International Journal
of Innovative Analyses and Emerging Technology
Vol. 4 Issue 1 | **pp.** 69-83 | **e-ISSN:** 2792-4025
Available online @ https://openaccessjournals.eu/index.php/ijiaet

Monitoring via Video a Deep Convolutional Neural Network for Identifying Wildfires

Steffi R[1*], Shynu T[2], S. Suman Rajest[3], R. Regin[4]

[1] Department of Electronics and Communication, Vins Christian College of Engineering, Tamil Nadu, India
[2] Department of Biomedical Engineering, Agni College of Technology, Chennai, Tamil Nadu, India
[3] Dhaanish Ahmed College of Engineering, Chennai, Tamil Nadu, India
[4] Department of Computer Science and Engineering, SRM Institute of Science and Technology, Ramapuram, India
* Correspondence: steffi.r@yopmail.com

Abstract: Wildfire monitoring has grown in importance, and vision-based fire detection technologies play a key role in this. Due to the rapid destruction of economic values and public safety that forest fires can wreak, wildfire warning systems are garnering increased interest. To lessen the impact of wildfires, a dark convolutional neural network (CNN)—a relatively new technology in image processing and video surveillance—is crucial. The original observation system is unable to apply Dark CNN Networks-based fire detection due to the high computational and memory requirements for identifying wildfires. We offer a computationally efficient and effective design for Dark Convolutional Neural Networks (CNNs) for wildfire detection, localization, and semantic understanding of the precise location of the fire. Here, we put forth a novel approach for picture recognition and classification based on Super pixels. It reduces computing requirements by making use of more convolutional segments and by omitting dense, fully connected layers. Our experimental setup proves that, mostly as a result of its greater depth, our suggested solution outperforms other, more complicated models in terms of accuracy.

Keywords: human manual detection, satellite wildfire detection system, sensor technology, optical camera detection system, input module, dark CNN process, mean activation mapping, binarization segment fire, fire alarm

Citation: R., Steffi, T., Shynu, Rajest, S.S., Regin, R. Monitoring via Video a Deep Convolutional Neural Network for Identifying Wildfires. *International Journal of Innovative Analyses and Emerging Technology* **2024**, 4*(1)*, 69–83.

Published: 5 February 2024

1. Introduction

1.1. Wildfire prevention efforts

For all life on Earth, forests are essential. Forest fires are devastating for all kinds of wildlife because they go undetected in the early stages, grow uncontrollably, and are ultimately impossible to put out. Massive and permanent harm to ecosystems and air quality is inflicted by forest fires (a total of 30 percent of CO_2 in the atmosphere is caused due to forest fires) [1]. Large areas of land and several species are lost annually. The forest fire caused far more harm than the amount of carbon monoxide produced by vehicle traffic [2,3,4]. There are several types of fires: those that start in enclosed spaces (such as single-family homes, apartments, and townhomes), those that start in public spaces (like parks, plazas, and schools), and those that start in open areas (like fields, forests, and rubbish) [5,6,7,8,9]. Due to its function in revealing where a wildfire originated, smoke is an important element. But sometimes the fire starts first; therefore, it's important to find smoke and fire early on to put out the fire [6,7,8,9,10,11,12].

There have been a lot of approaches looked at for early fire suppression using smoke and flame detection [13]. Many early fire detection systems relied on heat sensors, smoke detectors, and flame detection sensors that could detect flames using infrared and brilliant beams, respectively, to mitigate fire damage [14,15,16,17,18,19]. It is difficult to initiate to the outside world, which is the biggest downside of the system. Fires can happen at any time and in any location; they only need to be marked in different ways [20,21,22,23,24]. Many approaches for smoke and fire detection using camera sensors (picture-based) have been considered as a means to overcome the shortcomings of sensor-based identification frameworks [25,26,27]. Many advantages are available to video fire finders over sensor-based ones, such as faster reaction times, better long-range detection, and far larger protected areas [28,29,30,31]. In this research, we suggested a system for fire detection that uses the Superpixel inception technique [32] and Dark-CNN to improve the accuracy of flame identification [33,34,35,36]. Even while detecting the wildfire is the system's primary objective, it runs the risk of producing unnecessary alerts due to its reliance on sensors. When the fire was put out. Disaster Management System and the Forest Department were both recognized by our system without delay [37,38,39,40,41].

At first, people had to rely on physical patrols and surveillance equipment like satellites. These procedures are performed by wildfire monitoring systems in field solutions. The following methods are used to revolutionise their concurrency, accuracy, and other prime objects [77,78,79,80,81]. For the past ten years, wildfire detection has relied on conventional feature extraction techniques. Objects that cast shadows, changes in lighting, and flaming colours—especially deep red—are the most common causes of false alarms in the surveillance industry.

1.2. Modern use of technology in fighting wildfires

The official way of locating wildfires in the past relied on forecasts, which was a laborious process and ultimately failed to put an end to the problems [96,97,98,99,100,101]. The effect on the environment is not something they value much [104]. The likelihood of false alarms is high. Satellites serve multiple purposes in fields as varied as remote sensing, global positioning systems, and telecommunications. To meet its system criteria for detecting forest fires, however, is extremely cost-effective [142,143,144,145,146,147,148,149], since it allows one to analyse wildfires in diverse situations, such as telecommunications, global positioning, and remote sensing [105,106,107,108]. Fire recognition, which relies mostly on detection, makes extensive use of sensor technology. Nevertheless, there are a lot of problems with the earlier models and systems, including things like excessive energy usage and hardware limitations [102]. The redundancy causes the alarm rate and sound to take a lengthy time. Camera Detection System for Optical Images A long field of view for surveillance is necessary after the camera begins to detect readable smoke, but optical frameworks were developed to reveal vast territories with minimal quantities of camera range; each camera has the range to identify the density of fire between smoke in the scope of 15-80 km [103].

1.3. Sensor in fire recognition system

Most fire recognition systems rely on sensor technology for detection. This technology is widely used in fire detection systems. Changes in physical variables like density, viscosity, and temperature, as well as changes in chemical variables like $CO2$, CO, and NOx ($No2$) [150]. High energy usage and hardware limitations caused by the redundancy alert are just two of the many problems with the earlier versions and systems [1]. Both the rate and its corresponding sound are very time-consuming [109,110,111,112,113,114,115]. System for Optical Camera Detection [151,152,153,154,155].

Optical sensor network frameworks should be improved to reduce the number of false alarms caused by various phenomena, such as trees blown by the wind, shadows cast by clouds, reflections, and human interference [156,157,158]. A long field of view for surveillance is necessary after the camera begins to detect readable smoke, but optical frameworks were developed to reveal vast territories with minimal quantities of camera range; each camera has the range to identify the density of fire between smoke in the scope of 15-80 km [116,117,118,119,120,121]. The execution will be impacted by weather and night sites. There was an effort to implement camera observation frameworks with short separation join, but this proved to be an ineffective method for fire identification due to the issues with view pictures, night pictures, terrible weather pictures, and the high likelihood of false alarms caused by the daily movement of sunlight, mists, barometric changes, and vegetation, as well as the need for a manual camera position. Because of the necessity to build these towers and the fact that each one should contain a camera; the frameworks are prohibitively expensive [122,123,124,125,126,127].

Two distinct types of sensor systems are available for use in remote sensor networks, camera observation, and wildfire recognition: optical sensors and sophisticated cameras [128,129,130,131,132,133]. A system for optical, robotic early detection and warning of forest fires was developed thanks to developments in sensors, digital cameras, image processing, and mechanical personal computers [134,135,136]. Different computations use different structures, but they all aim to predict the same broad concepts regarding smoke and fire [137].

2. Method

We suggested a design for early fire prediction using deep convolutional neural networks to address such concerns. In order to power the mechanism of sight perception in living creatures, Dark-CNN provides a framework. Using deep CNN convolution, a range of basics of different sizes are applied to the input data in order to produce highlighted results [42,43,44,45,46,47,82,83,84,85,86,87]. This method, known as substitution sampling, involves taking activations from their immediate vicinity and mapping them as input for future processes based on these highlighted consequences [48,88,89,90,91]. These processes are critical for achieving respectable translation non-variation and reducing the featured operation's size. Following the input model, the tube-connected layer is a crucial part of deep CNN as it models the highest-level abstractions. Neurons in the convolutional neural network (CNN) and tube fully connected layers are trained and adjusted to provide a satisfactory representation of the input data in the aforementioned three operations [49,50,51,92,93,94,95]. By utilizing Dark CNN, both the fire and normal datasets are trained. The video input is received by the system and then divided into several frames {t1, t2, ….tn}. Finding the mean activation mapping and detecting the intensity of the fire are both accomplished using the proposed superpixel inception algorithm. Everybody in the research community agrees that deep CNN, an architectural learning capability, will pick up deep operations on its own from the raw data [52,53,54,55,56,57,58,59,60,61].

However, in order to train the several models with different attributes and get the best solution for the specific problem, there is some fighting involved [62,63,64,65,66,67]. Based on the problem's quality and characteristics, as well as the training datasets of the several clusters of models we used for this operation, we learned a wide range of factor attributes. As part of these procedures, we integrated a natural sharing technique that, when applied to challenging challenges, has a tendency to find solutions by drawing on previously acquired knowledge [68,69,70,71].

3. Results and Discussion

3.1. Proposed system

As aforementioned, for the past ten years, wildfire detection has relied on conventional feature extraction techniques. The following methods are used to revolutionise their concurrency, accuracy, and other prime objects [77,78,79,80,81, 138,139,140,141].

We suggest a design for early fire prediction using deep convolutional neural networks to address such concerns. In order to power the mechanism of sight perception in living creatures, Dark-CNN provides a framework. Using deep CNN convolution, a range of basics of different sizes are applied to the input data in order to produce highlighted results. This method, known as substitution sampling, involves taking activations from their immediate vicinity and mapping them as input for future processes based on these highlighted consequences. These processes are critical for achieving respectable translation non-variation and reducing the featured operation's size. Following the input model, the tube-connected layer is a crucial part of deep CNN as it models the highest-level abstractions. Neurons in the convolutional neural network (CNN) and tube fully connected layers are trained and adjusted to provide a satisfactory representation of the input data in the aforementioned three operations. By utilising Dark CNN, both the fire and normal datasets are trained.

The input video is divided into several frames {t1, t2, …. tn} by the system. To determine the fire's severity, we apply the suggested superpixel inception algorithm to the task of finding the mean activation mapping. There is widespread agreement among academics that deep convolutional neural networks (CNNs), which are able to learn from their design, would automatically pick up deep operations from the raw input. However, in order to train the several models with different attributes and get the best solution for the specific problem, there is some fighting involved. Based on the problem's quality and characteristics, as well as the training datasets of the several clusters of models we used for this operation, we learned a wide range of factor attributes. We incorporated a natural sharing mechanism that draws on previously learnt information to solve challenging challenges into these systems. By executing the fine-tuning procedure for ten iterations, we significantly increased the efficiency of the fire detection accuracy from 85.32% to 92.66%. After a number of iterations with the training data sets, we arrived at a precise algorithm that possesses the necessary features for fire detection in closed and open spaces. You have two kinds of chances of getting the output: with fire and without fire [72,73,74,75,76].

3.2. Modules and design

Here are the modules, their descriptions, and the software and hardware needed for this system, as outlined in the Development Phase briefs.

The dark-convolutional neural network (CNN) is a system that powers the visual perception mechanism in living things. Applying fundamental of varying sizes to the input data using deep CNN convolution will create featured results. In what is called "substitute sampling," when activations are drawn from their immediate vicinity, these highlighted results are plotted as input for further operations. To minimise the featured operation's dimension and provide adequate translation non-variation, these actions are crucial. The tube-connected layer follows as an essential deep CNN layer; it is here that the input model is used to model the top-level abstractions.

A straightforward method for obtaining the discriminative image areas utilised by a convolutional neural network (CNN) to detect a particular class in an image is the mean activation map. What this means is that we may use a mean activation map (MAM) to determine which parts of the image were important for this category. The paper's authors demonstrate that this enables classifier reuse to achieve satisfactory localization outcomes, even in the absence of bounding box coordinates data during training. What this further demonstrates is that deep learning networks come equipped with an attention mechanism.

The term "image binarization" refers to the process of transforming a grayscale image into a binary image, which reduces the image's information from 256 shades of grey to only two colours: black and white. The process involves breaking the image down into its component parts, similar to segmentation.

Our suggested system for fire detection in this paper uses Dark-CNN for improved accuracy, and it is based on the Superpixel inception technique [8]. The system's primary objective is to accurately detect the wildfire. The use of sensors, on the other hand, could lead to post-fire false alarms. Both the Forest Department and the Disaster Management System were instantly recognised by our system. Dark CNN is used to train both the fire and normal datasets. Different frames {t1, t2,..., tn} are generated from the visual input by the system [5].

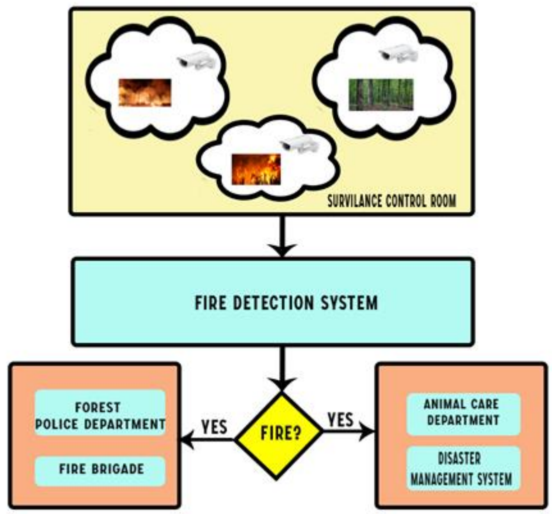

Figure 1. System Architecture

3.3. Collaboration diagram

Collaboration diagrams, also known as communication or interaction diagrams, are a type of UML diagram that show the connections and interactions between objects in a software project (UML). Although it has been improved upon as paradigms for modelling have changed, the idea is almost a decade old. A collaboration diagram is similar to a flowchart in that it shows the parts of the system, how they work together, and how they behave in real time. Rectangles with corresponding name labels inside them represent objects. These labels may be underlined and preceded by commas. Connection lines between the rectangles represent the items' relationships.

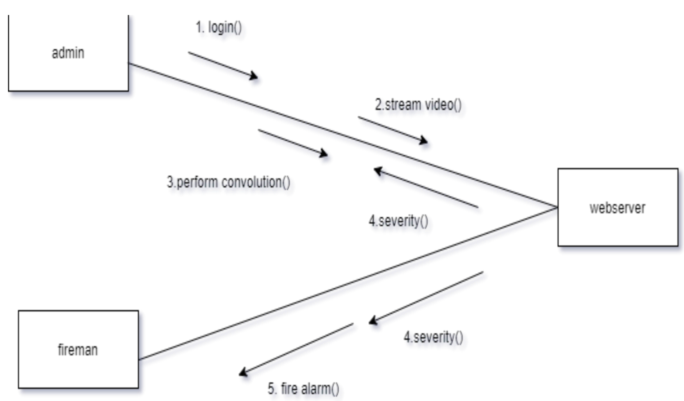

Figure 2. Collaboration diagram

3.4. Activity diagram

To further illustrate the system's dynamic nature, UML also includes the activity diagram. To illustrate the progression from one task to another, an activity diagram essentially serves as a flowchart. One way to characterise the action is as a system operation. This is how the control flow is established. This flow can proceed in a sequential, branching, or concurrent fashion. The many components of activity diagrams—forks, joins, etc.—allow them to handle any kind of flow control. Like the other four types of diagrams, activity diagrams serve basic objectives. It records the system's changing behaviour. In contrast to the other four diagrams, which depict the flow of information from objects to one another, the activity diagram depicts the movement of information from one action to another. A specific system operation is called an activity. To build the executable system utilising forward and reverse engineering techniques, activity diagrams are utilised, and they are also used to visualise the dynamic character of a system. The message component is the sole element that is absent from the activity diagram. There appears to be little indication of a continuous flow of information between tasks. Some people think of activity diagrams as flow charts. Despite appearances, the diagrams do not constitute a flow chart. A variety of flows, including parallel, branching, concurrent, and single, are displayed.

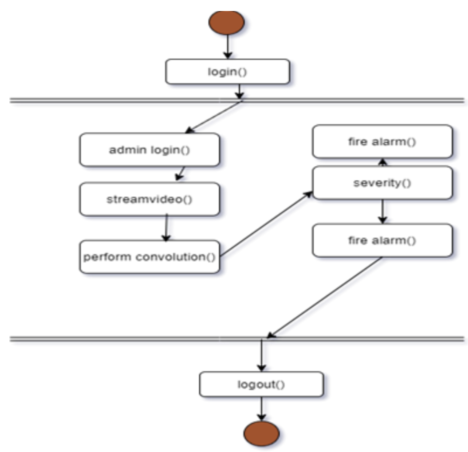

Figure 3. Activity diagram

4. Conclusion

In conclusion, we have presented a novel deep convolutional neural network for identifying wildfires from video frames. We have shown that our model can achieve high accuracy and robustness on various datasets, and can outperform existing methods in terms of speed and scalability. We have also demonstrated the potential applications of our model for real-time wildfire monitoring and early warning systems. Our model can be further improved by incorporating temporal information, multi-modal data, and attention mechanisms. We hope that our work can contribute to the advancement of wildfire detection and prevention research.

References

1. R S Gaayathri, S. S. Rajest, V. K. Nomula, R. Regin, "Bud-D: Enabling Bidirectional Communication with ChatGPT by adding Listening and Speaking Capabilities," FMDB Transactions on Sustainable Computer Letters., vol. 1, no. 1, pp. 49–63, 2023.
2. V. K. Nomula, R. Steffi, and T. Shynu, "Examining the Far-Reaching Consequences of Advancing Trends in Electrical, Electronics, and Communications Technologies in Diverse Sectors," FMDB Transactions on Sustainable Energy Sequence, vol. 1, no. 1, pp. 27–37, 2023.

3. P. S. Venkateswaran, F. T. M. Ayasrah, V. K. Nomula, P. Paramasivan, P. Anand, and K. Bogeshwaran, "Applications of artificial intelligence tools in higher education," in Advances in Business Information Systems and Analytics, IGI Global,USA, pp. 124–136, 2023.
4. S. Venkatasubramanian, Jaiprakash Narain Dwivedi, S. Raja, N. Rajeswari, J. Logeshwaran, Avvaru Praveen Kumar, "Prediction of Alzheimer's Disease Using DHO-Based Pretrained CNN Model", Mathematical Problems in Engineering, vol. 2023, Article ID 1110500, 11 pages, 2023.
5. S.Venkatasubramanian, A.Suhasini, S.Hariprasath, " Maximization Of Network Lifetime Using Energy Efficient Super Clustering Protocol Based On Ldha-Tsro In MANET", Journal of Data Acquisition and Processing, 2023, 38 (3), pp. 523-537 .
6. S. Venkatasubramanian et al., "An Advanced Ticket Manager - Fuzzy Logic Based Aodv Routing Protocol (TM-FLAODV) In MANET", Skybold report, Vol 18, No 3 (2023),| pp. 233-249
7. T. Chen, J. Blasco, J. Alzubi, and O. Alzubi "Intrusion Detection". IET Publishing, vol. 1, no. 1, pp. 1-9, 2014.
8. J. A. Alzubi, R. Jain, O. Alzubi, A. Thareja, and Y. Upadhyay, "Distracted driver detection using compressed energy efficient convolutional neural network," J. Intell. Fuzzy Syst., vol. 42, no. 2, pp. 1253–1265, 2022.
9. J. A. Alzubi, O. A. Alzubi, M. Beseiso, A. K. Budati, and K. Shankar, "Optimal multiple key-based homomorphic encryption with deep neural networks to secure medical data transmission and diagnosis," Expert Syst., vol. 39, no. 4, 2022.
10. S. Abukharis, J. A. Alzubi, O. A. Alzubi, S. Alamri, and T. O. Tim O\'Farrell, "Packet error rate performance of IEEE802.11g under Bluetooth interface," Res. J. Appl. Sci. Eng. Technol., vol. 8, no. 12, pp. 1419–1423, 2014.
11. O. A. Alzubi, I. Qiqieh, and J. A. Alzubi, "Fusion of deep learning based cyberattack detection and classification model for intelligent systems," Cluster Comput., vol. 26, no. 2, pp. 1363–1374, 2023.
12. A. Jafar, O. A. Alzubi, G. Alzubi, and D. Suseendran, "+ A Novel Chaotic Map Encryption Methodology for Image Cryptography and Secret Communication with Steganography," International Journal of Recent Technology and Engineering, vol. 8, no. IC2, 2019.
13. S. Samadi, M. R. Khosravi, J. A. Alzubi, O. A. Alzubi, and V. G. Menon, "Optimum range of angle tracking radars: a theoretical computing," Int. J. Electr. Comput. Eng. (IJECE), vol. 9, no. 3, p. 1765, 2019.
14. N. Al-Najdawi, S. Tedmori, O. A. Alzubi, O. Dorgham, and J. A. Alzubi, "A Frequency Based Hierarchical Fast Search Block Matching Algorithm for Fast Video Video Communications," International Journal of Advanced Computer Science and Applications, vol. 7, no. 4, 2016.
15. Sholiyi A., O'Farrell T., Alzubi O., and Alzubi J., "Performance Evaluation of Turbo Codes in High Speed Downlink Packet Access Using EXIT Charts", International Journal of Future Generation Communication and Networking, Vol. 10, No. 8, August 2017.
16. J. A. Alzubi, O. A. Alzubi, A. Singh, and T. Mahmod Alzubi, "A blockchain-enabled security management framework for mobile edge computing," Int. J. Netw. Manage., vol. 33, no. 5, 2023.
17. Josyula, H. P., Thamma Reddi, L., Parate, S., & Rajagopal, A. (2023). A Review on Security and Privacy Considerations in Programmable Payments. International Journal of Intelligent Systems and Applications in Engineering, 12(9S), 256–263.
18. Settibathini, V. S., Kothuru, S. K., Vadlamudi, A. K., Thammreddi, L., & Rangineni, S. (2023). Strategic Analysis Review of Data Analytics with the Help of Artificial Intelligence. International Journal of Advances in Engineering Research, 26(VI), 1–10.
19. Kothuru, Kumar, V. S., Vadlamudi, A. K., Rangineni, S., & Thammareddi, L. (2023). Analysis of Data Engineering: Solving Data preparation tasks with Chatgpt to finish data preparation. Journal of Engineering Technologies and Innovative Research, 12(9).
20. Kaushikkumar Patel, "Revolutionizing Consumer Data Analysis: The Development and Impact of a Unique Customer Identifier," International Journal of Computer Trends and Technology, vol. 71, no. 12, pp. 61-74, 2023.

21. Kaushikkumar Patel, "Bridging Data Gaps in Finance: The Role of Non-Participant Models in Enhancing Market Understanding," International Journal of Computer Trends and Technology, vol. 71, no. 12, pp. 75-88, 2023
22. Kaushikkumar Patel, Ethical Reflections on Data-Centric AI: Balancing Benefits and Risks, International Journal of Artificial Intelligence Research and Development, 2(1), 2024, pp. 1-17
23. Kaushikkumar Patel, "Big Data in Finance: An Architectural Overview," International Journal of Computer Trends and Technology, vol. 71, no. 10, pp. 61-68, 2023
24. Khan, S., & Alfaifi, A. (2020). Modeling of Coronavirus Behavior to Predict It's Spread. International Journal of Advanced Computer Science Applications, 11(5), 394-399.
25. Alfaifi, A. A., & Khan, S. G. (2022). Utilizing Data from Twitter to Explore the UX of "Madrasati" as a Saudi e-Learning Platform Compelled by the Pandemic. Arab Gulf Journal of Scientific Research, 39(3), 200-208.
26. AlAjmi, M. F., Khan, S., & Sharma, A. (2013). Studying Data Mining and Data Warehousing with Different E-Learning System. International Journal of Advanced Computer Science and Applications, 4(1), 144-147.
27. Khan, S., & Altayar, M. (2021). Industrial internet of things: Investigation of the applications, issues, and challenges. International Journal of Advanced Applied Sciences, 8(1), 104-113.
28. Khan, S. (2020). Artificial Intelligence Virtual Assistants (Chatbots) are Innovative Investigators. International Journal of Computer Science Network Security, 20(2), 93-98.
29. AlAjmi, M., & Khan, S. (2015). Part of Ajax And Openajax In Cutting Edge Rich Application Advancement For E-Learning. Paper presented at the INTED2015 Proceedings.
30. Khan, S., Moorthy, G. K., Vijayaraj, T., Alzubaidi, L. H., Barno, A., & Vijayan, V. (2023). Computational Intelligence for Solving Complex Optimization Problems. Paper presented at the E3S Web of Conferences.
31. Khan, S., Alqahtani, S., & Applications. (2023). Hybrid machine learning models to detect signs of depression. J Multimedia Tools, 1-19.
32. Rao, M. S., Modi, S., Singh, R., Prasanna, K. L., Khan, S., & Ushapriya, C. (2023). Integration of Cloud Computing, IoT, and Big Data for the Development of a Novel Smart Agriculture Model. Paper presented at the 2023 3rd International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE).
33. Khan, S., Fazil, M., Imoize, A. L., Alabduallah, B. I., Albahlal, B. M., Alajlan, S. A., . . . Siddiqui, T. (2023). Transformer Architecture-Based Transfer Learning for Politeness Prediction in Conversation. Sustainability, 15(14), 10828.
34. Venkatasubramanian, S., Hariprasath, S., "Aquila Optimization-Based Cluster Head Selection and Honey Badger-Based Energy Efficient Routing Protocol in WSN", Proceedings of the International Conference on Intelligent Computing, Communication and Information Security. ICICCIS 2022. Algorithms for Intelligent Systems. Springer, Singapore, pp 273–290.
35. Venkatasubramanian, Suhasini, and Vennila, "Cluster Head Selection using Spotted Hyena Optimizer for Energy-Efficient Routing in MANET," IAENG International Journal of Computer Science, vol. 50, no.3, pp1122-1129, 2023
36. Rasul, H. O. (2023). Synthesis, evaluation, in silico ADMET screening, HYDE scoring, and molecular docking studies of synthesized 1-trityl-substituted 1 H-imidazoles. Journal of the Iranian Chemical Society, 20(12), 2905-2916.
37. Rasul, H. O., Thomas, N. V., Ghafour, D. D., Aziz, B. K., Salgado M, G., Mendoza-Huizar, L. H., & Candia, L. G. (2023). Searching possible SARS-CoV-2 main protease inhibitors in constituents from herbal medicines using in silico studies. Journal of Biomolecular Structure and Dynamics, 1-15.
38. Rasul, H. O., Sabir, D. K., Aziz, B. K., Guillermo Salgado, M., Mendoza-Huizar, L. H., Belhassan, A., & Ghafour, D. D. (2023). Identification of natural diterpenes isolated from Azorella species targeting dispersin B using in silico approaches. Journal of Molecular Modeling, 29(6), 182.

39. Rasul, H. O., Aziz, B. K., Morán, G. S., Mendoza-Huizar, L. H., Belhassan, A., Candia, L. G., ... & Sadasivam, K. (2023). A Computational Study of The Antioxidant Power Of Eugenol Compared To Vitamin C. Química Nova, 46, 873-880.
40. Rasul, H. O., Aziz, B. K., Ghafour, D. D., & Kivrak, A. (2022). In silico molecular docking and dynamic simulation of eugenol compounds against breast cancer. Journal of molecular modeling, 28(1), 17.
41. Rasul, H. O., Aziz, B. K., Ghafour, D. D., & Kivrak, A. (2023). Discovery of potential mTOR inhibitors from Cichorium intybus to find new candidate drugs targeting the pathological protein related to the breast cancer: an integrated computational approach. Molecular Diversity, 27(3), 1141-1162.
42. Rasul, H. O., Aziz, B. K., Ghafour, D. D., & Kivrak, A. (2023). Screening the possible anti-cancer constituents of Hibiscus rosa-sinensis flower to address mammalian target of rapamycin: An in silico molecular docking, HYDE scoring, dynamic studies, and pharmacokinetic prediction. Molecular Diversity, 27(5), 2273-2296.
43. Margiana, R., Alsaikhan, F., Al-Awsi, G. R. L., Patra, I., Sivaraman, R., Fadhil, A. A., ... & Hosseini-Fard, S. (2022). Functions and therapeutic interventions of non-coding RNAs associated with TLR signaling pathway in atherosclerosis. Cellular Signalling, 100, 110471.
44. Arif, A., Alameri, A. A., Tariq, U. B., Ansari, S. A., Sakr, H. I., Qasim, M. T., ... & Karampoor, S. (2023). The functions and molecular mechanisms of Tribbles homolog 3 (TRIB3) implicated in the pathophysiology of cancer. International Immunopharmacology, 114, 109581.
45. Lei, Z., Alwan, M., Alamir, H. T. A., Alkaaby, H. H. C., Farhan, S. S., Awadh, S. A., ... & Nekuei, A. (2022). Detection of abemaciclib, an anti-breast cancer agent, using a new electrochemical DNA biosensor. Frontiers in Chemistry, 10, 980162.
46. Bashar, B. S., Kareem, H. A., Hasan, Y. M., Ahmad, N., Alshehri, A. M., Al-Majdi, K., ... & Qasim, M. T. (2022). Application of novel Fe3O4/Zn-metal organic framework magnetic nanostructures as an antimicrobial agent and magnetic nanocatalyst in the synthesis of heterocyclic compounds. Frontiers in Chemistry, 10, 1014731.
47. M Abbas, M., W Abooud, K., Qasim Mohammed, A., Hasan Al-Zubaidi, S., Hussain, A., M Hameed, N., ... & Ahmad Batayneh, K. (2022). Effects of various irrigation levels and biochar-based fertilizers on peanut production. Journal of Nuts, 13(4), 289-300.
48. Hussein, H. A., Khudair, S. A., Alwan, M., Aljawahiry, T., T Qasim, M., & V Pavlova, I. (2022). Impact of pollution caused by salmon breeding centers on river water quality. Caspian Journal of Environmental Sciences, 20(5), 1039-1045.
49. Lafta, H. A., AbdulHussein, A. H., Al-Shalah, S. A., Alnassar, Y. S., Mohammed, N. M., Akram, S. M., ... & Najafi, M. (2023). Tumor-Associated Macrophages (TAMs) in Cancer Resistance; Modula-tion by Natural Products. Current topics in medicinal chemistry.
50. Al-Jassani, M. J., Sayah, M. A., Qasim, M. T., Kadhim, A. J., & Muhammad, E. H. (2022). Isolation and Evaluation of Antibacterial Agents Produced by Soil Bacillus SP. and Study Some of their Immunological Parameters. Revista Electronica de Veterinaria, 23(4), 105-111.
51. Sane, S., Mahoori, A., Abdulabbas, H. S., Alshahrani, S. H., Qasim, M. T., Abosaooda, M., ... & Darvishzadehdaledari, S. (2023). Investigating the effect of pregabalin on postoperative pain in non-emergency craniotomy. Clinical Neurology and Neurosurgery, 226, 107599.
52. Al Anazi, A. A., Barboza-Arenas, L. A., Romero-Parra, R. M., Sivaraman, R., Qasim, M. T., Al-Khafaji, S. H., ... & Gono, R. (2023). Investigation and Evaluation of the Hybrid System of Energy Storage for Renewable Energies. Energies, 16(5), NA-NA.
53. Hjazi, A., Nasir, F., Noor, R., Alsalamy, A., Zabibah, R. S., Romero-Parra, R. M., ... & Akram, S. V. (2023). The pathological role of CXC chemokine receptor type 4 (CXCR4) in colorectal cancer (CRC) progression; special focus on molecular mechanisms and possible therapeutics. Pathology-Research and Practice, 154616.
54. Althomali, R. H., Al-Hawary, S. I. S., Gehlot, A., Qasim, M. T., Abdullaeva, B., Sapaev, I. B., ... & Alsalamy, A. (2023). A novel Pt-free counter electrode based on MoSe2 for cost effective dye-sensitized solar cells (DSSCs): Effect of Ni doping. Journal of Physics and Chemistry of Solids, 182, 111597.

55. Hjazi, A., Ahsan, M., Alghamdi, M. I., Kareem, A. K., Al-Saidi, D. N., Qasim, M. T., ... & Mirzaei, R. (2023). Unraveling the Impact of 27-Hydroxycholesterol in Autoimmune Diseases: Exploring Promising Therapeutic Approaches. Pathology-Research and Practice, 154737.
56. Gupta, J., Suliman, M., Ali, R., Margiana, R., Hjazi, A., Alsaab, H. O., ... & Ahmed, M. (2023). Double-edged sword role of miRNA-633 and miRNA-181 in human cancers. Pathology-Research and Practice, 154701.
57. Al-Hawary, S. I. S., Kadhum, W. R., Saleh, E. A. M., Yacin, Y., Abdullah, E. A., Qasim, M. T., ... & Alsalamy, A. (2023). Tunneling induced swapping of orbital angular momentum in a quantum dot molecule. Laser Physics, 33(9), 096001.
58. Gaffar Sarwar Zaman, Ibrahem Waleed, Ruaa Ali Obeid, Shaymaa Abdulhameed Khudair, Saafa Abaas Abd Al-Kahdum, Kadhum Al-Majdi, Ahmed S. Abed, Ali Alsalamy, Maytham T. Qasim, Ahmed Hussien Radie Alawadi. (2023). Electrochemical determination of zearalenone in agricultural food samples using a flower like nanocomposite-modified electrode, Materials Chemistry and Physics,Volume 305,127986. ISSN 0254-0584.
59. Al-dolaimy, F., Kzar, M.H., Hussein, S.A. et al. (2023). Incorporating of Cobalt into UiO-67 Metal–Organic Framework for Catalysis CO2 Transformations: An Efficient Bi-functional Approach for CO2 Insertion and Photocatalytic Reduction. J Inorg Organomet Polym.
60. Muzammil Khursheed, Kzar Mazin Hadi, Mohammed Faraj, et al. (2023). Methanol extract of Iraqi Kurdistan Region Daphne mucronata as a potent source of antioxidant, antimicrobial, and anticancer agents for the synthesis of novel and bioactive polyvinylpyrrolidone nanofibers. Frontiers in Chemistry. Vol.1, 2296-2646.
61. Batool, Kiran; Zhao, Zhen-Yu; Irfan, Muhammad; Żywiołek, Justyna (2023): Assessing the role of sustainable strategies in alleviating energy poverty: an environmental sustainability paradigm. w: Environmental science and pollution research international 30 (25), s. 67109–67130.
62. Nayyar, Anand; Żywiołek, Justyna; Rosak Szyrocka, Joanna; Naved, Mohd (2023): Advances in distance learning in times of pandemic. First edition. Boca Raton, FL: Chapman & Hall/CRC Press.
63. Zywiolek, Justyna; Matulewski, Marek; Santos, Gilberto (2023): The Kano Model As A Tool For Assessing The Quality Of Hunting Tourism - A Case From Poland. w: IJQR 17 (3), s. 1097–1112.
64. Żywiołek, Justyna (2018): Monitoring of information security system elements in the metallurgical enterprises. w: MATEC Web Conf. 183, s. 1007.
65. Żywiołek, Justyna (2019): Personal data protection as an element of management security of information. w: Multidisciplinary Aspects of Production Engineering 2 (1), s. 515–522.
66. Żywiołek, Justyna; Schiavone, Francesco: The Value of data sets in Information and Knowledge Management as a Threat to Information Security, Garcia-Perez, Alexeis; Simkin, Lyndon (red.), w: European Conference on Knowledge Management, s. 882–891, dostępne na stronie internetowej: https://tinyurl.com/ECKM21.
67. Żywiołek, Justyna; Schiavone, Francesco (2021): Perception of the Quality of Smart City Solutions as a Sense of Residents' Safety. w: Energies 14 (17), s. 5511.
68. Tak, A. (2023). Succeeding Against the Odds: Project Management in Complex IT Scenarios. Journal of Technology and Systems, 5(2), 41–49.
69. Tak, A. (2023). Artificial Intelligence and Machine Learning in Diagnostics and Treatment Planning. Journal of Artificial Intelligence & Cloud Computing, 2(1), 1-6.
70. Tak, A. (2022). The Role of Artificial Intelligence in US Healthcare Information. International Journal of Science and Research, 11(12), 1302-1308.
71. Tak, A. (2022). Advanced AI Applications in Gaming with Cloud-Powered Media and Entertainment Experiences. Journal of Artificial Intelligence & Cloud Computing, 1(1), 1-4.
72. Tak, A. (2021). Comprehensive Study of AI-Driven Market Forecasting Models and Their Applicability. International Journal of Science and Research, 10(2), 1705-1709.

73. Tak, A. (2021). Multi-Modal Fusion for Enhanced Image and Speech Recognition in AI Systems. International Journal of Science and Research, 10(6), 1780-1788.
74. Tak, A. (2021). The Data Mining Techniques for Analyzing Employee Performance and Productivity. International Journal of Science and Research, 10(10), 1575-1578.
75. Tak, A. (2022). The Impact of Electronic Health Records on Patient Care in the US Healthcare System. Journal of Health Statistics Reports, 1(2), 1–7.
76. Tak, A. (2022). Big Data Analytics in Healthcare: Transforming Information into Actionable Insights. Journal of Health Statistics Reports, 1(3), 1-6.
77. Prashant Kumar and Ananda Shankar Hati "Review on Machine Learning Algorithm Based Fault Detection in Induction Motors," Archives of Computational Methods in Engineering, vol: 28, pp: 1929-1940, 2021.
78. Kumar Prashant and Hati, Ananda Shankar "Convolutional Neural Network with batch normalization for fault detection in SCIM," IET Electric Power Application, vol: 15, issue: 1, pp. 39-50, 2021.
79. Kumar Prashant and Hati, Ananda Shankar "Deep Convolutional Neural Network based on adaptive gradient optimizer for fault detection in SCIM," ISA Transactions, vol: 111, pp: 350-359, 2021.
80. Prince, Hati Ananda Shankar, Chakrabarti Prasun, Abawajy Jemal Hussein and Ng Wee Keong "Development of Energy Efficient Drive for Ventilation System using Recurrent Neural Network," Neural Computing and Applications, Vol. 33, no. 14, pp. 8659-8668, 2021.
81. Sinha Ashish Kumar, Hati Ananda Shankar, Benbouzid Mohamed and Chakrabarti Prasun "ANN-based Pattern Recognition for Induction Motor Broken Rotor Bar Monitoring under Supply Frequency Regulation" Machines (2021), vol: 9(5).
82. Prince and Hati Ananda Shankar "A Comprehensive Review of Energy-Efficiency of Ventilation System using Artificial Intelligence" Renewable and Sustainable Energy Reviews (2021), vol: 146, 2021.
83. Kumar Prashant and Hati, Ananda Shankar "Transfer Learning Based Deep CNN Model for Multiple Faults Detection in SCIM" Neural Computing and Applications (2021).
84. Prince and Hati Ananda Shankar "Temperature and Humidity Dependent MRAS Based Speed Estimation Technique for Induction Motor used in Mine Ventilation Drive" Journal of Mining Science, 2021, Vol. 57, No. 5, pp. 842–851.
85. Kumar Prashant and Hati, Ananda Shankar "Dilated Convolutional Neural Network Based Model For Bearing Faults and Broken Rotor Bar Detection in Squirrel Cage Induction Motors" Expert Systems With Applications (2022).
86. Prince and Hati Ananda Shankar "Convolutional Neural Network-Long Short Term Memory Optimization for Accurate Prediction of Airflow in a Ventilation System" Expert Systems with Applications (2022).
87. Vatsa Aniket and Hati Ananda Shankar "Depolarization Current Prediction of Transformers OPI System Affected From Detrapped Charge Using LSTM," in IEEE Transactions on Instrumentation and Measurement, vol. 71, pp. 1-11, 2022, Art no. 2511711.
88. Gorai Rahul, Hati Ananda Shankar, and Maity Tanmoy, "A new cascaded multilevel converter topology with a reduced number of components" 3rd IEEE 2017 Conference on International conference on Power, Control, Signals and Instrumentation Engineering (ICPCSI-2017), 21-22 September 2017 | IEEE, Chennai, India., pp. 539-543.
89. Kumar Prashant, Hati, Ananda Shankar, Sanjeevikumar Padmanaban, Leonowicz Zbigniew and Prasun Chakrabarti "Amalgamation of Transfer Learning and Deep Convolutional Neural Network for Multiple Fault Detection in SCIM" 2020 IEEE International Conference on Environment and Electrical Engineering and 2020 IEEE Industrial and Commercial Power Systems Europe (EEEIC/I&CPS Europe), 9th-12th June 2020, Madrid, Spain.
90. R Rai, &J.H. Kim ,Estimation of combining ability and gene action for growth and flowering traits in Lilium longiflorum.International Journal of Advanced Science and Technology,Vol.29 No.8S pp 1356-1363,2020

91. R. Rai, A. Badarch, and J.-H. Kim, “Identification Of Superior Three Way-Cross F1s, Its Line×Tester Hybrids And Donors For Major Quantitative Traits In Lilium×formolongi,” Journal of Experimental Biology and Agricultural Sciences, vol. 8, no. 2, pp. 157–165, Apr. 2020,
92. R. Rai, J. Shrestha, and J. Kim, “Line×tester analysis in lilium×formolongi: identification of superior parents for growth and flowering traits,” SAARC Journal of Agriculture, vol. 17, no. 1, pp. 175–187, Aug. 2019.
93. R. Rai,J.Shrestha and J.H.Kim “Combining Ability and Gene Action Analysis of Quantitative Traits in Lilium × formolongi,” vol. 30, no. 3, pp. 131–143, Dec. 2018.
94. T. X. Nguyen, S.-I. Lee, R. Rai, N. Kim, and Jong Hwa Kim, “Ribosomal DNA locus variation and REMAP analysis of the diploid and triploid complexes ofLilium lancifolium,” Genome, vol. 59, no. 8, pp. 551–564, Aug. 2016.
95. N. X. Truong, J. Y. Kim, R. Rai, J. H. Kim, N. S. Kim, and A. Wakana, “Karyotype Analysis of Korean Lilium maximowiczii Regal Populations,” Journal of The Faculty of Agriculture Kyushu University, vol. 60, no. 2, pp. 315–322, Sep. 2015.
96. Gaurav Kumawat, Santosh Kumar Viswakarma, Prasun Chakrabarti , Pankaj Chittora, Tulika Chakrabarti , Jerry Chun-Wei Lin, “Prognosis of Cervical Cancer Disease by Applying Machine Learning Techniques”, Journal of Circuits, Systems, and Computers, 2022.
97. Akhilesh Kumar Sharma, Gaurav Aggarwal, Sachit Bhardwaj, Prasun Chakrabarti, Tulika Chakrabarti, Jemal Hussain, Siddhartha Bhattarcharyya, Richa Mishra, Anirban Das, Hairulnizam Mahdin, “Classification of Indian Classical Music with Time-Series Matching using Deep Learning”, IEEE Access , 9 : 102041-102052 , 2021.
98. Akhilesh Kumar Sharma, Shamik Tiwari, Gaurav Aggarwal, Nitika Goenka, Anil Kumar, Prasun Chakrabarti, Tulika Chakrabarti, Radomir Gono, Zbigniew Leonowicz, Michal Jasiński , “Dermatologist-Level Classification of Skin Cancer Using Cascaded Ensembling of Convolutional Neural Network and Handcrafted Features Based Deep Neural Network”, IEEE Access , 10 : 17920-17932, 2022.
99. Abrar Ahmed Chhipa , Vinod Kumar, R. R. Joshi, Prasun Chakrabarti, Michal Jaisinski, Alessandro Burgio, Zbigniew Leonowicz, Elzbieta Jasinska, Rajkumar Soni, Tulika Chakrabarti, “Adaptive Neuro-fuzzy Inference System Based Maximum Power Tracking Controller for Variable Speed WECS”, Energies ,14(19) :6275, 2021.
100. Chakrabarti P. , Goswami P.S., “Approach towards realizing resource mining and secured information transfer”, International Journal of Computer Science and Network Security, 8(7), pp.345-350, 2008.
101. Chakrabarti P., Choudhury A., Naik N. , Bhunia C.T., “Key generation in the light of mining and fuzzy rule”, International Journal of Computer Science and Network Security, 8(9), pp.332-337, 2008.
102. Chakrabarti P., De S.K., Sikdar S.C., “Statistical Quantification of Gain Analysis in Strategic Management” , International Journal of Computer Science and Network Security,9(11), pp.315-318, 2009.
103. Chakrabarti P. , Basu J.K. , Kim T.H., “Business Planning in the light of Neuro-fuzzy and Predictive Forecasting”, Communications in Computer and Information Science , 123, pp.283-290, 2010.
104. Prasad A. , Chakrabarti P., “Extending Access Management to maintain audit logs in cloud computing", International Journal of Advanced Computer Science and Applications ,5(3),pp.144-147, 2014.
105. Sharma A.K., Panwar A., Chakrabarti P. ,Viswakarma S., “Categorization of ICMR Using Feature Extraction Strategy and MIR with Ensemble Learning”, Procedia Computer Science, 57,pp.686-694,2015.
106. Patidar H. , Chakrabarti P., “A Novel Edge Cover based Graph Coloring Algorithm”, International Journal of Advanced Computer Science and Applications , 8(5),pp.279-286,2017.
107. Patidar H., Chakrabarti P., Ghosh A., “Parallel Computing Aspects in Improved Edge Cover based Graph Coloring Algorithm”, Indian Journal of Science and Technology ,10(25),pp.1-9,2017.
108. Tiwari M., Chakrabarti P, Chakrabarti T., “Novel work of diagnosis in liver cancer using Tree classifier on liver cancer dataset (BUPA liver disorder)” , Communications in Computer and Information Science , 837, pp.155-160, 2018.

109. Verma K., Srivastava P. , Chakrabarti P., "Exploring structure oriented feature tag weighting algorithm for web documents identification", Communications in Computer and Information Science ,837, pp.169-180, 2018.
110. Tiwari M., Chakrabarti P , Chakrabarti T., "Performance analysis and error evaluation towards the liver cancer diagnosis using lazy classifiers for ILPD", Communications in Computer and Information Science , 837, pp.161-168,2018.
111. Patidar H. , Chakrabarti P., "A Tree-based Graphs Coloring Algorithm Using Independent Set", Advances in Intelligent Systems and Computing, 714, pp. 537-546, 2019.
112. Chakrabarti P., Satpathy B., Bane S., Chakrabarti T., Chaudhuri N.S. , Siano P., "Business forecasting in the light of statistical approaches and machine learning classifiers", Communications in Computer and Information Science , 1045, pp.13-21, 2019.
113. A. T. Hoang, A. T. Le, and V. V. Pham, "A core correlation of spray characteristics, deposit formation, and combustion of a high-speed diesel engine fueled with Jatropha oil and diesel fuel," Fuel, vol. 244, pp. 159–175, 2019.
114. A. T. Hoang, S. Nižetić, and A. I. Ölçer, "2,5-Dimethylfuran (DMF) as a promising biofuel for the spark ignition engine application: A comparative analysis and review," Fuel, vol. 285, p. 119140, Feb. 2021.
115. Chakrabarti P. ,Chakrabarti T., Sharma M . , Atre D, Pai K.B., "Quantification of Thought Analysis of Alcohol-addicted persons and memory loss of patients suffering from stage-4 liver cancer", Advances in Intelligent Systems and Computing, 1053, pp.1099-1105, 2020.
116. Chakrabarti P., Bane S.,Satpathy B.,Goh M, Datta B N , Chakrabarti T., "Compound Poisson Process and its Applications in Business", Lecture Notes in Electrical Engineering, 601, pp.678-685,2020.
117. Chakrabarti P., Chakrabarti T., Satpathy B., SenGupta I . Ware J A., "Analysis of strategic market management in the light of stochastic processes, recurrence relation, Abelian group and expectation", Advances in Artificial Intelligence and Data Engineering, 1133 , pp.701-710, 2020.
118. Kothi N., Laxkar P. Jain A. , Chakrabarti P., "Ledger based sorting algorithm", Advances in Intelligent Systems and Computing, 989, pp. 37-46, 2020.
119. M. A. Veronin, R. P. Schumaker, and R. Dixit, 'The irony of MedWatch and the FAERS database: an assessment of data input errors and potential consequences', Journal of Pharmacy Technology, vol. 36, no. 4, pp. 164–167, 2020.
120. M. A. Veronin, R. P. Schumaker, R. Dixit, and M. Ogwo, 'Irony of the FAERS Database: An Analysis of Data Input Errors and Potential Consequences', in IIMA/ICITED Joint Conference 2018, 2018, pp. 101–116.
121. M. A. Veronin, R. P. Schumaker, R. R. Dixit, and H. Elath, 'Opioids and frequency counts in the US Food and Drug Administration Adverse Event Reporting System (FAERS) database: A quantitative view of the epidemic', Drug, Healthcare and Patient Safety, pp. 65–70, 2019.
122. M. A. Veronin, R. P. Schumaker, R. R. Dixit, and H. Elath, 'Opioids and Frequency Counts in the US Food and Drug Administration Adverse Event Reporting System (FAERS) Database', Current Aspects in Pharmaceutical Research and Development Vol. 8, pp. 35–43, 2022.
123. M. A. Veronin, R. P. Schumaker, R. R. Dixit, P. Dhake, and M. Ogwo, 'A systematic approach to'cleaning'of drug name records data in the FAERS database: a case report', International Journal of Big Data Management, vol. 1, no. 2, pp. 105–118, 2020.
124. M. Farooq and M. Hassan, "IoT smart homes security challenges and solution," International Journal of Security and Networks, vol. 16, no. 4, p. 235, 202.
125. M. Farooq and M. Khan, "Signature-Based Intrusion Detection System in Wireless 6G IoT Networks," Journal on Internet of Things, vol. 4, no. 3, pp. 155–168, 2023.
126. M. Farooq, "Artificial Intelligence-Based Approach on Cybersecurity Challenges and Opportunities in The Internet of Things & Edge Computing Devices," International Journal of Engineering and Computer Science, vol. 12, no. 07, pp. 25763–25768, Jul. 2023.

127. M. Farooq, "Supervised Learning Techniques for Intrusion Detection System Based on Multi-layer Classification Approach," International Journal of Advanced Computer Science and Applications, vol. 13, no. 3, 2022.
128. M. Farooq, R. Khan, and M. H. Khan, "Stout Implementation of Firewall and Network Segmentation for Securing IoT Devices," Indian Journal of Science and Technology, vol. 16, no. 33, pp. 2609–2621, Sep. 2023.
129. Magare A., Lamin M., Chakrabarti P., "Inherent Mapping Analysis of Agile Development Methodology through Design Thinking", Lecture Notes on Data Engineering and Communications Engineering, 52, pp.527-534,2020.
130. Mandvikar, S. (2023). Indexing robotic process automation products. International Journal of Computer Trends and Technology, 71(8), 52–56.
131. Mohd Akbar, Irshad Ahmad, Mohsina Mirza, Manavver Ali, Praveen Barmavatu "Enhanced authentication for de-duplication of big data on cloud storage system using machine learning approach", Cluster Computing, Springer Publisher , 2023. https://link.springer.com/article/10.1007/s10586-023-04171-y
132. Priyadarshi N., Bhoi A.K., Sahana S.K., Mallick P.K. , Chakrabarti P., Performance enhancement using novel soft computing AFLC approach for PV power system", Advances in Intelligent Systems and Computing, 1040, pp.439-448,2020.
133. Priyadarshi N., Bhoi A.K., Sharma A.K., Mallick P.K. , Chakrabarti P., "An efficient fuzzy logic control-based soft computing technique for grid-tied photovoltaic system", Advances in Intelligent Systems and Computing, 1040,pp.131-140,2020.
134. R. Boina, A. Achanta, and S. Mandvikar, "Integrating data engineering with intelligent process automation for business efficiency," International Journal of Science and Research, vol. 12, no. 11, pp. 1736–1740, 2023.
135. R. Dixit, R. P. Schumaker, and M. A. Veronin, 'A Decision Tree Analysis of Opioid and Prescription Drug Interactions Leading to Death Using the FAERS Database', in IIMA/ICITED Joint Conference 2018, 2018, pp. 67–67.
136. R. P. Schumaker, M. A. Veronin, and R. R. Dixit, 'Determining Mortality Likelihood of Opioid Drug Combinations using Decision Tree Analysis', 2022.
137. R. P. Schumaker, M. A. Veronin, T. Rohm, M. Boyett, and R. R. Dixit, 'A Data Driven Approach to Profile Potential SARS-CoV-2 Drug Interactions Using TylerADE', Journal of International Technology and Information Management, vol. 30, no. 3, pp. 108–142, 2021.
138. R. Regin, S. Suman Rajest, Shynu T, & Steffi. R. (2023). Planning the Most Effective Itinerary for Tourists through the use of Data Analysis. International Journal of Human Computing Studies, 5(12), 77-92.
139. R. Schumaker, M. Veronin, R. Dixit, P. Dhake, and D. Manson, 'Calculating a Severity Score of an Adverse Drug Event Using Machine Learning on the FAERS Database', in IIMA/ICITED UWS Joint Conference, 2017, pp. 20–30.
140. R. Schumaker, M. Veronin, T. Rohm, R. Dixit, S. Aljawarneh, and J. Lara, 'An Analysis of Covid-19 Vaccine Allergic Reactions', Journal of International Technology and Information Management, vol. 30, no. 4, pp. 24–40, 2021.
141. Regin, R., S. Suman Rajest, Shynu T, and Steffi. R. "Application of Machine Learning to the Detection of Retinal Diseases". European Journal of Life Safety and Stability, 37(1): 1-23.
142. S. Mandvikar and A. Achanta, "Process automation 2.0 with generative AI framework," Int. J. Sci. Res. (Raipur), vol. 12, no. 10, pp. 1614–1619, 2023.
143. S. Mandvikar, "Augmenting intelligent document processing (IDP) workflows with contemporary large language models (LLMs)," International Journal of Computer Trends and Technology, vol. 71, no. 10, pp. 80–91, 2023.
144. S. Mandvikar, "Factors to Consider When Selecting a Large Language Model: A Comparative Analysis," International Journal of Intelligent Automation and Computing, vol. 6, no. 3, pp. 37–40, 2023.

145. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2023). An Approach Based on Machine Learning for Conducting Sentiment Analysis on Twitter Data. International Journal of Human Computing Studies, 5(12), 57-76.
146. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2023). Using Voice Guidance, an Intelligent Walking Assistance Mechanism for the Blind. Central Asian Journal of Theoretical and Applied Science, 4(11), 41-63. Retrieved from https://cajotas.centralasianstudies.org/index.php/CAJOTAS/article/view/1335
147. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2024). A QR Code-Based Real-Time Auditing System for Safe Online Data Storage. International Journal of Human Computing Studies, 6(1), 10-28.
148. S. Suman Rajest, R. Regin, Shynu T, & Steffi. R. (2024). Analysis of Sentimental Bias the Implementation of Supervised Machine Learning Algorithms. International Journal of Innovative Analyses and Emerging Technology, 4(1), 8–33.
149. S. Suman Rajest, S. Silvia Priscila, R. Regin, Shynu T, & Steffi. R. (2023). Application of Machine Learning to the Process of Crop Selection Based on Land Dataset. International Journal on Orange Technologies, 5(6), 91-112.
150. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2023). Android Application for Remote Control of Personal Computers. International Journal on Orange Technologies, 5(12), 44-58.
151. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2023). Region Segmentation and Support Vector Machine for Brain Tumour Stage Analysis, Detection, and Automatic Classification. Central Asian Journal of Medical and Natural Science, 25-43.
152. Shynu T, S. Suman Rajest, R. Regin, & Steffi. R. (2024). Using a Deep Convolutional Neural Network to Identify Vehicle Driver Activity. International Journal on Orange Technologies, 6(1), 1-19.
153. Steffi. R, Shynu T, S. Suman Rajest, & R. Regin. (2023). A Convolutional Neural Network with a U-Net for Brain Tumor Segmentation and Classification. Central Asian Journal of Medical and Natural Science, 4(6), 1326-1343.
154. Suman Rajest, S., Regin, R., Y, A., Paramasivan, P., Christabel, G. J. A., & T, Shynu. (2023). The Analysis of How Artificial Intelligence Has an Effect on Teachers and The Education System. EAI Endorsed Transactions on E-Learning, 9(4), 1-10.
155. Sundararajan, V., Steffi, R., & Shynu, T. (2023). Data Fusion Strategies for Collaborative Multi-Sensor Systems: Achieving Enhanced Observational Accuracy and Resilience. FMDB Transactions on Sustainable Computing Systems, 1(3), 112–123.
156. Tak, A. (2023). The Role of Cloud Computing in Modernizing Healthcare IT Infrastructure. Journal of Artificial Intelligence & Cloud Computing, 2(2), 1–7.
157. Tak, A., & Sundararajan, V. (2023, December 2). Pervasive Technologies and Social Inclusion in Modern Healthcare: Bridging the Digital Divide. FMDB Transactions on Sustainable Health Science Letters, 1(3), 118-129.
158. W.-H. Chen, P. P. Biswas, H. C. Ong, A. T. Hoang, T.-B. Nguyen, et al., "A critical and systematic review of sustainable hydrogen production from ethanol/bioethanol: Steam reforming, partial oxidation, and autothermal reforming," Fuel, vol. 333, p. 126526, Feb.