Feature Recognition Algorithm in Advertising Design

Abstract: Now-a-days, due to the sharp increase in the number of advertising designs, creative duplication is easy to occur in advertising design. If this situation is not discovered in time, it may cause legal disputes and cause damage to the reputation and property of the enterprise. In view of the above situation, this paper proposes a trademark recognition technology based on SIFT feature recognition algorithm to avoid duplication of advertisement design and cause copyright disputes. Aiming at the defect that the dimension of the image feature vector extracted by SIFT algorithm is too high, the principal component analysis method is used to reduce its dimension. For the problem of unsatisfactory image recognition rate accuracy of SIFT algorithm, a support vector machine is used to classify the extracted feature vector, so as to improve the image recognition rate. Based on the above content, build a trademark recognition model. The research results show that the recognition accuracy of the model reaches 98.82%, 0.66% and 0.58% higher than that of Model 1 and Model 2; AUC value of model 3 is 0.962, 0.039 higher than model 2 and 0.107 higher than model 1. The above results show that the proposed trademark recognition model can better identify similar advertising designs, thereby avoiding design duplication and legal disputes.

Author 1: Weina Zhang

Sentiment Analysis of Twitter

Keywords: SIFT algorithm; trademark recognition; advertising design; support vector machine; principal component analysis **DOWNLOAD PDF**

Paper 97: Utilizing Deep Learning in Arabic Text Classification

Abstract: The number of social media users has increased. These users share and reshare their ideas in posts and this information can be mined and used by decision-makers in different domains, who analyse and study user opinions on social media networks to improve the quality of products or study specific phenomena. During the COVID-19 pandemic, social media was used to make decisions to limit the spread of the disease using sentiment analysis. Substantial research on this topic has been done; however, there are limited Arabic textual resources on social media. This has resulted in fewer quality sentiment analyses on Arabic texts. This study proposes a model for Arabic sentiment analysis using a Twitter dataset and deep learning models with
Arabic word embedding. It uses the supervised deep learning algorithms on the proposed dataset. The dataset contains 51,000 tweets, of which 8,820 are classified as positive, 37,360 neutral, and 8,820 as negative. After cleaning it will contain 31,413. The experiment has been carried out by applying the deep learning models, Convolutional Neural Network and Long Short-Term Memory while comparing the results of different machine learning techniques such as Naive Bayes and Support Vector Machine. The accuracy of the AraBERT model is 0.92% when applying the test on 3,505 tweets.

Author 1: Nehad M. Ibrahim Author 2: Wael M. S. Yafooz

Author 3: Abdel-Hamid M. Emara

Author 4: Ahmed Abdel-Wahab

Keywords: Arabic sentiment analysis; machine learning; convolutional neural networks; word embedding; Arabic word2Vec; long short-term method; AraBERT DOWNLOAD PDF

Paper 98: Synthesis of Comments to Social Media Posts for Business Applications

Abstract: Responding to enormous comments on social media platforms is one major challenge facing businesses in recent times, especially when dealing with irate consumers. Customers have increasingly adopted social networks as a platform for expressing their concerns and posting comments on business pages, posing a great challenge for customer support agents and digital marketers alike. Analyzing and responding manually to these enormous comments is a time-consuming task, necessitating the adoption of Artificial Intelligence (AI) tool that can complete the task swiftly- automatic comprehension of social media posts for comment generation. In this paper, we present algorithms and a tool for the automatic comprehension of customer tweets and generation of responses to these tweets. This was done in two-fold: using existing Natural Language Processing (NLP) libraries to preprocess and tokenize these tweets, and secondly, using rule-based algorithms to find a matching response to each customer, based on the array of extracted tokens from the customer's tweet. This was built into a tool called Comment-Synthesizer. This tool takes unfiltered tweets as input, preprocesses the tweets, and matches the tweet with predefined responses using a rule-based algorithm with a success rate of 76%. This tool, if implemented in a desktop automation application, can be used to respond automatically to a large volume of customers' social media comments/posts.

Author 1: Peter Adebowale Olujimi

Author 2: Abejide Ade-Ibijola

Keywords: Natural language comprehension; social media; natural language processing; customer engagements; artificial intelligence; comment generation **DOWNLOAD PDF**

Paper 99: PDE: A Real-Time Object Detection and Enhancing Model under Low Visibility Conditions

Abstract: Deep object detection models are important tools that can accurately detect objects and frame them for the user in real time. However, in low visibility conditions, such as fog or low light conditions, the captured images

are underexposed and blurred, which negatively affects the recognition accuracy and is not well visible to humans. In addition, the image enhancement model is complex and time-consuming. Using the image enhancement model before the object recognition model cannot meet the realtime requirements. Therefore, we propose the Parallel Detection and Enhancement model (PDE), which detects objects and enhances poorly visible images in parallel and in real time. Specifically, we introduce the specially designed tiny prediction head along with coordinated attention and multi-stage concatenation modules to better detect underexposed and blurred objects. For the parallel image enhancement model, we adaptively develop improved weighting evaluation models for each "3D Lookup Table" module. As a result, PDE achieves better detection accuracy for poorly visible objects and more user-friendly reference in real time. Experimental results show that PDE has significantly better object recognition performance than the state-of-the-art on real foggy (8.9%) and low-light (20.6%) datasets.

Author 1: Zhiying Li	Author 2: Shuyuan Lin
Author 3: Zhongming Liang	Author 4: Yongjia Lei
Author 5: Zefan Wang	Author 6: Hao Chen

Keywords: Low-visibility condition; image enhance; object detection **DOWNLOAD PDF**

Paper 100: Design and Implementation of an Unreal Engine 4-Based Smart Traffic Control System for Smart City Applications

Abstract: Traffic congestion is a serious problem nowadays, especially in Dhaka city. With the increasing population and automation, it has become one of the most critical issues in our country. There can be a lot of causes of congestion in traffic, such as insufficient capacity, large red signal delay, unrestrained demand, etc, which causes extra time delay, extra fuel consumption, a speed reduction of vehicle, and financial loss. The traffic control system is one of the most important factors affecting traffic flow. Poor traffic management around these hotspots could result in prolonged traffic jams. Small critical locations that are frequent hotspots for congestion are a common byproduct of poorly constructed road networks in many developing countries. In this research, we first offer a straightforward automated image processing method for analyzing CCTV camera image feeds to determine the level of traffic congestion. Our system's design seeks to use real-time photos from the cams at traffic intersections to calculate traffic density using image processing, and to adjust the traffic signal on the data obtained based on the current traffic congestion on the road. We suggest tailoring our system to erratic traffic feeds with poor visual quality. Using live Surveillance camera feeds from multiple traffic signals in Dhaka city, we demonstrate evidence of this bottleneck breakdown tendency persisting over prolonged time frames across multiple locations. To partially address this problem, we offer a local adapting algorithm that coordinates signal timing behavior in a restricted area and can locally minimize congestion collapse by maintaining time-variant traffic surges. Using simulation-based research on basic network topologies, we show how our local decongestion protocol may boost the capacity of the road and avoid traffic collapse in limited scenarios.

Author 1: Md. Imtiaz Hossain Subree

Keywords: Traffic control system; traffic congestion; CCTV; image processing; simulation

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Paper 101: Emotion Detection from Text and Sentiment Analysis of Ukraine Russia War using Machine Learning Technique

Abstract: In the human body, emotion plays a critical func-tion. Emotion is the most significant subject in human-machine interaction. In economic contexts, emotion detection is equally essential. Emotion detection is crucial in making any decision. Several approaches were explored to determine emotion in text. People increasingly use social media to share their views, and researchers strive to decipher emotions from this medium. There has been some work on emotion detection from the text and sentiment analysis. Although some work has been done in which emotion has been recognized, there are many things to improve. There is not much work to detect racism and analysis sentiment on Ukraine -Russia war. We suggested a unique technique in which emotion is identified, and the sentiment is analyzed. We utilized Twitter data to analyze the sentiment of the Ukraine-Russia war. Our system performs better than prior work. The study increases the accuracy of detecting emotion. To identify emotion and racism, we used classical machine learning and the ensemble method. An unsupervised approach and NLP modules were used to analyze sentiment. The goal of the study is to detect emotion and racism and also analyze the sentiment.

Author 1: Abdullah Al Maruf	Author 2: Zakaria Masud Ziyad
Author 3: Md. Mahmudul Haque	Author 4: Fahima Khanam

Keywords: Emotion detection; racism; sentiment analysis; social media; machine learning; ensemble; Ukraine-Russia

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Paper 102: An Analytical Model of Induction Motors for Rotor Slot Parametric Design Performance Evaluation

Abstract: Induction motors are commonly used in most elec-tricity generation due to their low investment cost. However, the performance of the induction motors for different applications highly depends on rotor design and machine geometry. For example, changing rotor bar height and width varies the rotor resistance and reactance, thereby leading to variation of the motor efficiency. A parametric study on rotor slot geometry parameters such as opening height, rotor slot depth, and rotor slot width, is carried out to investigate the effect of the parameters on the efficiency of a squirrel cage induction motor. The study is based on analytical model that considers a general-purpose squirrel cage induction motor with the specification of 5.5 kW, 60 Hz, and 460 V. The analytical model is developed and simulated within the MATLAB software environment. The effects of each parameter variation toward efficiency of the induction motor are investigated individually as well as all together using a 4D scatter plot. Results show that the efficiency can be improved up to 0.1%after designing a suitable setting of rotor slot parameters from the initial settings.

Author 1: Ahamed Ibrahim Sithy Juhaniya

Author 3: Muhammad Ammirrul Atiqi Mohd Zainuri

Author 4: Mohd Asyraf Zulkifley

Keywords: Analytical model; efficiency; induction motor; rotor slot parameters DOWNLOAD PDF

Paper 103: BBVD: A BERT-based Method for Vulnerability Detection

Abstract: Software vulnerability detection is one of the key tasks in the field of software security. Detecting vulnerability in the source code in advance can effectively prevent malicious attacks. Traditional vulnerability detection methods are often ineffective and inefficient when dealing with large amounts of source code. In this paper, we present the BBVD approach, which treats high-level programming languages as another natural language and uses BERT-based models in the natural language processing domain to automate vulnerability detection. Our experimental results on both SARD and Big-Vul datasets demonstrate the good performance of the proposed BBVD in detecting software vulnerability.

Author 1: Weichang Huang

Author 2: Shuyuan Lin

Author 3: Chen Li

Keywords: Vulnerability detection; BERT; software security

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Paper 104: Hybrid Deep Learning Architecture for Land Use: Land Cover Images Classification with a Comparative and Experimental Study

Abstract: Deep Learning algorithms have become more popular in computer vision, especially in the image classification field. This last has many applications such as moving object detection, cancer detection, and the classification of satellite images, also called images of land use-land cover (LULC), which are the scope of this paper. It represents the most commonly used method for decision making in the sustainable management of natural resources at various geographical levels. However, methods of satellite images analysis are expensive in the computational time and did not show good performance. Therefore, this paper, on the one hand, proposes a new CNN architecture called Modified MobileNet V1 (MMN) based on the fusion of MobileNet V1 and ResNet50. On the other hand, it presents a comparative study of the proposed model and the most used models based on transfer learning, i.e. MobileNet V1, VGG16, DenseNet201, and ResNet50. The experiments were conducted on the dataset Eurosat, and they show that ResNet50 results emulate the other models.

 Author 1: Salhi Wiam
 Author 2: Tabiti Khouloud

 Author 3: Honnit Bouchra
 Author 4: SAIDI Mohamed Nabil

 Author 5: KABBAJ Adil

Keywords: Deep Learning; image classification; land use-land cover; MobileNet; ResNet; satellite images

Paper 105: A Real-Time Open Public Sources Text Analysis System

Abstract: With the emergence of digital newspapers and social media, one can easily suffer from information overload. The enormous amount of data they provide has created several new challenges for computational and data mining, especially in the natural language processing field. Many pieces of research focusing on the information extraction process, such as named entity recognition, entity linking, and text analysis methodologies, are available. However, there is a lack of development for a system to unify all these advanced techniques. The current state-of-the-art systems are either semiautomatic or can only handle short-text documents. Most of them are not realtime or have a long lag. Some of them are domain restricted. Many of them only focus on a single source: Twitter. In this work, we proposed a system that can automatically collect, extract, and analyze information from public source text documents, like news and tweets. The system can be used in different domains, such as scientific research, marketing, and security-related domains.

Author 1: Chi Mai Nguyen	Author 2: Phat Trien Thai
Author 3: Van Tuan Nguyen	Author 4: Duy Khang Lam

Keywords: Named entity recognition; entity linking; text analysis system; data mining; natural language processing **DOWNLOAD PDF**

Paper 106: Analysis of EEG Signals in a Patient with Spastic

Cerebral Palsy Undergone Dolphin-Assisted Therapies

Abstract: Cerebral palsy is a group of developmental disorders that affects a certain percentage of population motivating the development of several types of therapies ranging from conventional where physical therapies are included to some alternative therapies such as the dolphin-assisted therapies (DAT), in order to improve the quality of life of patients suffering these disorders. To find scientific evidence of the DAT effectiveness, in this work is developed a fourstage first-order cybernetic model: Signal Acquisition, ii) EEG Processing, iii) EEG Exploring and iv) Healthcare Informatics System (HIS-DAT), in order to explore the electroencephalographic signals behavior from a patient with Infantile Spastic Cerebral Palsy undergone DAT, as well as bioacoustic signals emitted by a female bottlenose dolphin via specialized transducers or passive sensors for aquatic environments, by using nonlinear mathematical tools. We found that the Power Spectrum of signals from EEG and Hydrophone yield similar densities along all DAT and the child's brain activity increases 3-fold higher-frequency when the therapist-dolphin pair interacts with the patient. These findings are supported by the Self-Affine Analysis outcomes, pointing out the emergence of negative correlations from the patient's brain activity during the whole session of DAT but the greatest changes occurred During DAT.

Author 1: Oswaldo Morales Matamoros

Author 2: Erika Yolanda Aguilar del Villar

Author 3: Abril P'erez S'anchez

Author 4: Jes'us Jaime Moreno Escobar

Author 5: Ricardo Tejeida Padilla

Keywords: Brain–computer interfaces; healthcare system; non-linear dynamics; assisted therapies; infantile spastic cerebral palsy; analysis of EEG signals; power spectrum; self-affine analysis

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Paper 107: Dynamic Light Settings as Data Augmentations for Automated Scratch Detection

Abstract: The manufacture of plastic parts requires a rigorous visual examination of its production to avoid the shipment of some that would be defective to its customers. In an attempt to ease the detection of scratches on plastic parts, the prototype of a computer-assisted visual inspection system was developed. The aim of this paper is to introduce how we explored ways to design a semi-automatic system comprising of a lamp whose orientations and intensities help in revealing irregularities on subjects that would have been missed with a unique light configuration. This process was qualified as "hardware data augmentation". The pictures collected by our system were then used to train several convolutional neural networks (YOLOv4 algorithm/architecture). Finally, the performances of their models were confronted to evaluate the effects of the different light settings, and deduce which parameters are favourable to capture datasets leading to robust defect detection systems.

Author 1: GRAVE Valentin	Author 2: FUKUDA Osamu
Author 3: YEOH Wen Liang	Author 4: OKUMURA Hiroshi

Author 5: YAMAGUCHI Nobuhiko

Keywords: Augmentation technique; deep neural network; im-age processing; light emission; object detection DOWNLOAD PDF

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Paper 108: Multi-Task Multi-User Offloading in Mobile Edge Computing

Abstract: Mobile Edge Computing (MEC) is a new method to overcome the resource limitations of mobile devices by enabling Computation Offloading (CO) with low latency. This paper proposes a multi-user multi-task effective system to offload com-putations for MEC that guarantees in terms of energy, latency for MEC. To begin, radio and computation resources are integrated to ensure the efficient utilization of shared resources when there are multiple users. The energy consumed is positively correlated with the power of transmission and the local CPU frequency. The values can be adjusted to accommodate multi-tasking in order to minimize the amount of energy consumed. The current methods for offloading aren't appropriate when multiple tasks and multiple users have high computing density. Additionally, this paper proposes a multi-user system that includes multiple tasks and high-density computing that is efficient. Simulations have confirmed the Multi-User Multi-Task Offloading Algorithm (MUMTOD). The results in terms of execution time and energy consumption are extremely positive. This improves the effectiveness of offloading as well as reducing energy consumption.

Author 3: Abdellah Idrissi

Keywords: Time execution; energy consumption; computation offloading; mobile edge computing DOWNLOAD PDF

Paper 109: Performance Comparison of Multiple Neural Networks for Fault Detection of Sensors Array in Oil Heating Reactor

Abstract: Fault detection is an important issue for early failure revelation and machine components preserving before the damage. The processes of fault detection, diagnosis and correction especially in oil heating reactor sensors are among the most crucial steps for reliable and proper operation inside the reactor. The fault detection in sensors array of heating reactor is considered as an important tool to guarantee that the controller can take the best possible action to insure the quality of the output. In this paper, fault detection for the temperature sensor in oil heating reactor using different types of faults with different levels is addressed. Multiple approaches based on Neural Network (NN)s such as the classical Fully Connected Neural Network (FCNN), Bidirectional Long Short Term Memory network (BiLSTM) based on Recurrent Neural Network (R.N.N.) and Convolutional Neural Network (CNN) are suggested for this purpose. The suggested networks are trained and tested on real dataset sequences taken from sensors array readings of real heating reactor in Egypt. The performance comparison of the suggested networks is evaluated using different metrics such as "confusion matrix", accuracy, precision, etc. The various NN are simulated, trained and tested in this paper using MATLAB software 2021 and the advanced tool of "DeepNetworkDesigner". The simulation results prove that CNN outperforms the other comparative networks with classification accuracy reached to 100% with different levels and different types of faults.

Author 1: Mai Mustafa

Author 2: Sawsan Morkos Gharghory

Author 3: Hanan Ahmed Kamal

Keywords: Fault detection; sensor array; oil heater reactor; confusion matrix; neural network; recurrent neural network; con-volution neural network; bidirectional short term memory

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Paper 110: The Impact of Peer Code Review on Software Maintainability in Open-Source Software: A Case Study

Abstract: Recently, open-source software (OSS) has become a considerably popular and reliable source of functionality corrections. OSS also allows software developers to reduce technical debt in software development. However, previous studies have shown that the main problem within OSS development is the lack of systematic processes and formal documents related to system development, such as requirements, designs, and testing. This feature of OSS development causes problems in the software quality, such as those related to security and maintainability. In this research, the authors focused on the software's maintainability because this attribute has to greatest potential to reduce the cost and increase the productivity of the software

development process. There is currently no existing research that examines whether OSS developers pay attention to software maintainability. To better understand how OSS developers improve software maintainability, this research aims to answer the question: "Are developers interested in software maintainability under the modern code review of open-source software projects?" To answer the research question, the authors investigated the code review process in which the OSS developers changed the code based on a review of code comments related to maintenance and collected the subcharacteristics associated with software maintainability from the existing literature. The authors examined the review comments from two OSS projects: Eclipse and Qt. The results suggest that the number of code revisions due to maintenance issues was moderate and that the OSS developers tend to improve source code quality. This direction could be observed from the increasing number of modifications on given maintenance-based comments over the years. Therefore, an implication of this is the possibility that OSS project developers are interested in software maintainability.

Author 1: Aziz Nanthaamornphong

Author 2: Thanyarat Kitpanich

Keywords: Open-source software; software maintainability; code review **DOWNLOAD PDF**

Paper 111: Bi-LSTM Model to Recognize Human Activities in UAV Videos using Inflated I3D-ConvNet

Abstract: Human activity recognition in aerial videos is an emerging research area. In this paper, an Inflated I3D-ConvNet (Inflated I3D) and Bidirectional Long Short-Term Memory (Bi-LSTM) based human action recognition model in UAV videos have been proposed. The initial module was pre-trained using the Kinetics-400 video dataset, which consisted of 400 classes of human activities and around 400 video clips for each class culled from real-world and arduous YouTube videos. The proposed inflated I3D-ConvNet which was built on 2D-ConvNet inflation learns and extracts spatio-temporal features from aerial video while leveraging the architectural design of Inception-V1. The proposed model employs Bi-LSTM architecture for human action classification on the Drone-Action dataset which is a smaller benchmark UAV-captured video dataset. This model considerably improves the state-of-the-art results in activity classification using the SoftMax classifier and retains an accuracy of about 98.4%.

Author 1: Sireesha Gundu

Author 2: Hussain Syed

Keywords: 2D-ConvNet; Bi-LSTM; drone-action; inception-V1; inflated I3D-ConvNet; Kinetics-400 DOWNLOAD PDF

Paper 112: Aspect-based Sentiment Analysis for Bengali Text using Bidirectional Encoder Representations from Transformers (BERT)

Abstract: Public opinion is important for decision-making on numerous occasions for national growth in democratic countries like Bangladesh, the USA, and India. Sentiment analysis is a technique used to determine the polarity of opinions expressed in a text. The more complex stage of sentiment

analysis is known as Aspect-Based Sentiment Analysis (ABSA), where it is possible to ascertain both the actual topics being discussed by the speakers as well as the polarity of each opinion. Nowadays, people leave comments on a variety of websites, including social networking sites, online news sources, and even YouTube video comment sections, on a wide range of topics. ABSA can play a significant role in utilizing these comments for a variety of objectives, including academic, commercial, and socioeconomic development. In English and many other popular European languages, there are many datasets for ABSA, but the Bengali language has very few of them. As a result, ABSA research on Bengali is relatively rare. In this paper, we present a Bengali dataset that has been manually annotated with five aspects and their corresponding sentiment. A baseline evaluation was also carried out using the Bidirectional Encoder Representations from Transformers (BERT) model, with 97% aspect detection accuracy and 77% sentiment classification accuracy. For aspect detection, the F1-score was 0.97 and for sentiment classification, it was 0.77.

Author 1: Moythry Manir Samia	Author 2: Alimul Rajee
Author 3: Md. Rakib Hasan	Author 4: Mohammad Omar Faruq
Author 5: Pintu Chandra Paul	

Keywords: Sentiment analysis; Bengali sentiment analysis; Aspect-Based Sentiment Analysis (ABSA); Bengali ABSA; deep learning; Bidirectional Encoder Representations from Transformers (BERT)

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Paper 113: Drought Forecasting in Alibori Department in Benin using the Standardized Precipitation Index and Machine Learning Approaches

Abstract: Drought forecasting provides an early warning for the effective management of water resources to avoid or mitigate drought damage. In this study, the prediction of droughts is carried out in the department of Alibori in Benin republic using the standardized precipitation index (SPI) where two Machine Learning approaches were used to set up the drought prediction models which were Random Forest (RF) and Extreme Gradient Boosting (XGBOOST). The performance of these models was reported using metrics such as: coefficient of determination (R2), root mean square error (RMSE), mean square error (MSE), and root mean absolute error (MAE). The results revealed that XGBOOST models gave better prediction performance for SPI 3, 6, 12 with coefficients of determination of 0.89, 0.83 and 0.99, respectively. The square root mean square error (RMSE) of the models gives 0.29, 0.40 and 0.07, respectively. This work demonstrated the potential of artificial intelligence approaches in the prediction of droughts in the Republic of Benin.

Author 1: Rodrigue B. W. VODOUNON

Author 2: Henoc SOUDE

Author 3: Oss'enatou MAMADOU

Keywords: Droughts; forecasting; machine learning; SPI

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Abstract: One of the major tools of the new era of digital transformation is Internet of Things (IoT) through which, one can look forward to exploring the new technologies in the digital world as well as how they help in improving the real world. This work provides an overview of the approach used to deploy a surveillance system for monitoring any indoor space in general and specifically for agricultural spaces. The entire process starts after motion detection by motion sensors using Machine Learning techniques. This requires coverage and response processing algorithms implemented in the electronic chain. The electronic part of the system relies on the micro-controllers, sensors and communications between them. A mobile application has been developed to allow competent authorities to receive alerts for real-time intervention with the aim of preventing the destruction of crops slaughtered near herds passage. The monitoring system' synoptic diagram and its operation along with the power modules description are introduced. Prototype has been designed and performance evaluation performed to show the system' responsiveness.

Author 1: P'elagie HOUNGUE

Author 2: Romaric SAGBO

Author 3: Gilles DAHOUE

Author 4: Julien KOMACLO

Keywords: Monitoring system; agricultural space; machine learning; herds passage; motion detection **DOWNLOAD PDF**

Paper 115: Measurement Tool for Exposure Techniques in X-ray Ionizing Radiation Equipment

Abstract: This article shows the development of an instrument for measuring the exposure parameters used to take radiographic studies in living beings; such as kilovoltage, current and time, since radiation protection is a fundamental pillar in the care of patients and operators of ionizing radiation equipment, it is necessary to calibrate these parameters in equipment that produce X-rays. For the manufacture of the measuring instrument is used an ESP32 microcontroller which is programmed using the Python syntax using the project micropython, in addition to current, distance and light sensors. The results of these measurements will be displayed through output devices such as organic light-emitting diode (OLED) displays, liquid crystal (LCD) displays, and a Web server, in order to perform the measurements safely from the control room and thus avoid exposure to radiation as much as possible. The kVp measurement performed in this article is for equipment operating at 60 [Hz], for high frequency equipment a new parameterization must be performed in order to obtain results as close to reality as possible. By using the web server for the transmission of measurement data, the radiation exposure was reduced and the calibration times of the equipment were improved. This article presents the measurements, and also the calculation of the error of each of the different exposure parameters of conventional X-ray equipments, such as kVp, mA, mAs and time. The errors obtained in the measurements were made assuming that the X-ray equipment used has a 0 error, i.e. assuming that the X-ray equipment is calibrated and that it is a standard equipment.

Author 1: Edwin Arley Cortes Puentes

Author 2: Andres Gomez Rodriguez

Author 3: Fernando Martinez Santa

Keywords: Voltage; current; X-Ray; kVp; mA; mAs radiation; ESP32; OLED microcontroller

Paper 116: Encrypted Storage Method of Oral English Teaching Resources based on Cloud Platform

Abstract: With the development of the times, the secure storage of educational resources has become one of the key security problems faced by colleges and universities. On the one hand, the cost of traditional resource storage is too expensive, on the other hand, its encryption and access efficiency are low. To solve this problem, this research takes the cloud platform serves as the main carrier for the encrypted storage of school teaching resources. On this basis, the convolutional neural network is encrypted and optimized, and the argmax algorithm is improved to improve the access efficiency of encrypted data. Finally, the effectiveness and superiority of the design method are compared and analyzed through the method of performance detection. The results show that the maximum consumption time of encryption and decryption of the encrypted storage model is no more than 20000ms, which is significantly less than that of the traditional model. The running time of the argmax output encryption module is 1.76ms and the running loss is 0.26 MB, which is less than that of the traditional model. It can be seen that the encrypted storage model has stronger encryption performance and access performance, and has a better application effect in the encrypted storage of oral English teaching resources with a large amount of access data and frequent updates.

Author 1: Tongsheng Si

Keywords: Cloud platform; oral language; encryption; resource storage **DOWNLOAD PDF**

Paper 117: Denoising Method of Interior Design Image based on Median Filtering Algorithm

Abstract: Interior design image generation process is prone to the interference of many factors, resulting in the interior design image denoising effect decreases, denoising time increases, so the interior design image denoising method based on median filtering algorithm is proposed. The architecture of interior design image collection is set up, including video signal conversion module, compression coding module, programmable logic chip module and power module. The interior design image collection is realized by using sensors to collect interior design related video information and converting video signals. Based on the results of image acquisition, the median filtering algorithm based on rough set theory is used to realize the denoising of interior design images. Experimental results show that the denoising effect of the proposed method is better, the average signal-to-noise ratio of interior design images is 54.6dB, and the denoising time is always lower than 0.3s, which can be widely used in practice.

Author 1: Tao Li

Keywords: Median filtering algorithm; interior design; image denoising; image acquisition architecture; the rough set

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Paper 118: Application of CAD Aided Intelligent Technology in Landscape Design

Abstract: The current landscape design methods ignore the depth rendering of scene elements, resulting in low spatial utilization of landscape plant diversity index and landscape spatial pattern. Therefore, this study explores the application of CAD in landscape design. AutoCAD aided intelligent technology is adopted to display the scene in multiple directions and from all angles with terrain design, planning design and planting design as the main contents. Using 3D graphics engine to render landscape elements. On this basis, the spatial coordination planning model of plant landscape is established. The color attribute of landscape space staggered pattern is added to 3D visual reconstruction model by image library function, and the CAD intelligent technology is applied in landscape design. The results shows, the method scored higher in graphic refresh rate, visual brightness and visual contrast, a higher plant diversity coefficient in multiple iterations, and a higher spatial utilization ratio of the landscape pattern than the other two design methods, and the spatial utilization ratio of the landscape pattern of the proposed method is higher than that of the reference method.

Author 1: Juan Du

Keywords: Landscape design; CAD intelligent technology; engine rendering; image library function; 3D visual reconstruction; digital design; landscape architecture

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Paper 119: Filtering and Enhancement Method of Ancient Architectural Decoration Image based on Neural Network

Abstract: Due to poor ambient light or uneven lighting, the old decoration image acquisition methods are easy to cause the image blur. To solve this problem, this paper proposes a neural network-based filtering enhancement method for ancient architectural decoration images, which preserves image details by enhancing contrast, smoothing noise reduction and edge sharpening. Based on the convolutional neural network which is composed of encoder, decoder and layer hop connection, the residual network and hole convolution are introduced, and the hole U-Net neural network is constructed to fuse the pixel feature blocks of different levels. This method enhanced the image contrast according to the gray level and frequency histogram, and aiming at the gray value of the pixel to be processed in the image. And the middle value of the gray value of the neighborhood pixel is used to filter the noise of the ancient building decoration image. The paper also analyzes the joint strength of beams and columns in ancient buildings, and calculates the elastic constants of beams and columns and the stress at the joint of them, considering the image texture characteristics of the wood in ancient buildings with the mortise and tenon connection of beams and columns. Experimental results show that the proposed method has good noise suppression performance, can effectively obtain image detail features, and significantly improve the subjective visual effect of ancient architectural decoration images.

Author 1: Yanan Wang

Keywords: Neural network; decorative images of ancient buildings; filter enhancement method; encoder; decoder; pixel gray value

Paper 120: A Neural Network-Based Algorithm for Weak Signal Enhancement in Low Illumination Images

Abstract: There is noise interference in low-illumination images, which makes it difficult to extract weak signals. For this reason, this paper proposes a low-illumination image weak signal enhancement algorithm based on neural network. Multi-scale normalization is performed on low-light images, and multi-scale Retinex is used to enhance weak signals in low-light images. On this basis, the GAN artificial neural network is used to detect the weak signal of the weak signal in the image, the normalization of the weak signal of the low-illumination image is completed based on the residual network, the self-encoding parameters of the depth residual are generated, and the weak signal enhancement result of the low-illumination image is output. The experimental results show that the method in this paper has better enhancement effect on low-illumination images and better image denoising effect. When the scale value is large, the low-contrast area of the low-illumination image has a better enhancement effect. The saturated area of the low-light image has a better enhancement effect.

Author 1: Dawei Yin Author 2: Jianwei Li

Keywords: Artificial neural network; GAN neural network; low-light image; weak signal enhancement

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Paper 121: Digital Intelligent Management Platform for High-Rise Building Construction Based on BIM Technology

Abstract: In this study, the digital intelligent management platform of high-rise building construction based on BIM technology is used for real-time monitoring and management of construction progress and quality. In the data acquisition and processing layer, construction site data is obtained through RFID technology. After processing such as cleaning and integration, it is input to the BIM model layer to dynamically generate various real-time BIM models, and these real-time BIM model information is input to the application layer to query, monitor and correct the construction progress and quality. The results are presented by the display layer. The actual application results show that the real-time BIM models generated by the platform have clear details and can realize the query, monitoring and correction functions for the construction progress of high-rise buildings, and effectively correct the construction progress according to the construction progress monitoring query results to achieve the unification with the planned progress. It can effectively realize the visual measurement of the size of each component in construction and monitor the construction quality in real time.

Author 1: Rui Deng Author 2: Chun'e Li

Keywords: BIM technology; high-rise building construction; digitization; intelligent management; BIM model; RFID technology

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Paper 122: Research on Key Technologies of Smart City Building Interior Decoration Construction based on In-Depth

Learning

Abstract: The intelligentization of building interior decoration construction is of great significance to the construction of smart city, and robot automation has brought an opportunity for this. Robot self-decoration is the development trend in the future. One of the key issues involved, is the self-planning of mobile path. In this regard, the research adopts the proximal policy optimization algorithms (PPO) to improve the self-planning path ability of the decoration robot. For the information of lidar and robot status, the Full Connect Neural Network (FCNN) is used to process it. In addition, the reward function and the corresponding Credit Assignment Problem (CAP) model are designed, to accelerate the learning process of path planning. Aiming at the dynamic uncertainty in the actual environment, the adaptive loss function is used to build an auxiliary model to predict the environmental change. The simulation results show that the research and design strategy significantly improves the learning efficiency and path planning success rate of the decoration robot, and shows good adaptability to the dynamic environment, which has important reference significance for the practical application of the decoration robot.

Author 1: Li Zhang Au

Author 2: Aimin Qin

Keywords: Interior decoration; path planning; deep reinforcement learning; reward function; credit allocation

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Paper 123: Research on Face Recognition Technology of Subway Automatic Ticketing System based on Neural Network and Deep Learning

Abstract: Face recognition technology is the core technology of the subway ticketing system, which is related to the efficiency of people's ticket purchase. In order to improve people's experience of taking public transport, it is necessary to improve the performance of face recognition technology. In this study, the Back Propagation (BP) algorithm is used to optimize the parameters of the SoftMax classifier of the convolutional neural network, and the branch structure is added to the structure of the SphereFace-36 convolutional neural network to extract the local features of the face. Based on the improved neural network, the face recognition system of the subway automatic ticketing system is established. The results show that the area under the ROC curve is the highest for validation and identification of the optimization model; The recognition accuracy of the optimized model in different data sets is 1.0%, 0.7%, 1.1%, 0.9% and 0.6% higher than that of SphereFace-36 respectively, and its specificity is higher than that of SphereFace-36, with the maximum difference of 9%; The average accuracy of global feature extraction and recognition of the optimized network model is 83.01%. In the simulation experiment, the optimized model can accurately recognize facial features, which has high practical value and can be applied to the automatic ticketing system.

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Author 2: Xin Lin

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Keywords: Automatic ticketing system; BP; CNN; deep learning; face recognition; SphereFac; SoftMax classifier

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Paper 124: Research on Improved Xgboost Algorithm for Big Data Analysis of e-Commerce Customer Churn

Abstract: With the increasing cost of acquiring new users for e-commerce enterprises, it has become an important task for e-commerce enterprises to actively carry out customer churn management. Therefore, based on the distributed gradient enhancement library algorithm (XGBoost), this research proposes a big data analysis study on e-commerce customer churn. First, it conducts an evaluation analysis on e-commerce customer segmentation and combines the random forest algorithm (RF) to build an RF XGBoost prediction model based on customer churn. Finally, it verifies the performance of the prediction model. The results show that the area under receiver operating characteristic curve (AUC) value, prediction accuracy, recall rate, and F1 value of the RF-XGBoost model are significantly better than those of the RF, XGBoost, and ID3 decision trees to build an e-commerce customer churn prediction model; The average output error of RF-XGBoost model is 0.42, and the average output error is relatively good, indicating that the model proposed in this study has a smaller error and higher accuracy. It can make a general assessment of the customer churn of e-commerce enterprises, and then provide data support for the customer maintenance work of e-commerce enterprises. It is helpful to analyze the relevant factors affecting customer churn, to Equationte targeted customer service programs, thus improving the economic benefits of e-commerce enterprises.

Author 1: Li Li

Keywords: E-commerce; customer churn; random Forest; XGBoost; big data DOWNLOAD PDF