JEDIC

Journal of Ethics and Diversity in International Communication

| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

Poultry Farm Using Sensor Technologies in Their Operations

Dr. C. R. Rathish
Associate Professor, Department of Computer Engineering, New Horizon College of Engineering, Bengaluru, India

Dr. Sivaramakrishnan S
Department of Electronics and Communication Engineering, Dayananda Sagar University, India

Annotation: Hands-on management is the norm in most henhouses. Air quality, temperature, and humidity are only a few environmental characteristics that must be properly maintained. Each of these factors affects poultry production. There is a much higher mortality rate among broiler chickens than the normal rate. Using IoT and Wireless Sensor Networks, this research hopes to improve the health of Brunei's chickens by reducing the mortality rate and increasing the number of healthy chicks that can be produced (WSN). Prototypes developed using IoT and WSN technologies were used to verify the above parameters against thresholds. Autocorrection operations are triggered whenever one or more of these parameters cross a predetermined threshold. Additionally, the user is alerted through SMS when something goes wrong with the system. These metrics can also be tracked and displayed via a Web interface.

Keywords: Poultry Farm, Using Sensor, Technologies, Operations, automatic alert notification.

Introduction:

Both meat and eggs are nutrient-dense. They're eaten for their protein and mineral content. Due to rising demand, chicken farming is one of India's most important agricultural industries [1]. This project emphasizes layer chicken growth [2]. Layer hens lay eggs. Temperature, air quality, humidity, food, and water must guarantee healthy chicken growth. The suggested initiative attempts to boost India's production by automating monitoring the above elements and cultivating poultry feed using the Internet of Things (IoT) [3].

Objective

The main objective of our project is to

- To reduce the mortality rate of chicken
- Less manpower
- To produce a healthy chicken

Its methods allow for remote monitoring and control of chickens from afar. Environmental monitoring and control are critical and require study in agriculture and biology [4-11]. According to a global survey, chicken is a popular food crop. In terms of nutrition, it's rich in protein, low in fat and cholesterol, and requires little effort to consume. Increasing consumer knowledge of the safety of food products like chickens and growing demand for high-quality chicken food have occurred in recent years [12-22]. Through remote sensing, wireless sensors and mobile networks are linked together in this study. Broiler hens aged 49 to 63 days are affected by the temperature-humidity index [23]. The temperature in the coop has an impact on both the productivity and living performance of the chickens housed there [24-37]. High ventilation rates are required for heavy

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

broilers (more than 3.2 kg) to keep them warm and productive. Large birds pant in mild to moderate temperatures, suggesting that the highest temperature threshold is lower for heavier birds [38]. These, or temperature-humidity indices, integrate the two variables. There is a possibility that the heat could affect performance. In this investigation, heavy broilers were kept at dry-bulb temperatures of 15°C, 21°C, and 27°C, as well as relative humidity levels of 50, 65, and 80 percent. Monitoring and automation of chicken farms utilizing wireless sensors and GPRS networks is the goal to control and automatically monitor environmental elements such as temperature, humidity, ammonia gas, etc., a study on smart poultry farm automation and monitoring system incorporated wireless sensors and GPRS network [39-45]. Users may be sent a text message about chicken farms' internal environmental conditions. The system responds to a sudden change in the climate by regulating environmental elements. Food and water levels are monitored using sensors. Poultry farms' environmental records are available for review online. It was decided to use the low-power, high-performance Raspberry Pi processor. The LM35 temperature, SY-HS-220 Humidity, and MQ135 sensors detect Ammonia Gas in the air. The water level is measured using an MQ Smoke Sensor and a Level Sensor. Sensors are shown in the diagram below as being used to link automation devices in a chicken farm [46-67].

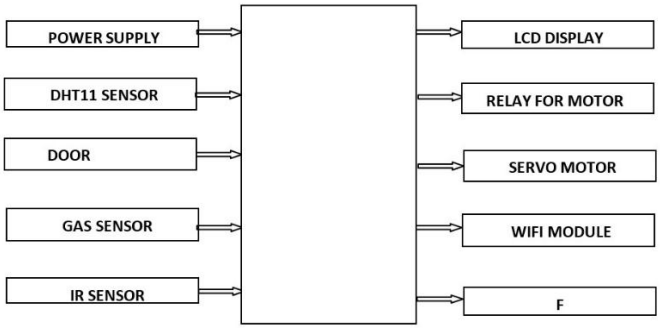

Figure 1: Block Diagram

Block diagram showing (figure 1) sensor and Arduino poultry farm automation [68]. This provides a high-level overview of system components, process participants, and working connections. The graphic below depicts how sensors connect poultry farm automation equipment. Circuit schematics design, build, and maintain electronics. This diagram demonstrates a sensor-based automated poultry farm [69-75].

Working Principle

A temperature sensor will automatically turn on a fan or heater. A DHT11 sensor can accurately measure indoor temperatures [76-89]. The microprocessor turns on the exhaust fan or heater depending on whether the chicken coop needs cooling or heating. It provides comfortable, energy-efficient conditions for cattle without manual monitoring. The DHT11 sensor determines whether to humidify or dehumidify the chicken coop. When the DHT11 sensor's humidity is below the threshold, a steam-producing electric jug humidifies the poultry house. When humidity is high, the exhaust fan turns on [90]. The fan removes unnecessary dampness. Crowding away from heat sources and flailing wings frequently indicate high temperatures [91-115].

Proposed System

The suggested system sends IoT data. A wireless Sensor Network (WSN) consists of spatially distributed autonomous devices employing sensors to monitor physical or environmental factors, such as temperature and humidity [116-122]. The sensor measures environmental temperature. The

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

humidity sensor estimates air temperature, while the Gas sensor detects gas. IoT receives all info. Network nodes communicate wirelessly. Each node may sense, process, and broadcast data to neighboring nodes or the base station [123]. LCDs controller status. In this article, fire protection and anti-theft elements assure farm surveillance. Data storage through IoT is another appealing feature of this technology, allowing users to determine the necessary preset before any threats materialize. This increases agricultural productivity and produces healthy poultry [124-131].

Pin Diagram

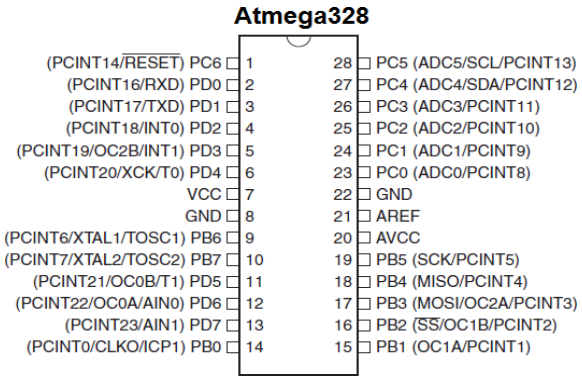

Figure 2: Pin Diagram

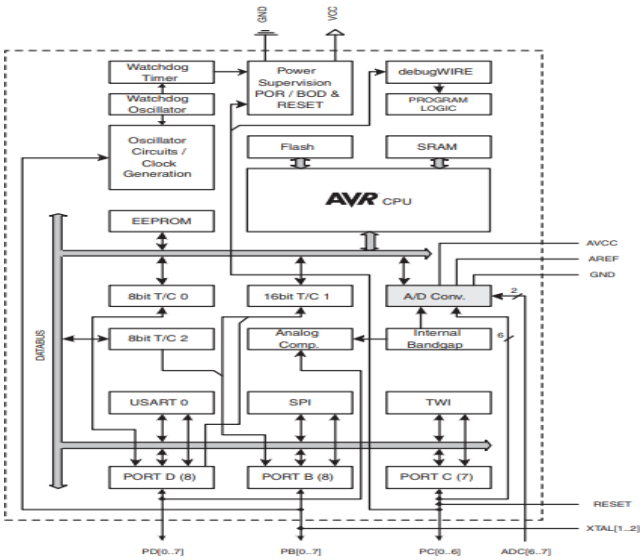

Figure 3: Architecture Diagram

The AVR has separate programs, data memory, and buses to maximize performance and parallelism (figures 2 and 3). Single-level pipelining executes program memory instructions [132-141]. This idea executes instructions per clock cycle. Programming memory is reprogrammable flash. Controls Unit 32x8 GPR Bus ALU Data 8-bit SRAM SPI Instruction Decoder Stopwatch ADC EEPROM I/Os Control Lines I/O Module Straightforward Redirect Program Counter Flash Program Memory I/O Module 2. ALU can also do single-register operations. The status register is updated after an arithmetic operation [147].

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

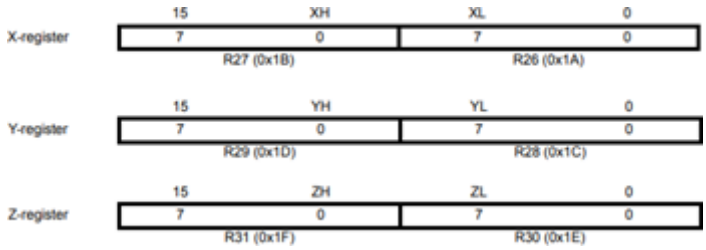

Figure 4: Arithmetic operation

Jump and call instructions directly (figure 4) address the entire addresses space to control programme flow. AVR instructions are 16-bit words. Every programme memory address is 16- or 32-bit. Boot programme and application programme parts split programme flash memory. During interruptions and subroutine calls, the stack stores the PC. SP is writable in I/O space. AVR's five addressing modes make data SRAM easy to reach [148-167]. AVR's memory areas are linear and regular. The stack stores temporary data, local variables, and procedure return addresses. The stack grows from top to bottom. The stack pointer register always points up. The stack pointer points to the Subroutine and interrupts stacks in SRAM [168-171].

Power Supply

USB or external power can power the Arduino Uno. Automatically chooses power source. An AC-to-DC adapter (wall-wart) or battery can provide external (non-USB) power. The board may be unstable if less than 7V is given to the 5V pin. Using more than 12V may destroy the board's voltage regulator [172-185]. 7-12 volts is preferable. Power pins: VIN. Arduino's external power input voltage (as opposed to 5 volts from the USB connection or other regulated power source). The onboard regulator produces 3.3 V. 50 mA is the max current. GND Electrodes. Sleep modes allow applications to power down unneeded MCU modules. The AVR's sleep modes let you adapt power consumption to your application. When activated, BOD checks power supply voltage during sleep times [186-191].

General Purpose Input and Output

Using pin Mode (), digital Write (), and digital Read (), each of Uno's 14 digital pins can be utilized as an input or output. 5 volts. Each pin may deliver or receive 40 mA and contains a 20-50 KOhm pull-up resistor (disconnected by default). Some pins are specialized. RX0 and RX1 (TX). TTL serial data RX and TX [192-195]. These pins connect to ATmega8U2 USB-to-TTL Serial chip pins. Two external interruptions. These pins might trigger an interrupt on a low value, rising or falling edge, or value change. Details are in Interrupt (). PWM 3,5,6,9,10,11 analogWrite () produces 8-bit PWM. (SS), (MOSI), (MISO), (13). (SCK). These pins provide SPI communication, which is given by the hardware but not an Arduino [196]. 13-LED Pin 13 has an integrated LED. LED is on when the pin is HIGH; off when low. The Uno has 6 analog inputs with 10-bit resolution (i.e., 1024 different values). They measure from ground to 5 volts by default, although the AREF pin and analog Reference() function can adjust this. Some pins are specialized.

DHT11 Sensor

This DHT11 Temperature and Humidity Sensor provides a calibrated digital signal output. This sensor has a resistive element and a wet NTC sensor [197-199]. It's high-quality, quick, and anti-interference. Each DHT11 sensor's humidity chamber is accurate. The single-wire serial interface system is simplified. Small size, low power, and 20-meter signal transmission distance enable numerous applications (figure 5).

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

Figure 5: DHT11 sensor

DHT11 sensor reads temperature and humidity. DHT11's analog output is connected to Arduino A0's analog input. 3-pin dht11 sensor. The dht11 sensor also calculates dew point, heat index, etc. High humidity requires this. High humidity causes this. Hair's humidity level. High humidity causes sweating.

4.3.4 IR SENSOR IR LEDTransmitter

Infrared LEDs emit infrared light. IR light's wavelength (700nm – 1mm) is higher than visible light's. IR LEDs offer a 20-60-degree light-emitting angle and a range of approx. IR transmitter type and manufacturer determine range. Kilometer-range transmitters exist. Photoreceptor When light lands on a photodiode, it conducts IR. The photodiode is a P-N junction semiconductor that operates in Reverse Bias when light hits it. Light affects current flow. This allows IR detection. The photodiode has a black covering like an LED; black absorbs light most. Preset Variable Resistor It calibrates the detection range (figure 6).

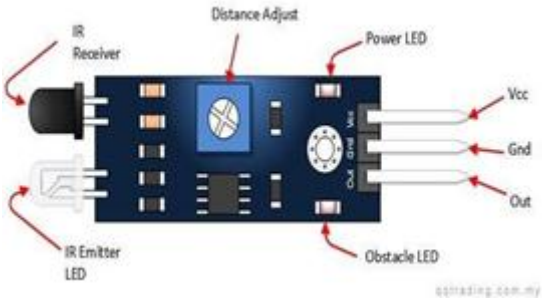

Figure 6: IR sensor

Gas Sensor

MQ-135 Gas sensors detect or measure NH3, NOx, Alcohol, Benzene, Smoke, and CO2 in air quality control systems. The MQ-135 sensor module's Digital Pin makes it work without a microprocessor. This helps when detecting one gas (figure 7).

Figure 7: Gas sensor

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

DC Water Pump

Micro Submersible Pump 3-6V DIY little water pump for a garden fountain. This tiny Submersible Pump Motor runs on 3 6V. Connect the tube to the motor outlet, submerge it, and power it. Motorized pumps use 6,12,24 or 32 volts DC. A basic gear drive powers the impeller in a sealed container (figure 8).

Figure 8: DC Water Pump

Relay Board

Electromechanical relays have coils. A little current via the coil creates a magnetic field that moves, closes, or opens the switch. A relay controls a high-voltage (AC or DC) circuit using a tiny DC circuit without any direct electrical connection (figure 9).

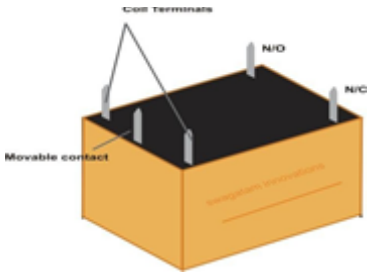

Figure 9: Relay

Operations of Relay

A small DC energizes the relay coil. The armature is attracted to the NO pin. When the coil current stops, the armature returns to its usual position, connecting COM to NC (Normally Connected). All fundamental relays operate similarly (figure 10).

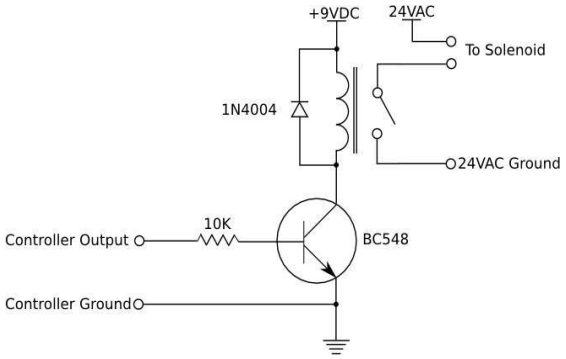

Figure 10: Circuit Diagram of relay

Selecting Your Servo Motor

Each servo motor has you can prefer a 0° to 360° motor or modify the motor to form a full circle. If your application requires stronger and longer-running motors, choose metal or plastic gears (figure 11).

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

Figure 11: Servo motor

Next is the motor's torque. At 0.5cm, the engine can pull 5kg; at 2cm, only 1.25. The project's load determines the motor's torque.

How To Use A Servo Motor

Then comes the matter of how to use the Servo motor. This motor has three wires. This page's top describes it. To rotate this motor, we must supply +5V via the Red and Brown wires and PWM via the Orange wire (figure 12).

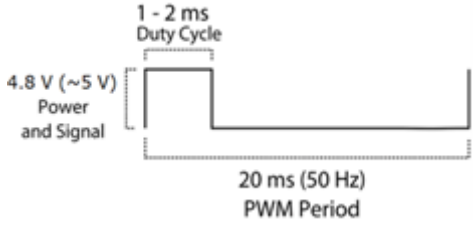

Figure 12: Servo motor with PWM period

50Hz PWM signal, 20ms time. On-Time is 1ms to 2ms. When the on-time is 1ms, the motor is at 0°, 1.5ms, 90°, and 2ms, 180°.

LCD Display

Hobbyists employ many displays. LCDs are their most advanced display device. Once you interface it, it'll be your easiest and most reliable output device. Debuggers aren't always usable for microcontroller-based projects. LCDs can test outputs. LCDs block light. Electrical currents arrange liquid crystal molecules, allowing light to pass through and form colors and images. A liquid crystal display's backlight illuminates rectangular pixels.

Wi-Fi Module

It can also get online data through API, making your app smarter. This module may be programmed using Arduino IDE, making it user-friendly. This module version has just 2 GPIO pins (you may hack it to utilize up to 4). Thus, you must use it with another microcontroller like Arduino; otherwise, choose the ESP-12 or ESP-32 variants (figure 13).

JEDIC
Journal of Ethics and Diversity in International Communication
| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 2 Issue: 7

Figure 13: Wi-Fi Module

Buzzer

Mechanical, electromechanical, or piezoelectric buzzers are auditory signaling devices. Alarms, timers, and user input confirmation use buzzers. Mechanical, electromechanical, or piezoelectric buzzers are auditory signaling devices. Buzzers and beepers are used as alarms, timers, and user input confirmations (mouse click, keystroke). DC voltage produces single-tone sound. Future Electronics has several common types: Sound Level, Frequency, Rated Voltage, Dimension, and Packaging Type (figure 14).

Figure 14: Buzzer

Result

A cooling fan and light generate a more stable temperature (about 32 degrees Celsius) than without them, promoting healthy hens. Using a fan and light generates more consistent relative humidity (about 60%) than without them. This makes barn chickens healthier. Assume good hygiene, food, and water are also maintained. In that instance, reducing chicken farm mortality will boost output (figure 15).

Figure 15: Output image

Conclusions

The climate on the farm influences the health of the hens and the farm employees. Hens might

suffer from digestive, respiratory, and other health issues due to poor climatic circumstances. Environment control is challenging in Brunei because of the country's tropical climate. IoT and mobile technology in Brunei poultry farms can enhance the climate and reduce mortality. Data analytics can be used to predict bird diseases like bird flu and others that can have devastating effects on the poultry farm eco-system to help the farm owner take corrective action before it happens. A sleep-and-wake mode can be used in the smart chicken coop to save energy. An automated extinguisher system can be implemented at a future date. We can submit chicken vaccine remnants, worker information, and so on on the internet. A food preserver and a playhouse employ the same technology.

References

1. Muhammad Faiz Haji Hambali, Ravi Kumar patchumthu, Au Thien Wan, "IOT Based Smart Poultry Farm in Brunei, "8th International Conference on Information and Communication Technology (ICOICT) in August 2020.
2. Archana M P1, Uma S K2, "Monitoring and controlling of poultry farm using IoT," International Journal of Innovative Research in Computer and Communication Engineering, Vol.6, Issue 4, April 2018.
3. Ayyappan. V, Deepika.T, "Smart poultry farm automation and monitoring system," IOT Based Smart Poultry Farm, South Asian Journal of Engineering and Technology Vol.3, No.2 (2017) 77–84,07/03/2017.
4. Danar Wicaksono, Ratna Mayasari, "Design and Analysis Automatic Temperature control in the Broiler poultry farm based on wireless sensor network," 2nd International Conferences on Information Technology, Information Systems and Electrical Engineering (ICITISEE), Nov 2017.
5. U. Rajkanna, M. Mathan Kumar, S. Suryaprakash, P. Thirumoorthi, "Development of Smart Car Security System using Multi Sensors," International Journal of Pure and Applied Mathematics, vol. 117, Issue. 22, pp.19-23, 2017.'
6. Drishti Kanjilal, Divyata Singh, Rakhi Reddy, and Jimmy Mathew," Smart Farm: Extending Automation To The Farm Level," ProcIJSTR, Vol. 3, no. 7, pp. 2277-8616, July.2014.
7. Pravina B. Chikankar, Deepak Mehetre, and Soumitra Das," AnAutomatic Irrigation System using ZigBee in Wireless SensorNetwork," Computer Engineering Department K J College of Engineering &Management Research, Pune, India. 2015.
8. Raheela Shahzadi, Muhammad Tausif, Javed Ferzund, and Muhammad Asif Suryani," Internet of Things based Expert Systemfor Smart Agriculture," Proc. IJACSA, Vol. 7, No. 9,2016.
9. R. Vejarano, R. Siche, and W. Tesfaye, ''Evaluation of biological contaminants in foods by hyperspectral imaging: A review,'' Int. J. FoodProperties, vol. 20, pp. 1264–1297, Dec. 2017.
10. Y. Liu, H. Pu, and D.-W. Sun, ''Hyperspectral imaging technique for evaluating food quality and safety during various processes: A review of recent applications,'' Trends Food Sci. Technol., vol. 69, pp. 25–35, Nov. 2017.
11. Mahamuni, C. V. (2016, December). A military surveillance system based on wireless sensor networks with extended coverage life. In 2016 International conference on global trends in signal processing, information computing and communication (ICGTSPICC) (pp. 375-381). IEEE.

12. Deo, G. S., Mishra, A., Jalaluddin, Z. M., & Mahamuni, C. V. (2020, September). Predictive analysis of resource usage data in academic libraries using the vader sentiment algorithm. In 2020 12th International Conference on Computational Intelligence and Communication Networks (CICN) (pp. 221-228). IEEE.

13. Mahamuni, C., Reddy, K. T. V., & Patnaik, N. A Relative Study and Analysis of Various Energy Efficiency Schemes in Wireless Sensor Networks. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (IJAREEIE), 4, 7919-7923.

14. Mahamuni, C. V., & Jalauddin, Z. M. (2021, December). Intrusion Monitoring in Military Surveillance Applications using Wireless Sensor Networks (WSNs) with Deep Learning for Multiple Object Detection and Tracking. In 2021 International Conference on Control, Automation, Power and Signal Processing (CAPS) (pp. 1-6). IEEE.

15. Mahamuni, C. V. (2016, December). Performance enhancement of microstrip patch antenna using metamaterial cover. In 2016 International Conference on Global Trends in Signal Processing, Information Computing and Communication (ICGTSPICC) (pp. 382-388). IEEE.

16. Goud, C. S., Das, S., Kumar, R., Mahamuni, C. V., & Khedkar, S. (2020, July). Wireless Sensor Network (WSN) Model for Shrimp Culture Monitoring using Open Source IoT. In 2020 Second International Conference on Inventive Research in Computing Applications (ICIRCA) (pp. 764-767). IEEE.

17. Mahamuni, C. V., & Reddy, K. T. (2016). A Robust Coverage based on Optimal Backoff Sleep Time in Wireless Sensor Networks. ME Dissertation (Supervisor: Prof (Dr) KTV Reddy), Dept. of Electronics and Telecommunication Engineering, FCRIT-Vashi, University of Mumbai.

18. Deo, G., Totlani, J., & Mahamuni, C. (2022, April). Detection of COVID-19 and Prediction of Pneumonia from Chest X-Rays using Deep Learning. In 2022 IEEE 11th International Conference on Communication Systems and Network Technologies (CSNT) (pp. 232-238). IEEE.

19. Mishra, A., Jalaluddin, Z. M., & Mahamuni, C. V. (2022, April). Air Quality Analysis and Smog Detection in Smart Cities for Safer Transport using Machine Learning (ML) Regression Models. In 2022 IEEE 11th International Conference on Communication Systems and Network Technologies (CSNT) (pp. 200-206). IEEE.

20. Mahamuni, C. V., Reddy, K. T. V., & Patnaik, N. (2016, November). Optimal backoff sleep time based protocol for prolonged network life with blacklisting of failure-prone nodes in wireless sensor networks. In 2016 Online International Conference on Green Engineering and Technologies (IC-GET) (pp. 1-6). IEEE.

21. Mahamuni, C. V., & Reddy, K. T. V. (2017). Optimal Node Scheduling based on Randomized Sleep Assignment and Active Node Failure for Energy-Efficient Coverage of WSNs. Networking and Communication Engineering, 9(3), 72-80.

22. Deo, G. S., Totlani, J. A., Mamidi, K. E., & Mahamuni, C. V. (2020, May). Performance Analysis of BiMOS Differential Pair with Active Load, Wilson and Widlar Current Mirrors, and Diode Connected Topology. In 2020 4th International Conference on Intelligent Computing and Control Systems (ICICCS) (pp. 99-104). IEEE.

23. Mahamuni, C. V. (2020). Space-Time Adaptive Processing (STAP) Techniques for Mitigation

of Jammer Interference and Clutter Suppression in Airborne Radar Systems: A MATLAB Implementation-Based Study. IUP Journal of Telecommunications, 12(4), 31-45.

24. Mahamuni, C., Reddy, K. T. V., & Patnaik, N. (2015). An Energy Efficient Performance in Wireless Sensor Networks: A Literature Survey. Research Chronicler, A Multidisciplinary Research Journal, 3(7), 39-54.
25. Vikram K and K. V. L. Narayana, "Cross-layer multi channel MAC protocol for wireless sensor networks in 2.4-GHz ISM band," 2016 International Conference on Computing, Analytics and Security Trends (CAST), 2016, pp. 312-317, doi: 10.1109/CAST.2016.7914986.
26. Vikram K, K. Venkata Lakshmi Narayana, Yuvaraj P, A survey on Wireless Sensor Networks for Smart grid, Sensors & Transducers Journal, ISSN 1726-5479, U.K. vol. 186, Issue 3, pp.18-24, March 2015.
27. Vikram K, Sarat Kumar Sahoo, "Interference-Aware Adaptive Transmission Power Control for ZigBee Wireless Networks" Vol. 828, Pg. No: 56-69, June-2018, Communications in Computer and Information Science, Springer.
28. Vikram K, Sarat Kumar Sahoo, "A Collaborative Frame Work for Avoiding the Interference in 2.4GHz Frequency Band Smart Grid Applications" Vol. No. 22, No.1, Pg. No: 48-56, June-2018. Electronics Journal.
29. Vikram K, Sarat Kumar Sahoo, K. Venkata Lakshmi Narayana, "Forward Error Correction based Encoding Technique for Cross-layer Multi Channel MAC protocol", Vol. 117, Pg. No 847-854, September 2017, Energy Procedia.
30. S. Kumar, and S. Mookiah, " Contemporary Scenario of Small Scale Industries in Tirunelveli District," Journal of Xi'an University of Architecture & Technology, vol. XII, no. II, p. 1155, 2020.
31. Waleed, ZongguoMa, FazliWahid, & S.Kumar, " Measuring the Perception of Chinese Residents in Response to Influence of COVID-19 on Tourism Industry in China," Linguistica Antverpiensia, no. 02, p. 2182, 2021.
32. Suriya Hamid, and S. Kumar, " Desicision Making Capability On Personal Life Along With Work Among Service Sector Women," International Journal of Pharmaceutical Research, vol. 13, no. 2, p. 4114, 2021.
33. S. Kumar, and Suriya Hamid, " The Role of Cultural Organizations, Leadership Services, Job Satisfaction towards Organizational Citizenship Behavior: A Path Analysis Study in Private Primary Schools," International Journal of Pharmaceutical Research, vol. 13, no. 2, p. 4120, 2021.
34. S. Kumar, and Suriya Hamid, " Neuro Robotic Learning Methodology: Successful Experiences through Robotics at the Initial, Primary and Secondary Level," International Journal of Pharmaceutical Research, vol. 13, no. 2, p. 4135, 2021.
35. T. Akila, A. Vadivukarasi, M. Swathi, A. Ramya, B. Poorani, and S.Kumar, " Search for Identity in Edward Albee's Who's Afraid of Virginia Woolf?," Journal of Positive School Psychology, vol. 06 no. 04, p. 9272, 2022.
36. S. Kumar, and U. Varsha, " Economic and Health Impact of Migrant Workers during Covid-19 Period in Musiri Block at Tiruchirappalli District," International Journal of Early Childhood Special Education (INT-JECS), vol. 14, no. 3, p. 9650, 2022.

37. S. Kumar, " A Study on the Impact of Covid – 19 Lockdown in Manapparai Steel Industry," Turkish Online Journal of Qualitative Inquiry (TOJQI), vol. 12, no. 4, p. 1329, 2021.

38. S. Kumar, " The Impact Of Gaja Cyclone On Paddy And Rural Infrastructure In Thettanviduthi Village, (Pudukkottai District) Tamil Nadu, India," Journal of Elementary Education Online, vol. 20, no. 6, p. 2867, 2021.

39. Vikram K, Sarat Kumar Sahoo, K. V. L. Narayana, "A Survey on Interference Avoiding Methods for Wireless Sensor Networks working in the 2.4GHz Frequency Band", Vol. 13, Number 3, Pg No: 59 – 81, July-2020, Journal of Engineering Science and Technology Review,

40. Yuvaraj. P, Vikram K, K. Venkata Lakshmi Narayana, A Review on state of art variants of LEACH protocol for Wireless Sensor Networks, Sensors & Transducers Journal, ISSN 1726-5479, U.K. vol. 186, Issue 3, pp.25-32, March 2015.

41. V. Chaudhary, Z. Dalwai and Vikram Kulkarni, "Intelligent Distraction and Drowsiness Detection System for Automobiles," 2021 International Conference on Intelligent Technologies (CONIT), 2021, pp. 1-4, doi: 10.1109/CONIT51480.2021.9498562.

42. N. Verma, S. Patil, B. Sinha and Vikram Kulkarni, "Object Detection for COVID Rules Response and Crowd Analysis," 2021 Innovations in Power and Advanced Computing Technologies (i-PACT), 2021, pp. 1-6, doi: 10.1109/i-PACT52855.2021.9697011

43. N. Kulkarni, B. Patanwadia and Vikram Kulkarni, "A Survey on Machine Learning Techniques for Breast Cancer Diagnosis and Detection," 2021 3rd International Conference on Advances in Computing, Communication Control and Networking (ICAC3N), 2021, pp. 425-427, doi: 10.1109/ICAC3N53548.2021.9725448.

44. Parvathi K, Santhi T, Makeswari M, Nirmaladevi V, Rathinam R. Ricinus Communis Activated Charcoal Preparation, Characterization and Application for Methyl Red Adsorptive Removal. Orient J Chem 2022;38(1), Pg. 110-117.

45. Rathinam R, Brindha T, Petchiammal M, Mohamed Ibrahim A, Photo-Electrocatalytic Degradation Of Aqueous Rhodamine B Dye Using Titanium Electrodes Coated With RuO2/IrO2/TaO2, Indian Journal of Environmental protection, 41(12), pp.1365-1371, 2021.

46. Umadevi M, Rathinam R, Brindha T, Dheenadhayalan S, Pattabhi S, Application of Electro-Chemical Oxidation for the Treatment of Reactive Red 195 using Graphite Electrode, Asian Journal of Biological and Life Sciences, 2022,10 (3), 620-625.

47. Brindha T, Rathinam R, Dheenadhayalan S, Sivakumar R. Nanocomposite Coatings in Corrosion Protection Applications: An Overview . Orient J Chem 2021;37(5), Pg.1062-1067 .

48. H. Shatnawi, C. Lim, F. Ismail and A. Aldossary, "An optimisation study of a solar tower receiver: the influence of geometry and material, heat flux, and heat transfer fluid on thermal and mechanical performance", Heliyon, vol. 7, no. 7, p. e07489, 2021.

49. Jose, J. M., Jose, J. V., & Vijaykumar Mahamuni, C. (2020). Multi-Biosensor based Wireless Body Area Networks (WBAN) for Critical Health Monitoring of Patients in Mental Health Care Centers: An Interdisciplinary Study. International Journal of Research in Engineering, Science and Management, 3.

50. Mahamuni, C., Reddy, K. T. V., & Patnaik, N. A Literary Study of Coverage and Connectivity in Wireless Sensor Networks for Optimal Performance. International Journal of Engineering

and Management (IJERM), 2, 28-31.

51. Mahamuni, C. V. (2015). Metamaterial based Electromagnetic Cloaking: A Survey. International Journal of Advance Foundation and Research in Science and Engineering (IJAFRSE), 2(5), 15-20.
52. Mahamuni, C., Reddy, K. T. V., & Patnaik, N. (2015, December). A Graphene Monolayer-based Plasmonic Patch Antenna for Microwave and Millimeterwave Wireless Communication. In Proceedings of 11th International Conference on Microwaves Antennas & Remote Sensing ICMARS-2015, Jodhpur, INDIA (pp. 190-193).
53. J. Żywiołek, J. Rosak-Szyrocka, M. A. Khan, and A. Sharif, "Trust in Renewable Energy as Part of Energy-Saving Knowledge," Energies, vol. 15, no. 4, p. 1566, 2022.
54. J. Żywiołek, J. Rosak-Szyrocka, and B. Jereb, "Barriers to Knowledge Sharing in the Field of Information Security," Management Systems in Production Engineering, vol. 29, no. 2, pp. 114–119, 2021.
55. S. Tiwari, J. Rosak-Szyrocka, and J. Żywiołek, "Internet of Things as a Sustainable Energy Management Solution at Tourism Destinations in India," Energies, vol. 15, no. 7, p. 2433, 2022.
56. J. Rosak-Szyrocka, J. Żywiołek, and M. Mrowiec, "Analysis of Customer Satisfaction with the Quality of Energy Market Services in Poland," Energies, vol. 15, no. 10, p. 3622, 2022.
57. J. Rosak-Szyrocka, J. Zywiolek, A. Zaborski, S. Chowdhury, and Y.-C. Hu, "Digitalization of higher education around the Globe during covid-19," IEEE Access, p. 1, 2022.
58. Ravi Kumar Gupta, "A Study on Occupational Health Hazards among Construction Workers in India", International Journal of Enterprise Network Management. Vol. 12, No. 4, pp. 325-339, 2021.
59. Ravi Kumar Gupta, "Adoption of Mobile Wallet Services: An Empirical Analysis", Int. J. of Intellectual Property Management, 2022, DOI: 10.1504/IJIPM.2021.10035526
60. Ravi Kumar Gupta, "Utilization of Digital Network Learning and Healthcare for Verbal Assessment and Counselling During Post COVID-19 Period", Technologies, Artificial Intelligence and the Future of Learning Post-COVID-19. Springer Nature, Switzerland, pp. 117-134, 2022.
61. Deepak Vidhate and Shruti Pophale, "Depression Scale Recognition Over Fusion of Visual and Vocal Expression using Artificial Intellectual Method", International Journal of Computer Applications, vol. 183, no. 24, pp. 16-19, 2021.
62. D. Vidhate et al., "Customer Relationship Management: An IT Success as Multifunctional Domain and it's Future Directions", International Journal of Computer Applications, vol. 183, no. 19, pp. 30-34, 2021.
63. D. Vidhate and P. Kulkarni, "Performance comparison of multiagent cooperative reinforcement learning algorithms for dynamic decision making in retail shop application", International Journal of Computational Systems Engineering, vol. 5, no. 3, p. 169, 2019.
64. D. Vidhate, "Cooperative Multi-Agent Joint Action Learning Algorithm (CMJAL) for Decision Making in Retail Shop Application", International Journal of Agent Technologies and Systems, vol. 9, no. 1, pp. 1-19, 2017.

65. Vidhate, D.A., Kulkarni, P. (2019). "A Framework for Dynamic Decision Making by Multi-agent Cooperative Fault Pair Algorithm (MCFPA) in Retail Shop Application", Information and Communication Technology for Intelligent Systems, Smart Innovation, Systems and Technologies, vol 107. Springer, Singapore. https://doi.org/10.1007/978-981-13-1747-7_68

66. Vidhate, D.A., Kulkarni, P. (2018)." A Novel Approach by Cooperative Multiagent Fault Pair Learning (CMFPL)", Advances in Computing and Data Sciences, ICACDS 2018, Communications in Computer and Information Science, vol 905. Springer, Singapore. https://doi.org/10.1007/978-981-13-1810-8_35

67. Vidhate, D.A., Kulkarni, P. (2018). "Exploring Cooperative Multi-agent Reinforcement Learning Algorithm (CMRLA) for Intelligent Traffic Signal Control", Smart Trends in Information Technology and Computer Communications, SmartCom 2017. Communications in Computer and Information Science, vol 876. Springer, Singapore. https://doi.org/10.1007/978-981-13-1423-0_9.

68. Vidhate, D.A., Kulkarni, P. (2018). "Intelligent Traffic Control by Multi-agent Cooperative Q Learning (MCQL)", Intelligent Computing and Information and Communication. Advances in Intelligent Systems and Computing, vol 673. Springer, Singapore. https://doi.org/10.1007/978-981-10-7245-1_47.

69. Vidhate, D.A., Kulkarni, P. (2018). "A Novel Approach for Dynamic Decision Making by Reinforcement Learning-Based Cooperation Methods (RLCM)", International Conference on Intelligent Computing and Applications. Advances in Intelligent Systems and Computing, vol 632. Springer, Singapore. https://doi.org/10.1007/978-981-10-5520-1_37

70. Vidhate, D.A., Kulkarni, P. (2018). "Improved decision making in multiagent system for diagnostic application using cooperative learning algorithms", Int. j. inf. tecnol. Vol. 10, pp 201–209.

71. Vidhate, D.A., Kulkarni, P. (2018). "A Framework for Improved Cooperative Learning Algorithms with Expertness (ICLAE)", Advanced Computing and Communication Technologies. Advances in Intelligent Systems and Computing, vol 562. Springer, Singapore. https://doi.org/10.1007/978-981-10-4603-2_15

72. Vidhate, D. A., & Kulkarni, P. (2017). "Multi-agent cooperation models by reinforcement learning (MCMRL)", Int. J. Comput. Appl, vol 176, issue 1, pp 25-29.

73. Vidhate, D. A. (2017). "Cooperative Multi-Agent Joint Action Learning Algorithm (CMJAL) for Decision Making in Retail Shop Application" International Journal of Agent Technologies and Systems (IJATS), vol 9, no 1, pp 1-19.

74. Vidhate, D. A., & Kulkarni, P. A. (2017). "Performance Evaluation of Cooperative RL Algorithms for Dynamic Decision Making in Retail Shop Application", Machine Learning Research, vol 2, no 4, pp 133.

75. Vidhate, D. A., & Kulkarni, P. A. (2017) "Multiagent Cooperative Reinforcement Learning by Expert Agents (MCRLEA)", International Journal of Intelligent Information Systems, vol 6, no 6, pp72-84.

76. P. Bhadola, B. Kunakhonnuruk, A. Kongbangkerd, and Y. M. Gupta, "Analysis of microenvironment data using low-cost portable data logger based on a microcontroller," ECS Transactions, vol. 107, no. 1, p. 15099, 2022.

77. Y. M. Gupta, K. Buddhachat, S. Peyachoknagul, and S. Homchan, "Novel DNA barcode sequence discovery from transcriptome of Acheta domesticus: a partial mitochondrial DNA," in Materials Science Forum, 2019, vol. 967: Trans Tech Publ, pp. 59-64.

78. Y. M. Gupta, K. Buddhachat, S. Peyachoknagul, and S. Homchan, "Collection of Mitochondrial tRNA Sequences and Anticodon Identification for Acheta domesticus," in Materials Science Forum, 2019, vol. 967: Trans Tech Publ, pp. 65-70.

79. Y. M. Gupta and S. HOMCHAN, "Insect detection using a machine learning model," Nusantara Bioscience, vol. 13, no. 1, 2021.

80. S. Homchan, P. Bhadola, and Y. M. Gupta, "Statistical Analysis of Simple Sequence Repeats in Genome Sequence: A Case of Acheta Domesticus (Orthoptera: Gryllidae)," ECS Transactions, vol. 107, no. 1, p. 14799, 2022.

81. Eliwa, M. M. The effect of some different types of learning within training programs in terms of self-determination theory of motivation on developing self-Academic identity and academic buoyancy and decreasing of mind wandering among university students in Egypt. Journal of Education -Sohag University, 92(92), 1–29, 2021.

82. Eliwa, M. M; Al Badri, A.H. Long and Short-Term Impact of Problem-Based and Example-Based STEM Learning on the Improvement of Cognitive Load among Egyptian and Omani Learners. Journal of Scientific Research in Education (JSRE)- Ain Shams University, 22(3), 713-742, 2021.

83. Eliwa, M. M. The Effectiveness of Digital Transformation of Learning on Students' Learning Experience, Students' Engagement and Perceived Intellectual Competence: A Mixed-Method Approach. Journal of Educational and Psychological Sciences- Fayoum University,15(3), 848-890, 2021.

84. Eliwa, M. M; Alshoukary, H. A. (2022). Modeling Causal Relationships between Academic Adjustment, Academic Striving and Future Expectations on Psychological Resilience and Cognitive Modifiability among Elementary School Students. Journal of the Faculty of Education Beni-Suef University(JFE), 19(116), 655-694.

85. SS Priscila, M Hemalatha, “Improving the performance of entropy ensembles of neural networks (EENNS) on classification of heart disease prediction”, Int J Pure Appl Math 117 (7), 371-386, 2017.

86. S Silvia Priscila, M Hemalatha, “ Diagnosisof heart disease with particle bee-neural network” Biomedical Research, Special Issue, pp. S40-S46, 2018.

87. S Silvia Priscila, M Hemalatha, “ Heart Disease Prediction Using Integer-Coded Genetic Algorithm (ICGA) Based Particle Clonal Neural Network (ICGA-PCNN)”, Bonfring International Journal of Industrial Engineering and Management Science 8 (2), 15-19, 2018.

88. Jalil, N.A., P Prapinit, M Melan, AB Mustaffa (2019). Adoption of Business Intelligence-Technological, Individual and Supply Chain Efficiency. Proceedings of the 2019 International Conference on Machine Learning, Big Data and Business Intelligence. Year: 2019, Volume: 1, Pages: 67-73.

89. Jalil, N.A., Hwang, H.J. (2019). Technological-centric business intelligence: Critical success factors. International Journal of Innovation, Creativity and Change, Volume 5, Issue 2, August, 2019, Pages 1499 to 1516.

90. Nasir Abdul Jalil and Koay Kian Yeik. 2019. Systems, Design and Technologies Anxieties Towards Use of Self-service Checkout. In Proceedings of the 2019 3rd International Conference on Education and E-Learning (ICEEL 2019). Association for Computing Machinery, New York, NY, USA, 122–127.

91. B. Singh, N. A. Jalil, D. K. Sharma, S. R, K. Kumar and D. Jebakumar immanuel, "Computational systems overview and Random Process with Theoretical analysis," 2021 7th International Conference on Advanced Computing and Communication Systems (ICACCS), 2021, pp. 1999-2005.

92. Roy Setiawan, Luigi Pio Leonardo Cavaliere, KartikeyKoti, Gabriel Ayodeji Ogunmola, N. A. Jalil, M. Kalyan Chakravarthi, S. Suman Rajest, R. Regin, Sonia Singh, "The Artificial Intelligence and Inventory Effect on Banking Industrial Performance"Turkish Online Journal of Qualitative Inquiry (TOJQI). Volume 12, Issue 6, July, 2021: 8100-8125.

93. Roespinoedji, D., Juniati, S., Hasan, H., Jalil, N.A., Shamsudin, M.F., 2019. Experimenting the long-haul association between components of consuming renewable energy: ARDL method with special reference to Malaysia. Int. J. Energy Econ. Policy 9, 453–460.

94. D. K. Sharma, N. A. Jalil, V. K. Nassa, S. R. Vadyala, L. S. Senthamil and T. N, "Deep learning Applications to classify Cross-Topic Natural Language Texts Based on Their Argumentative Form," 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021, pp. 1580-1586.

95. D. K. Sharma, N. A. Jalil, R. Regin, S. S. Rajest, R. K. Tummala and T. N, "Predicting Network Congestion with Machine Learning," 2021 2nd International Conference on Smart Electronics and Communication (ICOSEC), 2021, pp. 1574-1579, doi: 10.1109/ICOSEC51865.2021.9591897.

96. Nasir Abdul Jalil and Mikkay Wong Ei Leen. 2021. Learning Analytics in Higher Education: The Student Expectations of Learning Analytics. In 2021 5th International Conference on Education and E-Learning (ICEEL 2021). Association for Computing Machinery, New York, NY, USA, 249–254.

97. Fazle Rabbi , Nasir Abdul Jalil , S. Suman Rajest , R. Regin, " An Approximation For Monitoring The Efficiency Of Cooperative Across Diverse Network Aspects", Webology, Volume 17, No 2, 2020, Pages: 1234-1247.

98. Mahamuni, C., Reddy, K. T. V., & Patnaik, N. (2015). Study of Metamaterials as an Emerging Technology in Microwave and Millimeterwave Wireless Communication. Research Chronicler International Multidisciplinary Research Journal (RCIMRJ), 3(VII), 20-25.

99. Mahamuni, C., Reddy, D. K., & Patnaik, M. N. (2015, October). Dielectric Response of Rectangular Planar Antenna and Characterization of Metamaterial Superstrates As Low Loss Dielectric for Improved Radiation: A Study. In Proceedings of THINKQUEST 2nd International Conference on" Contours of Digital Technology"(ICCDT-2015) (pp. 46-52).

100. S. Venkatasubramanian, D. A. Suhasini, and D. C.Vennila, "An Energy Efficient Clustering Algorithm in Mobile Adhoc Network Using Ticket Id Based Clustering Manager," International Journal of Computer Science and Network Security, vol. 21, no. 7, pp. 341–349, Jul. 2021.

101. Venkatasubramanian, S., Suhasini, A. and Vennila, C., "An Efficient Route Optimization Using Ticket-ID Based Routing Management System (T-ID BRM)". Wireless Personal

Communications, pp.1-20, 2021

102. S. Venkatasubramanian, A. Suhasini, C. Vennila, "Efficient Multipath Zone-Based Routing in MANET Using (TID-ZMGR) Ticked-ID Based Zone Manager", International Journal of Computer Networks and Applications (IJCNA), 8(4), PP: 435- 443, 2021.
103. Venkatasubramanian, S.. "Optimized Gaming based Multipath Routing Protocol with QoS Support for High-Speed MANET", International Journal of Advanced Research in Science, Communication and Technology. vol. 9, No. 1, ,pp.62-73, September , 2021.
104. Venkatasubramanian.S., "A Chaotic Salp Swarm Feature Selection Algorithm for Apple and Tomato Plant Leaf Disease Detection", International Journal of Advanced Trends in Computer Science and Engineering, 10(5), pp.3037–3045,2021.
105. S.venkatasubramanian, "Multistage Optimized Fuzzy Based Intrusion Detection protocol for NIDS in MANET", International Journal Of Innovative Research In Technology, Volume 8 Issue 6, November, pp.301-311, 2021.
106. S.Venkatasubramanian,K., Senthil Kumar & J, Gnana & M, Ayeesha. "IoT and AI Based Recognition and Classification of Covid 19 Persons in Public Place", Turkish Online Journal of Qualitative Inquiry. 12. pp.7098-7110, 2021.
107. Srinivasan, Venkatasubramanian, "Detection of black hole attack using honeypot agent-based scheme with deep learning technique on MANET", Ingénierie des Systèmes d'Information, Vol. 26, No. 6, pp. 549-557., 2021.
108. S.venkatasubramanian, "Correlation Distance Based Greedy Perimeter Stateless Routing Algorithm for Wireless Sensor Networks", Int. J. Advanced Networking and Applications Volume: 13 Issue: 03 pp. 4962-4970,2021.
109. Allugunti,V.R., Kishor Kumar Reddy, C., Elango, N.M., Anisha, P.R. (2021). Prediction of Diabetes Using Internet of Things (IoT) and Decision Trees: SLDPS. In: Satapathy, S., Zhang, YD., Bhateja, V., Majhi, R. (eds) Intelligent Data Engineering and Analytics. Advances in Intelligent Systems and Computing, vol 1177. Springer, Singapore. https://doi.org/10.1007/978-981-15-5679-1_43
110. Dang, N., Khanna, A., Allugunti, V.R. (2021). TS-GAN with Policy Gradient for Text Summarization. In: Khanna, A., Gupta, D., Pólkowski, Z., Bhattacharyya, S., Castillo, O. (eds) Data Analytics and Management. Lecture Notes on Data Engineering and Communications Technologies, vol 54. Springer, Singapore. https://doi.org/10.1007/978-981-15-8335-3_64
111. V. Reddy Allugunti and N. Elango, "Development of a Generic Secure Framework for Universal Device Interactions in IoT of Fifth Generation Networks," 2018 Second World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4), 2018, pp. 238-245, doi: 10.1109/WorldS4.2018.8611592.
112. D.Jayaramaiah, A.Prasanth, A.Viswanatha Reddy, Dr.Anirban Basu, 2012, Multi Agent Management System for Next Generation Mobile Networks. [MAMS for NGMN], International Journal Of Engineering Research & Technology, Volume 01, Issue 07 (September 2012)
113. Prof. D. Jayaramaiah,A. Viswanatha Reddy,Srikishan. D. Agent based User Interface Design for Mobile Cloud Computing Environment (AUID) , International Journal of Engineering Innovations and Research, Volume 1 Issue 3, May 2012

114. Reddy, V., Allugunti, , M, E. & Reddy, C. K. (2019). Internet of things based early detection of diabetes using machine learning algorithms: Dpa. International Journal of Innovative Technology and Exploring Engineering, 8(10):1443–1447.

115. V. Reddy Allugunti and N. Elango, "Development of a Generic Secure Framework for Universal Device Interactions in IoT of Fifth Generation Networks," 2018 Second World Conference on Smart Trends in Systems, Security and Sustainability (WorldS4),2018,pp.238-245.

116. Allugunti, V., M, E. & Reddy, C. K. (2019). Diabetes kaggle dataset adequacy scrutiny using factor exploration and correlation. International Journal of Recent Technology and Engineering, 8(1 SpecialIssue4):1105–1110.

117. Allugunti V.R (2022). A machine learning model for skin disease classification using convolution neural network. International Journal of Computing, Programming and Database Management 3(1), 141-147.

118. Allugunti V.R (2022). Breast cancer detection based on thermographic images using machine learning and deep learning algorithms. International Journal of Engineering in Computer Science 4(1), 49-56.

119. Allugunti VR Reddy CKK , Elango NM (2021). Prediction of Diabetes Using Internet of Things (IoT) and Decision Trees: SLDPS, Intelligent Data Engineering and Analytics, 2021

120. Reddy DAB A. Viswanatha, Jayaramaiah D., Prasanth A. (2012). Multi Agent Management System for Next Generation Mobile Networks [MAMS for NGMN], International Journal of Engineering Research & Technology (IJERT), Vol.1

121. Kishan B M, Dr. D. Jayaramaiah. A Survey on Optimized QOS Provisioning for NGMN//. International Journal of Innovative Research in Computer and Communication Engineering. Vol. 3, Issue 4, April 2015.-p.p 2908 – 2915.

122. Jha, R. et al. (2021). Voice-Based Gender Identification Using qPSO Neural Network. In: Khanna, A., Gupta, D., Pólkowski, Z., Bhattacharyya, S., Castillo, O. (eds) Data Analytics and Management. Lecture Notes on Data Engineering and Communications Technologies, vol 54. Springer, Singapore. https://doi.org/10.1007/978-981-15-8335-3_66

123. S.Venkatasubramanian, "Ambulatory Monitoring of Maternal and Fetal using Deep Convolution Generative Adversarial Network for Smart Health Care IoT System" International Journal of Advanced Computer Science and Applications(IJACSA), 13(1), 2022.

124. S. Venkatasubramanian, D. A. Suhasini, and D. Vennila, "A Review on Machine Learning Techniques for QoS in WSN", IJAST, vol. 28, no. 9, pp. 169 - 178, Oct. 2019.

125. Venkatasubramanian.S, et al. (2017). A Cross Layer Supported Non-Reservation Based Approach For Qos Provisioning In Mobile Ad Hoc Networks. International Journal of Innovative Research in Science and Engineering, vol.3, No.2, 184-189.

126. Venkatasubramanian, S., Suhasini, A., Vennila, C. "QoS Provisioning in MANET Using Fuzzy-Based Multifactor Multipath Routing Metric". In proceedings of Sustainable Communication Networks and Application. Lecture Notes on Data Engineering and Communications Technologies, vol 93. Springer, Singapore. https://doi.org/10.1007/978-981-16-6605-6_41

127. R. Harini, R. Janani, S. Keerthana, S. Madhubala and S. Venkatasubramanian, "Sign Language

Translation," 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS), 2020, pp. 883-886.

128. S. Venkatasubramanian, "Fruit-Fly Algorithm Based Dynamic Source Routing Algorithm for Energy Efficient Multipath Routing in MANET," 2022 International Conference on Computer Communication and Informatics (ICCCI), 2022, pp. 01-08, doi: 10.1109/ICCCI54379.2022.9740906.
129. D. Kem, "Personalised and adaptive Learning: Emerging learning platforms in the era of digital and smart Learning,", International Journal of Social Science and Human Research, vol. 05, no. 2, pp. 385-391, 2022.
130. D. Kem, "Policy discourse and communication strategies in India.", Journal of the Kerala Sociological Society, vol, XXXIII, No. 2, pp. 37-48, 2005.
131. D. Kem, "'Adolescents and the Mass Media: Contemporary Issues in the Literature, Journal of the Kerala Sociological Society, Thiruvananthapuram, Kerala, vol. XX no. 2, pp. 43-60, 2006.
132. D. Kem and M. Jena, "Social responsibility of science.", Journal of the Kerala Sociological Society, vol, XXXV, no. 2, pp. 37-48, 2007.
133. D. Jayalakshmi and D. Kem, "Social informatics: The socio-technical network system," Guru Nanak Journal of Sociology, vol. 25, no. 2, pp. 1-10, 2004.
134. Farouk, A., Alahmadi, A., Ghose, S., & Mashatan, A. (2020). Blockchain platform for industrial healthcare: Vision and future opportunities. Computer Communications, 154, 223-235.
135. Zhu, F., Zhang, C., Zheng, Z., & Farouk, A. (2021). Practical Network Coding Technologies and Softwarization in Wireless Networks. IEEE Internet of Things Journal, 8(7), 5211-5218.
136. Adil, M., Song, H., Ali, J., Jan, M. A., Attique, M., Abbas, S., & Farouk, A. (2021). Enhanced AODV: A Robust Three Phase Priority-based Traffic Load Balancing Scheme for Internet of Things. IEEE Internet of Things Journal.
137. Adil, M., Jan, M. A., Mastorakis, S., Song, H., Jadoon, M. M., Abbas, S., & Farouk, A. (2021). Hash-MAC-DSDV: Mutual Authentication for Intelligent IoT-Based Cyber-Physical Systems. IEEE Internet of Things Journal.
138. Adil, M., Ali, J., Attique, M., Jadoon, M. M., Abbas, S., Alotaibi, S. R., ... & Farouk, A. (2021). Three Byte-Based Mutual Authentication Scheme for Autonomous Internet of Vehicles. IEEE Transactions on Intelligent Transportation Systems.
139. Adil, M., Khan, M. K., Jamjoom, M., & Farouk, A. (2021). MHADBOR: AI-enabled Administrative Distance based Opportunistic Load Balancing Scheme for an Agriculture Internet of Things Network. IEEE Micro.
140. Mendonça, R. V., Silva, J. C., Rosa, R. L., Saadi, M., Rodriguez, D. Z., & Farouk, A. (2021). A lightweight intelligent intrusion detection system for industrial internet of things using deep learning algorithm. Expert Systems, e12917.
141. Adil, M., Attique, M., Khan, M. M., Ali, J., Farouk, A., & Song, H. (2022). HOPCTP: A Robust Channel Categorization Data Preservation Scheme for Industrial Healthcare Internet of Things. IEEE Transactions on Industrial Informatics.
142. Adil, M., Khan, M. K., Jadoon, M. M., Attique, M., Song, H., & Farouk, A. (2022). An AI-

enabled Hybrid lightweight Authentication Scheme for Intelligent IoMT based Cyber-Physical Systems. IEEE Transactions on Network Science and Engineering.

143. Aoudni, Y., Donald, C., Farouk, A., Sahay, K. B., Babu, D. V., Tripathi, V., & Dhabliya, D. (2022). Cloud security based attack detection using transductive learning integrated with Hidden Markov Model. Pattern Recognition Letters, 157, 16-26

144. Naseri, M., Heidari, S., Baghfalaki, M., Gheibi, R., Batle, J., Farouk, A., & Habibi, A. (2017). A new secure quantum watermarking scheme. Optik, 139, 77-86.

145. Abdolmaleky, M., Naseri, M., Batle, J., Farouk, A., & Gong, L. H. (2017). Red-Green-Blue multi-channel quantum representation of digital images. Optik, 128, 121-132.

146. Farouk, A., Batle, J., Elhoseny, M., Naseri, M., Lone, M., Fedorov, A., ... & Abdel-Aty, M. (2018). Robust general N user authentication scheme in a centralized quantum communication network via generalized GHZ states. Frontiers of Physics, 13(2), 1-18.

147. Farouk, A., Zakaria, M., Megahed, A., & Omara, F. A. (2015). A generalized architecture of quantum secure direct communication for N disjointed users with authentication. Scientific reports, 5(1), 1-17.

148. Naseri, M., Raji, M. A., Hantehzadeh, M. R., Farouk, A., Boochani, A., & Solaymani, S. (2015). A scheme for secure quantum communication network with authentication using GHZ-like states and cluster states controlled teleportation. Quantum Information Processing, 14(11), 4279-4295.

149. Metwaly, A. F., Rashad, M. Z., Omara, F. A., & Megahed, A. A. (2014). Architecture of multicast centralized key management scheme using quantum key distribution and classical symmetric encryption. The European Physical Journal Special Topics, 223(8), 1711-1728.

150. Abulkasim, H., Farouk, A., Alsuqaih, H., Hamdan, W., Hamad, S., & Ghose, S. (2018). Improving the security of quantum key agreement protocols with single photon in both polarization and spatial-mode degrees of freedom. Quantum Information Processing, 17(11), 1-11.

151. Abulkasim, H., Farouk, A., Hamad, S., Mashatan, A., & Ghose, S. (2019). Secure dynamic multiparty quantum private comparison. Scientific reports, 9(1), 1-16.

152. Zhou, N. R., Liang, X. R., Zhou, Z. H., & Farouk, A. (2016). Relay selection scheme for amplify-and-forward cooperative communication system with artificial noise. Security and Communication Networks, 9(11), 1398-1404.

153. Abulkasim, H., Alsuqaih, H. N., Hamdan, W. F., Hamad, S., Farouk, A., Mashatan, A., & Ghose, S. (2019). Improved dynamic multi-party quantum private comparison for next-generation mobile network. IEEE Access, 7, 17917-17926.

154. Naseri, M., Abdolmaleky, M., Parandin, F., Fatahi, N., Farouk, A., & Nazari, R. (2018). A new quantum gray-scale image encoding scheme. Communications in Theoretical Physics, 69(2), 215.

155. Naseri, M., Abdolmaleky, M., Laref, A., Parandin, F., Celik, T., Farouk, A., ... & Jalalian, H. (2018). A new cryptography algorithm for quantum images. Optik, 171, 947-959.

156. Heidari, S., Abutalib, M. M., Alkhambashi, M., Farouk, A., & Naseri, M. (2019). A new general model for quantum image histogram (QIH). Quantum Information Processing, 18(6),

1-20.

157. Khan, Shakir, and Mohammed Altayar. "Industrial internet of things: Investigation of the applications, issues, and challenges." International Journal of Advanced and Applied Sciences 8.1 (2021): 104-113.
158. AlAjmi, Mohammed, and Shakir Khan. "Mobile Community Networks Information Investigation for Additional Significance." 6th International Conference of Education, Research and Innovation (ICERI2013) pp. 2013.
159. Zamani, Abu Sarwar. "Response prediction of earthquake motion using artificial neural networks." International Journal of Applied Research in Computer Science and Information Technology 1.2 (2012).
160. AlAjmi, Mohammed, and Shakir Khan. "Data Mining–Based, Service Oriented Architecture (SOA) In E-Learning." ICERI2012 (5th International conference on Education, Research and Innovation), Madrid (Spain). 2012.
161. S. Khan et al., "HCovBi-Caps: Hate Speech Detection Using Convolutional and Bi-Directional Gated Recurrent Unit With Capsule Network," in IEEE Access, vol. 10, pp. 7881-7894, 2022.
162. S. Khan, "Data Visualization to Explore the Countries Dataset for Pattern Creation", Int. J. Onl. Eng., vol. 17, no. 13, pp. pp. 4–19, Dec. 2021.
163. Shakir Khan "Study Factors for Student Performance Applying Data Mining Regression Model Approach", IJCSNS International Journal of Computer Science and Network Security, Vol. 21 No. 2, pp. 188-192, 2021.
164. Shakir Khan and Amani Alfaifi, "Modeling of Coronavirus Behavior to Predict it's Spread" International Journal of Advanced Computer Science and Applications(IJACSA), 11(5), 2020.
165. M. F. AlAjmi, S. Khan and A. Sharma, "Collaborative learning outline for mobile environment," 2014 International Conference on Issues and Challenges in Intelligent Computing Techniques (ICICT), 2014, pp. 429-434.
166. AlAjmi, Mohamed F., and Shakir Khan. "The Utility of New Technologies in Enhancing Learning Vigilance in Educationally Poor Populations." EDULEARN12 (4th International Conference on Education and New Learning Technologies). 2012.
167. Khan, Shakir, and Mohamed F. AlAjmi. "Cloud Computing Safety Concerns in Infrastructure as a Service." Research Journal of Recent Sciences
168. Khan, Shakir. "Artificial Intelligence Virtual Assistants (Chatbots) are Innovative Investigators." International Journal of Computer Science and Network Security 20.2 (2020): 93-98.
169. AlAjmi, Mohamed F., and Shakir Khan. "Collaborative Pharmacy Student Learning Outline for Mobile Atmosphere." International Journal of Advanced Computer Science and Applications 5.3 (2014).
170. K.B. Adanov, S. Suman Rajest, Mustagaliyeva Gulnara, Khairzhanova Akhmaral (2019), "A Short View on the Backdrop of American's Literature". Journal of Advanced Research in Dynamical and Control Systems, Vol. 11, No. 12, pp. 182-192.
171. D Datta, S Mishra, SS Rajest, (2020) "Quantification of tolerance limits of engineering system using uncertainty modeling for sustainable energy" International Journal of Intelligent

Networks, Vol.1, 2020, pp.1-8, https://doi.org/10.1016/j.ijin.2020.05.006

172. Leo Willyanto Santoso, Bhopendra Singh, S. Suman Rajest, R. Regin, Karrar Hameed Kadhim (2021), "A Genetic Programming Approach to Binary Classification Problem" EAI Endorsed Transactions on Energy, Vol.8, no. 31, pp. 1-8. DOI: 10.4108/eai.13-7-2018.165523
173. Khan, Shakir, and Mohamed F. AlAjmi. "The Open Source Software (OSS) Utilization in Project Scattered Computing Environments." International Journal of Scientific Research 2.2 (2013): 177-178.
174. Alajmi, M., and S. Khan. "Effective Use of Web 2.0 Tools in Pharmacy Students' Clinical Skills Practice During Field Training." iceri2011 proceedings (2011): 6649-6653.
175. AlAjmi, Mohamed F., Shakir Khan, and Abdulkadir Alaydarous. "Data Protection Control and Learning Conducted Via Electronic Media IE Internet." International Journal of Advanced Computer Science and Applications 5.11 (2014).
176. Khan, Shakir, Mohammed AlAjmi, and Arun Sharma. "Safety Measures Investigation in Moodle LMS." Special Issue of International Journal of Computer Applications (2012).
177. Shakir Khan and Mohammed Alshara, "Fuzzy Data Mining Utilization to Classify Kids with Autism", IJCSNS International Journal of Computer Science and Network, Vol. 19 No. 2, pp. 147-154, 2018.
178. Shakir Khan and Mohammed Alshara, "Arabic Evaluations' Development in Information Retrieval", International Journal of Advanced and Applied Sciences, 6(12) 2019, Pages: 92-98.
179. S. Sudhakar and S.Chenthur Pandian "Secure Packet Encryption and Key Exchange System in Mobile Ad hoc Nerwork", Journal of Computer Science, Vol.8, No. 6, pp : 908-912, 2012.
180. S. Sudhakar and S. Chenthur Pandian, "Hybrid Cluster-based Geographical Routing Protocol to Mitigate Malicious Nodes in Mobile Ad Hoc Network", International Journal of Ad Hoc and Ubiquitous Computing, 2016 Vol.21 No.4, pp.224-236.
181. Aakanksha Singhal and D.K. Sharma, "Seven Divergence Measures by CDF of fitting in Exponential and Normal Distributions of COVID-19 Data", Turkish Journal of Physiotherapy and Rehabilitation, Vol.32(3), pp. 1212 - 1222, 2021.
182. D.K. Sharma and Haldhar Sharma, "A Study of Trend Growth Rate of Confirmed cases, Death cases and Recovery cases in view of Covid-19 of Top Five States of India", Solid State Technology, Vol.64(2), pp. 4526-4541, 2021.
183. D.K. Sharma, "Information Measure Computation and its Impact in MI COCO Dataset", IEEE Conference Proceedings, 7th International Conference on Advanced Computing and Communication Systems (ICACCS), Vol.1, pp. 2011-2014, 2021.
184. Aakanksha Singhal and D.K. Sharma, "Keyword extraction using Renyi entropy: a statistical and domain independent method", IEEE Conference Proceedings, 7th International Conference on Advanced Computing and Communication Systems (ICACCS), Vol.1, pp. 1970-1975, 2021.
185. Aakanksha Singhal and D.K. Sharma, "Generalization of F-Divergence Measures for Probability Distributions with Associated Utilities", Solid State Technology, Vol.64(2), pp. 5525-5531, 2021.
186. Aakanksha Singhal and D.K. Sharma, "A Study of before and after Lockdown Situation of 10

Countries through Visualization of Data along With Entropy Analysis of Top Three Countries", International Journal of Future Generation Communication and Networking, Vol.14(1), pp. 496-525, 2021.

187. Aakanksha Singhal and D.K. Sharma, "Generalized 'Useful' Rényi & Tsallis Information Measures, Some Discussions with Application to Rainfall Data", International Journal of Grid and Distributed Computing, Vol. 13(2), pp. 681-688, 2020.
188. Reetu Kumari and D. K. Sharma, "Generalized `Useful non-symmetric divergence measures and Inequalities", Journal of Mathematical Inequalities, Vol. 13(2), pp. 451-466, 2019.
189. D.S. Hooda and D.K. Sharma, "On Characterization of Joint and Conditional Exponential Survival Entropies", International Journal of Statistics and Reliability Engineering, Vol. 6(1), pp. 29-36, 2019.
190. Reetu Kumari and D. K. Sharma, "Generalized `Useful' AG and `Useful' JS-Divergence Measures and their Bounds", International Journal of Engineering, Science and Mathematics, Vol. 7 (1), pp. 441-450, 2018.
191. D.S. Hooda, Reetu Kumari and D. K. Sharma, "Intuitionistic Fuzzy Soft Set Theory and Its Application in Medical Diagnosis", International Journal of Statistics in Medical Research, Vol. 7, pp. 70-76, 2018.
192. D.K. Sharma and Sonali Saxena, "Generalized Coding Theorem with Different Source Coding Schemes", International Journal on Recent and Innovation Trends in Computing and Communication, Vol. 5(6), pp. 253 – 257, 2017.
193. Jerusha Angelene Christabel G, Suman Rajest S, "A Short Review on Fragmented Narration in Select Works of Sarnath Banerjee", American Journal of Social and Humanitarian Research, Vol. 3 No. 4, pp. 12-31, (2022).
194. Rajest, D. S. S., & G, J. A. C. (2022). A Brief on Past and Present a Tug of War in the Select Works of Kurt Vonnegut. Central Asian Journal of Literature, Philosophy And Culture, 3(4), 59-79.
195. G, J. A. C., & Rajest, D. S. (2022). Fragmented Narration in Corridor's Thematic, Language and Imagery. Central Asian Journal Of Arts And Design, 3(4), 15-37.
196. Steffi. R, D.K. Sharma, S. Suman Rajest, R. Regin, A. J. Obaid, and G. Jerusha Angelene Christabel, "Perceptron in Supervised, Semi-Supervised, Unsupervised Learning and Artificial Neural Network", CAJOTAS, vol. 3, no. 5, pp. 176-199, May 2022.
197. Khan, Shakir, and Mohammed Ali Alshara. "Adopting Open Source Software for Integrated Library System and Digital Library Automation." International Journal of Computer Science and Network Security 20.9 (2020): 158-165.
198. S. Khan, "Business Intelligence Aspect for Emotions and Sentiments Analysis," 2022 First International Conference on Electrical, Electronics, Information and Communication Technologies (ICEEICT), 2022, pp. 1-5.
199. Khan, S., Fazil, M., Sejwal, V.K., Ali Alshara, M., Alotaibi, R.M., Kamal, A., Baig, A., BiCHAT: BiLSTM with deep CNN and hierarchical attention for hate speech detection, Journal of King Saud University - Computer and Information Sciences (2022), doi: https://doi.org/10.1016/j.jksuci.2022.05.006