



**International Journal of Advanced Research in
Education and Technology (IJARETY)**

Volume 11, Issue 3, May-June 2024

Impact Factor: 7.394



IoT Based Smart School Bus Monitoring System

S.S. Srivarshan¹, C. Lokesh², S. Sathiyapriyan³, M. Selvakumari⁴, S. Saravanan⁵

UG Students, Department of Electrical and Electronics Engineering, Muthayammal Engineering College,
Tamil Nadu, India.^{1,2,3}

Assistant Professor, Department of Electrical and Electronics Engineering, Muthayammal Engineering College,
Tamil Nadu, India.⁴

Professor, Department of Electrical and Electronics Engineering, Muthayammal Engineering College,
Tamil Nadu, India.⁵

ABSTRACT: An IoT-based smart school bus monitoring system revolutionizes child safety during transportation. Incorporating an on-board attendance system, it ensures real-time tracking of children boarding and alighting the bus. This data triggers automated SMS alerts to parents and the school management, providing reassurance about their child's location throughout the journey. Integrated vehicle GPS enables precise location sharing, fostering transparency between parents and the school. This system not only enhances child safety but also streamlines communication, offering peace of mind to both parents and school authorities regarding the children's whereabouts during transit. The IoT-Based Smart School Bus Monitoring System leverages modern technology to enhance the safety and efficiency of school transportation. This system utilizes RFID readers to register children's attendance upon entering the bus. The attendance data is then transmitted via GSM to inform parents of their child's boarding, along with the GPS location of the bus. The school bus in and out information is also shared with the transportation team, enabling them to track the bus's movements throughout its route. The system always Monitor to provide real-time GPS location sharing to ensure constant monitoring of the bus's whereabouts. This innovative system represents a significant advancement in the field of school transportation, promising a more secure and efficient experience for all stakeholders involved.

I.INTRODUCTION

In the realm of modern education, ensuring the safety and well-being of students on their journey to school is of utmost importance. Enter the IoT-based Smart School Bus Monitoring System, a ground-breaking solution designed to revolutionize the way we oversee and secure children's transportation. This innovative system leverages the power of interconnected devices and real-time data to create a comprehensive platform that ensures the safety of students during their bus commute. The cutting-edge solution incorporates RFID technology to register children's attendance as they board the bus, providing real-time updates to parents via GSM communication and GPS integration enables constant tracking of the bus's location, offering an additional layer of security. As the bus reached the school, an RFID reader facilitates automatic gate access, ensuring a seamless arrival process. With these measures in place, our system not only revolutionizes school transportation logistics. The GPS location monitor the IOT app, to provide parents with invaluable peace of mind knowing their children are safe throughout their journey. Automated notifications further strengthen this communication, providing reassurance to parents and empowering school management to actively monitor and respond to any potential issues. This introduction sets the stage for a deeper exploration of how this advanced technology redefines the standards of student safety during transportation, fostering a collaborative environment between parents, schools, and innovative technology for a safer, more secure journey to and from school.

II.EXISTING SYSTEM

The safety of school children became the most important issue nowadays, as there are many previous incidents, where the child was forgotten in the bus or the child was missing in the bus. The System contains two main units – Bus unit and School unit. Bus unit consist of Face recognition system, raspberry Pi, GSM modem and motor control unit. School unit consist of GSM modem and database in VB (Visual Basics).

III.PROPOSED SYSTEM

In bus unit, face recognition is used to recognize every child or authenticated person and allow only authenticated person inside the bus. Raspberry Pi is used to control (to open or close) the door. GSM modem is interfaced with raspberry pi in the bus unit. GSM modem will send an in time and out time record of each and every child to the school unit. We have a database in school unit, which keeps the record of each and every child. It stores the information of every child such as parents name and cell phone numbers, address, relative numbers etc. We are using Visual Basic (VB) Software to maintain this database. School unit also has one GSM modem in it. The data sent by bus unit is received by school unit through this GSM modem. Then it sends this data to VB database where it keeps the record of in time and out time of each and every child. Then, GSM modem will send an alert SMS to the parents of child accordingly.

BLOCK DIAGRAM OF PROPOSED SYSTEM

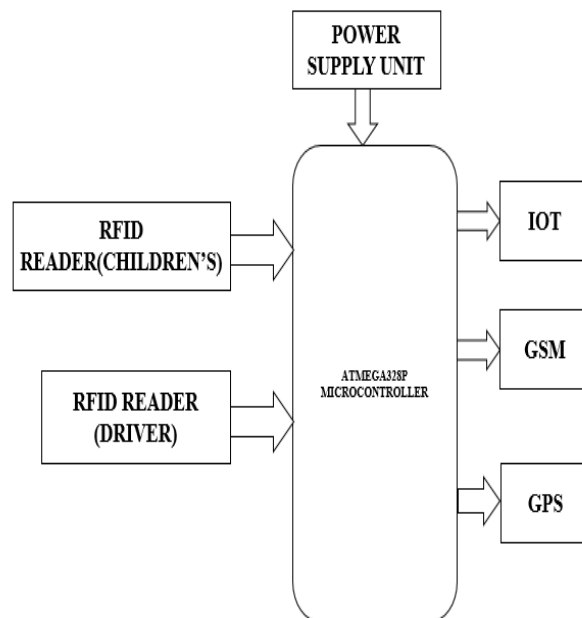


Figure.1. Block Diagram of Proposed System.

The proposed system block diagram shown in fig. The proposed system encompasses an IoT-based Smart School Bus Monitoring System, a sophisticated integration of technology aimed at elevating the safety and oversight of student transportation. Central to this system is an on-board attendance mechanism that ensures meticulous tracking of students boarding and disembarking the bus. This data is seamlessly integrated with advanced GPS technology, enabling real-time tracking and location sharing of the school bus. An essential feature lies in the automated alerts dispatched to parents and the school management, providing instant updates about their child's presence on the bus and its current location. This system is not just a safety measure but also a platform fostering enhanced communication and collaboration between parents and schools, cultivating a shared responsibility for ensuring the safety and security of students during their commute. Moreover, the system's data analytics capabilities offer insights that optimize bus routes, schedules, and operational efficiency, ensuring a comprehensive and efficient transportation ecosystem within the school.

Arduino UNO

The Arduino UNO R3 is the perfect board to get familiar with electronics and coding. This versatile development board is equipped with the well-known ATmega328P and the ATmega 16U2 Processor. This board will give you a great first experience within the world of Arduino.



Figure.2. Arduino UNO

Peripherals:

- 2x 8-bit Timer/Counter with a dedicated period register and compare channels
- 1x 16-bit Timer/Counter with a dedicated period register, input capture and compare channels
- 1x USART with fractional baud rate generator and start-of-frame detection
- 1x controller/peripheral Serial Peripheral Interface (SPI)
- 1x Dual mode controller/peripheral I2C
- 1x Analog Comparator (AC) with a scalable reference input
- Watchdog Timer with separate on-chip oscillator
- Six PWM channels
- Interrupt and wake-up on pin change
- ATmega16U2 Processor
- 8-bit AVR® RISC-based microcontroller

Memory:

- 16 KB ISP Flash
- 512B EEPROM
- 512B SRAM

Debug WIRE interface for on-chip debugging and programming

Power:

2.7-5.5 volts

Global positioning System NEO-6M

Locate, communicate, accelerate NEO-6 u-blox 6 GPS Modules Data Sheet Abstract Technical data Sheet describing the cost effective, high-performance u-blox 6 based NEO-6 series of GPS modules, that brings the high performance of the u-blox 6 positioning engine to the miniature NEO form factor. These receivers combine a high level of integration capability with flexible connectivity options in a small package. This makes them perfectly suited for mass-market end products with strict size and cost requirements. 16.0 x 12.2 x 2.4 mm www.u-blox.com NEO-6 - Data Sheet Document Information Title NEO-6 Subtitle u-blox 6 GPS Modules Document type Data Sheet Document number GPS.G6-HW-09005-E Document status Document status information Objective Specification This document contains target values. Revised and supplementary data ...¹¹



Figure.3. Global Positioning System

Global Positioning System is a satellite-based navigation system that provides location and time information anywhere on Earth. It consists of a network of satellites orbiting the planet, constantly transmitting signals that GPS receivers on the ground can pick up. By calculating the time it takes for signals from multiple satellites to reach the receivers, GPS devices determine the receiver's precise location, typically expressed in latitude and longitude coordinates. GPS technology is widely used in navigation, mapping, surveying, and various other applications requiring accurate positioning information.

EM-18 RFID Reader Module

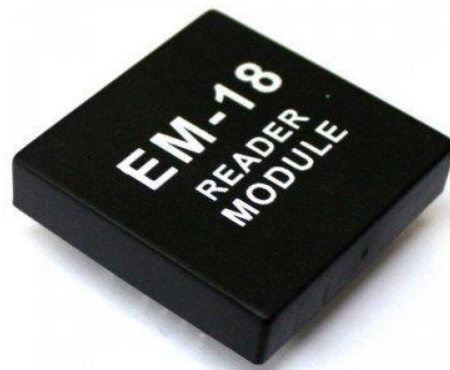


Figure.4. EM-18 RFID Reader Module

EM-18 RFID Reader Module 125 KHZ, is one of the commonly used modules for Radio Frequency Identification Projects. It can be directly interfaced with a microcontroller using UART communication and with a PC using an RS232 converter. This module can work with any 125KHz RFID tags and it can provide UART / Wiegand26 output formats. The Pitch of output pins is 2.54mm, thus it can be directly inserted into a breadboard for project development. Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects. The tags contain electronically stored information. This EM-18 RFID Reader is a Tiny, simple-to-use RFID reader module. With a built-in antenna, the only holdup is the 2mm pin spacing. Power the module, hold up a card and get a serial string output containing the unique ID of the card. It has TTL output.

Node MCU ESP8266

The Node MCU ESP8266 development board comes with the ESP-12E module containing the ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. Node MCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects. Node MCU can be powered using a Micro USB jack and VIN pin (External Supply Pin). It supports UART, SPI, and I2C interface.

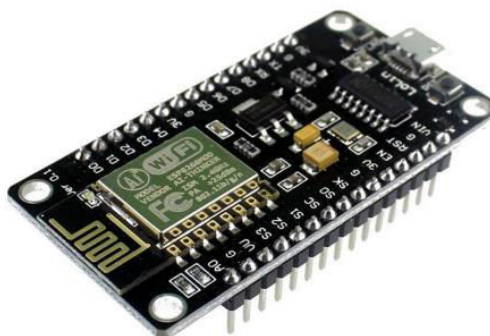


Figure.5. Node MCU

Specifications & Features

Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106, Operating Voltage: 3.3V, Input Voltage: 7-12V, Digital I/O Pins (DIO): 16, Analog Input Pins (ADC): 1, UARTs: 1, SPIs: 1, I2Cs: 1, Flash Memory: 4 MB, SRAM: 64 KB, Clock Speed: 80 MHz, USB-TTL based on CP2102 is included onboard, Enabling Plug n Play, PCB Antenna Small Sized module to fit smartly inside your IoT projects.

LCD Display

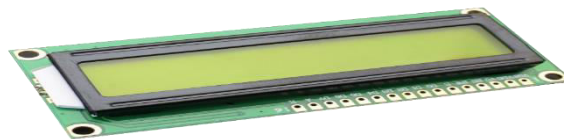


Figure.6.LCD Display

This is an LCD Display designed for E-blocks. It is a 16 character, 2-line alphanumeric LCD display connected to a single 9-way D-type connector. This allows the device to be connected to most E-Block I/O ports. The LCD display requires data in a serial format, which is detailed in the user guide below. The display also requires a 5V power supply. Please take care not to exceed 5V, as this will cause damage to the device. The 5V is best generated from the E-blocks Multi programmer or a 5V fixed regulated power supply.

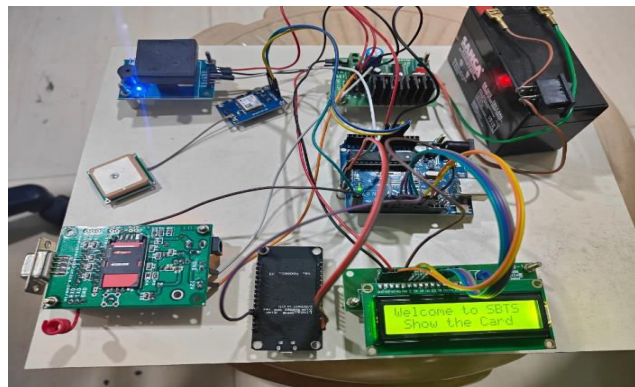


Figure.7.Hardware Model

IV.CONCLUSION

In conclusion, the IoT-based Smart School Bus Monitoring System stands as a transformative solution poised to redefine student transportation safety. By amalgamating advanced technologies like on-board attendance systems and GPS tracking, it addresses the critical need for heightened vigilance and communication in ensuring children's safety during their bus journeys. The seamless integration of real-time data sharing, facilitated by automated alerts to parents and school authorities, empowers proactive responses to any transportation-related concerns. By seamlessly integrating RFID technology, GSM communication, and GPS tracking, we have created a robust solution that prioritizes the well-being of children throughout their journey. The system's ability to register attendance, share real-time updates with parents, and provide constant GPS tracking offers unparalleled peace of mind for families. The automated gate access at the school and notifications to the transportation team streamline the arrival process and improve overall logistics. As we navigate the evolving landscape of educational technology, this innovative system exemplifies a paradigm shift, placing student safety at the forefront while streamlining communication and operational efficiency. Ultimately, it heralds a new era in school transportation, one where technology harmonizes with responsibility to ensure a safer, more secure journey for students to and from school.

REFERENCES

1. AJayalakshmi, P. Srujana, P. Ramesh, and G. Layasri. "Design of an Intelligent School Bus Monitoring and Reporting System via IoT." *Annals of the Romanian Society for Cell Biology* (2021): 3937-3944.
2. Jeyakkannan, N., C. Karthik, and Vivek Lukose. "IoT Based Smart Bus System using wireless sensor networks." *Journal of Physics: Conference Series*. Vol. 1937. No. 1. IOP Publishing, 2021.
3. P. A. Kamble and R. A. Vatti, "Bus tracking and monitoring using RFID," 2017 Fourth International Conference on Image Information Processing (ICIIP), Shimla, India, 2017, pp. 1-6, doi: 10.1109/ICIIP.2017.8313748.
4. Khutar, Dawood Zahi, Omar Hashim Yahya, and Haider Th Salim Alrikabi. "Design and Implementation of a Smart System for School Children Tracking." *IOP Conference Series: Materials Science and Engineering*. Vol. 1090. No. 1. IOP Publishing, 2021.
5. Bhatta, Rabinarayan, Parth Pratim, and S. Priya. "RFID based SMART SCHOOL BUS: Certifying Safety for the Children Going to School on the Road." 2021 Fifth International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud)(I-SMAC). IEEE, 2021.
6. V.Dhinesh, T.Premkumar, S.Saravanan and G.Vijayakumar," Online Grid Integrated Photovoltaic System with New Level Inverter System" *International Research Journal of Engineering and Technology (IRJET)*, Vol.5, Issue 12, pp.1544-1547, 2018.
7. J.Vinoth, T.Muthukumar, M.Murugandam and S.Saravanan," Efficiency Improvement of Partially Shaded PV System, *International Journal of Innovative Research in Science, Engineering and Technology*, Vol.4, Special issue 6, pp.1502-1510, 2015.
8. M.B.Malayandi, Dr.S.Saravanan, Dr. M.Muruganandam, "A Single Phase Bridgeless Boost Converter for Power Factor Correction on Three State Switching Cells", *International Journal of Innovative Research in Science, Engineering and Technology*, Vol. 4, Special Issue 6, pp. 1560-1566, May 2015.
9. A.Sasipriya, T.Malathi, and S.Saravanan, "Analysis of Peak to Average Power Ratio Reduction Techniques in SFBC OFDM System" *IOSR Journal of Electronics and Communication Engineering (IOSR-JECE)*, Vol. 7, No.5, 2013.
10. P.Ranjitha, V.Dhinesh, M.Muruganandam, S.Saravanan, "Implementation of Soft Switching with Cascaded Transformers to drive the PMDC Motor", *International Journal of Innovative Research in Science, Engineering and Technology*, Vol. 4, Special Issue 6, pp. 1411-1418, May 2015.
11. C.Sowmiya, N.Mohanandhini, S.Saravanan and M.Ranjitha,"Inverter Power Control Based On DC-Link Voltage Regulation for IPMSM Drives using ANN" *International Research Journal of Engineering and Technology (IRJET)*, Vol.5, Issue 11, pp.1442-1448, 2018.
12. N.Yuvaraj, B.Deepan, M.Muruganandam, S.Saravanan, "STATCOM Based of Adaptive Control Technique to Enhance Voltage Stability on Power Grid", *International Journal of Innovative Research in Science, Engineering and Technology*, Vol. 4, Special Issue 6, pp. 1454-1461, May 2015.
13. P.Manikandan, S.Karthick, S.Saravanan and T.Divya," Role of Solar Powered Automatic Traffic Light Controller for Energy Conservation" *International Research Journal of Engineering and Technology (IRJET)*, Vol.5, Issue 12, pp.989-992, 2018.
14. R.Satheesh Kumar, D. Kanimozhi, S. Saravanan, "An Efficient Control Scheme for Wind Farm Using Back to Back Converter," *International Journal of Engineering Research & Technology (IJERT)*, Vol. 2, No.9, pp.3282-3289, 2013.
15. K.Prakashraj, G.Vijayakumar, S.Saravanan and S.Saranraj, "IoT Based Energy Monitoring and Management System for Smart Home Using Renewable Energy Resources," *International Research Journal of Engineering and Technology*, Vol.7, Issue 2, pp.1790-1797, 2020.
16. J Mohammed sidqi, A. Senthil kumar, S.Saravanan, M. Swathisriranjani, "Hybrid Renewable Energy Sources for Power Quality Improvement with Intelligent Controller," *International Research Journal of Engineering and Technology*, Vol.7, Issue 2, pp.1782-1789, 2020.
17. S. Raveendar, P.M. Manikandan, S. Saravanan, V. Dhinesh, M. Swathisriranjani, "Flyback Converter Based BLDC Motor Drives for Power Device Applications," *International Research Journal of Engineering and Technology*, Vol.7, Issue 2, pp.1632-1637, 2020.
18. K. Manikant, P. Manikandan, V. Dhinesh, Dr. N. Mohanandhini, Dr. S. Saravanan, "Optimal Scheduling of Solar Wind Bio-Mass Systems and Evaluating the Demand Response Impacts on Effective Load Carrying Capability," *International Research Journal of Engineering and Technology*, Vol.7, Issue 2, pp.1632-1637, 2020.
19. T.R. Vignesh, M.Swathisriranjani, R.Sundar, S.Saravanan, T.Thenmozhi," Controller for Charging Electric Vehicles Using Solar Energy", *Journal of Engineering Research and Application*, vol.10, Issue.01,pp.49-53, 2020.
20. V.Dhinesh, Dr.G.Vijayakumar, Dr.S.Saravanan," A Photovoltaic Modeling module with different Converters for Grid Operations", *International Journal of Innovative Research in Technology*, vol.6, Issue 8, pp.89-95, 2020.

21. V. Dhinesh, R. Raja, S. Karthick, Dr. S. Saravanan, "A Dual Stage Flyback Converter using VC Method", International Research Journal of Engineering and Technology, Vol.7, Issue 1, pp.1057-1062, 2020.
22. G. Poovarasan, S. Susikumar, S. Naveen, N. Mohananthini, S. Saravanan, "Study of Poultry Fodder Passing Through Trolley in Feeder Box", International Journal of Engineering Technology Research & Management, vol.4, Issue.1, pp.76-83, 2020.
23. C. Sowmya, N. Mohananthini, S. Saravanan, and A. Senthil kumar, "Using artificial intelligence inverter power control which is based on DC link voltage regulation for IPMSM drives with electrolytic capacitor", AIP Conference Proceedings 2207, 050001 (2020); <https://doi.org/10.1063/5.0000390>, Published Online: 28 February 2020.
24. M.Revathi, S.Saravanan, R.Raja, P.Manikandan, "A Multiport System for A Battery Storage System Based on Modified Converter with MANFIS Algorithm", International Journal of Engineering Technology Research & Management, vol.4, issue 2, pp.217-222, 2020.
25. D Boopathi, S Saravanan, Kaliannan Jagatheesan, B Anand, "Performance estimation of frequency regulation for a micro-grid power system using PSO-PID controller", International Journal of Applied Evolutionary Computation (IJAEC), Vol.12, Issue.4, pp.36-49, 2021.
26. V Deepika, S Saravanan, N Mohananthini, G Dineshkumar, S Saranraj, M Swathisriranjan, "Design and Implementation of Battery Management System for Electric Vehicle Charging Station", Annals of the Romanian Society for Cell Biology, Vol.25, Issue.6, 17769-17774, 2021.
27. A Senthilkumar, S Saravanan, N Mohananthini, M Pushparaj, "Investigation on Mitigation of Power Quality Problems in Utility and Customer side Using Unified Power Quality Conditioner", Journal of Electrical Systems, Vol.18, Issue.4, pp.434-445, 2022.
28. V Kumarakrishnan, G Vijayakumar, D Boopathi, K Jagatheesan, S Saravanan, B Anand, "Frequency regulation of interconnected power generating system using ant colony optimization technique tuned PID controller", Control and Measurement Applications for Smart Grid: Select Proceedings of SGESC 2021, pp.129-141.
29. C Nagarajan, B Tharani, S Saravanan, R Prakash, "Performance estimation and control analysis of AC-DC/DC-DC hybrid multi-port intelligent controllers based power flow optimizing using STEM strategy and RPFC technique", International Journal of Robotics and Control Systems", Vol.2, Issue.1, pp.124-139, 2022.
30. G Vijayakumar, M Sujith, S Saravanan, Dipesh B Pardeshi, MA Inayathullaa, "An optimized MPPT method for PV system with fast convergence under rapidly changing of irradiation", 2022 International Virtual Conference on Power Engineering Computing and Control: Developments in Electric Vehicles and Energy Sector for Sustainable Future (PECCON), pp.1-4.
31. C Nagarajan, K Umadevi, S Saravanan, M Muruganandam, "Performance Analysis of PSO DFFP Based DC-DC Converter with Non Isolated CI using PV Panel", International Journal of Robotics and Control Systems' Vol.2, Issue.2, pp.408-423, 2022.
32. VM Geetha, S Saravanan, M Swathisriranjani, CS Satheesh, S Saranraj, "Partial Power Processing Based Bidirectional Converter for Electric Vehicle Fast Charging Stations", Journal of Physics: Conference Series, Vol.2325, Issue.1, pp.012028, 2022.
33. M Santhosh Kumar, G Dineshkumar, S Saravanan, M Swathisriranjani, M Selvakumari, "Converter Design and Control of Grid Connected Hybrid Renewable Energy System Using Neuro Fuzzy Logic Model", 2022 Second International Conference on Computer Science, Engineering and Applications (ICCSEA), pp.1-6, 2022.
34. C Gnanavel, A Johny Renoald, S Saravanan, K Vanchinathan, P Sathishkhanna, "An Experimental Investigation of Fuzzy-Based Voltage-Lift Multilevel Inverter Using Solar Photovoltaic Application", Smart Grids and Green Energy Systems, pp.59-74, 2022.
35. C Nagarajan, K Umadevi, S Saravanan, M Muruganandam, "Performance investigation of ANFIS and PSO DFFP based boost converter with NICI using solar panel", International Journal of Engineering, Science and Technology, Vol.14, Issue.2, pp.11-21,2022.
36. K Priyanka, N Mohananthini, S Saravanan, S Saranraj, R Manikandan, "Renewable operated electrical vehicle battery charging based on fuzzy logic control system", AIP Conference Proceedings, Vol.2452, Issue.1, pp.030007, 2022.
37. V Kumarakrishnan, G Vijayakumar, D Boopathi, K Jagatheesan, S Saravanan, B Anand, "Optimized PSO technique based PID controller for load frequency control of single area power system", Solid State Technology, Vol.63. Issue.5, pp.7979-7990, 2020.
38. G. Poovarasan, S. Susikumar, S. Naveen, N. Mohananthini, S. Saravanan, "Implementation of IoT Based Poultry Feeder Box", International Journal of Innovative Research In Technology, Vol.6, Issue.2, pp.33-38, 2020.
39. N.Gokulnath, B.Jasim Khan, S.Kumaravel, Dr.A.Senthil Kumar and Dr.S.Saravanan, "Soldier Health and Position Tracking System", International Journal of Innovative Research In Technology (IJIRT)), Vol-6 Issues 12, pp.39-45, 2020.

40. P.Navaneetha, R.Ramiya Devi, S.Vennila, P.Manikandan and Dr.S.Saravanan , “ IOT Based Crop Protection System against Birds and Wild Animal Attacks”, International Journal of Innovative Research In Technology (IJIRT)), Vol-6 Issues 11, pp.133-143, 2020.
41. V. Dhinesh, D. Prasad, G. Jeevitha, V. Silambarasan, Dr. S. Saravanan, “ A Zero Voltage Switching Pulse Width Modulated Multilevel Buck Converter”, International Research Journal of Engineering and Technology (IRJET), Vol 7 Issue 3, pp.1764,2020.
42. K. Punitha, M. Rajkumar, S. Karthick and Dr. S. Saravanan, “ Impact of Solar And Wind Integration on Frequency Control System”, International Research Journal of Engineering and Technology (IRJET), Vol 7 Issue 3, pp.1357-1362,2020.
43. A.Arulkumar, S.Balaji, M.Balakrishnan, G.Dineshkumar and S.Saravanan, “Design And Implementation of Low Cost Automatic Wall Painting Machine” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.170-176, 2020.
44. V.Periyasamy, S.Surya, K. Vasanth, Dr.G.Vijayakumar and Dr.S.Saravanan, “Design And Implementation of Iot Based Modern Weaving Loom Monitoring System” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 04, pp.11-18, 2020.
45. M.Yogheshwaran, D.Praveenkumar,S.Pravin,P.M.Manikandan and Dr.S.Saravanan, “IoT Based Intelligent Traffic Control System” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 04, pp.59-63, 2020.
46. R.Pradhap, R.Radhakrishnan, P.Vijayakumar, R.Raja and Dr.S.Saravanan, “Solar Powered Hybrid Charging Station For Electrical Vehicle” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 04, pp.19-27, 2020
47. S.Shenbagavalli, T.Priyadharshini, S.Sowntharya, P.Manikandan and Dr.S.Saravanan, “Design and Implementation of Smart Traffic Controlling System” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 04, pp.28-36, 2020.
48. M.Pavithra, S.Pavithra, R.Rama Priya, M.Vaishnavee, M.Ranjitha and S.Saravanan, “Fingerprint Based Medical Information System Using IoT” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 04, pp.45-51, 2020.
49. A.Ananthan, A.M.Dhanesh, J.Gowtham, R.Dhinesh, G.Jeevitha and Dr.S.Saravanan, “IoT Based Clean Water Supply” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.154-162, 2020.
50. R.Anbarsan, A.Arsathparvez, K.S.Arunachalam, M.Swathisriranjani and Dr.S.Saravanan, “Automatic Class Room Light Controlling Using Arduino” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.192-201, 2020.
51. S.Karthikeyan, A.Krishnaraj, P.Magendran, T.Divya and Dr.S.Saravanan , “The Dairy Data Acquisition System” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.163-169, 2020.
52. M.Amaran, S.Mannar Mannan, M.Madhu, Dr.R.Sagayaraj and Dr. S.Saravanan, “Design And Implementation of Low Cost Solar Based Meat Cutting Machine” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.202-208, 2020.
53. N.Harish, R.Jayakumar, P.Kalaiyaran, G.Vijayakumar and S. Saravanan, “IoT Based Smart Home Energy Meter” International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.177-183, 2020.
54. K.Subashchandrabose, G.Moulieshwaran, M.Raghul, V.Dhinesh and S.Saravanan, “Design of Portable Sanitary Napkin Vending Machine”, International Journal of Engineering Technology Research & Management (IJETRM), Vol-4 Issues 03, pp.52-58, 2020.
55. R.Gopi, K.Gowdhaman, M.Ashok, S.Divith, S.Saravanan and G.Dineshkumar, “An Online Method of Estimating State of Health of A Li-Ion Battery”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.31-36, 2023.
56. S.Azhaganandham, P.Elangovan, M.S.Kayalkanan, M.Dineshkumar and S.Saravanan, “Automatic Direct Torque Control System For 3 Phase Induction Motor”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.1-3, 2023.
57. K. Ranjith Kumar, A.Naveen, R.Ragupathi, S. Savitha and S. Saravanan, “Automatic Industrial-Based Air Pollution Avoidance System Using Iot”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.100-105, 2023.
58. G.T.Nandhini, V.Megasri, T.Jeevitha, S.Sandhiya and S. Saravanan, “Automatic Pick And Drop Helping Robot”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.72-76, 2023.

59. K.Deepika, S.Divya, A.Hema, R.Meena, V.Deepika and S.Saravanan, "Automatic Solar Panel Cleaning System", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.62-66, 2023.
60. A.Balaji, K.Harikiruthik, A.Mohamed Hassan, S.Saravanan and S.Saranraj, "Design and Implementation of A Single Stage Multi-Pulse Flexible Topology Thyristor Rectifier for Battery Charging in Electric Vehicles", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.37-42, 2023.
61. D.Hemalatha, S.Indhumathi, V.Myvizhi and S.Saravanan, "Design and Implementation of Intelligent Controller for Domestic Applications", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.4-7, 2023.
62. N.Priyadharshini, S.Saraswathi, T.Swetha, K.Sivaranjani, K.Umadevi and S.Saravanan, "Fuel Monitoring System using IoT", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.126-130, 2023.
63. S. Divyasri, E. Indhu, M. P. Keerthana, M. Selvakumari and S. Saravanan, "Gas Cylinder Monitoring System using IoT", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.67-71, 2023.
64. J.Arul, R.Balaji, S.Jeyamoorthy, M.Manipathra, R.Sundar and S.Saravanan, "IoT based Air Conditioner Control using ESP32", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.48-52, 2023.
65. Vundel Munireddy, J.Prahathesvaran, C.R.Thirunavukarasu, M.Santhosh Kumar and S.Saravanan, "IoT Based Charge Controller for Direct Fast Charging of Electric Vehicles Using Solar Panel", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.77-81, 2023.
66. D.Monish Kumar, K.Akash, S.Aswinkumar, S.Saravanan and R. Sagayaraj, "IoT based Industry Surveillance and Air Pollution Monitoring using Drones", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.14-18, 2023.
67. T.Silambarasan, R.Surya, J.Pravinkumar, R.Sundar and S Saravanan, "IoT based Monitoring System For Sewage Sweeper", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.88-93, 2023.
68. R.Aravinthan, Alwin.Augustin, P.Divagaran, S.Saravanan and P.Manikandan, "IoT Based Power Consumption and Monitoring System", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.43-47, 2023.
69. S.Partheeban, S.Sundaravel, S.Umapathi, R.Sagayaraj and S.Saravanan, "IoT based Safety Helmet for Mining Workers", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.116-120, 2023.
70. D.K.Vignesh, K.Sabarishwaran, S.Yuvaraj, P.Manikandan and S Saravanan, "IoT based Smart Dustbin", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.82-87, 2023.
71. P Muthukrishnan, P Poovarasan, S Vasanth, R Raja and S Saravanan, "Smart Borewell Child Rescue System", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.121-125, 2023.
72. S. Gokul, B. Gokulnath, P. Manikandan, S.Saravanan and N. Mohananthini, "Smart Crop Protection From Animals And Birds Using Arduino", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.19-25, 2023.
73. M.Abinesan, S.Jawahar, S.A.Gopi, A.Gokulraj and S.Saravanan, "Smart EV Charging Hub Integrated with Renewable Energy for Highway Utility", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.58-61, 2023.
74. K.Eswaramoorthi, R.Manikandan, R.Balamurugan, C.Ramkumar and S.Saravanan, "Smart Parking System using IoT", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.53-57, 2023.
75. S.Nirmalraj, C.Pranavan, M.Prem and S.Saravanan, "Smart Trolley With IoT Based Billing System", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.111-115, 2023.
76. S. NithyaSri, S.S.Sabitha, M.Thilagavathi, S.Umamageshwari, C.Nithya and S.Saravanan, "Smart Wireless Notice Board using IoT", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.106-110, 2023.
77. V.Gunasekaran, M.Gowtham, S. Anbubalaji, S.Saravanan and R.Prakash, "Solar based Electric Wheel Chair", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.8-13, 2023.
78. S.Naveenkumar, S.Prakash, A.P.Shrikirishnaa, C.Ramkumar and S.Saravanan, "Two to Three Phase 5HP Digital Panel", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.94-99, 2023.
79. Harivignesh K, Jaisankar.A, Chandru.J, Saravanan.S and Raja.R, "Voice Controlled Automatic Writer", International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.26-30, 2023.

80. N.Sakthiselvam, S.Srinivasan,S.Raajkumar, M.Selvakumari, S.Saravanan, “An Integrated Fault Isolation and Prognosis Method for Electric Drive Systems of Battery Electric Vehicles”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.166-171, 2023.
81. P Thava Prakash, P.Venketesan, D.Vignesh, S.Prakash, S.Saravanan, “Design of Low Cost E-Bicycle using Brushless DC Motor with Speed Regulator”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.148-153, 2023.
82. D.Tamilarasan, V.S.Vairamuthu, Y.Vasanth, K.Umadevi, S.Saravanan, “GSM based Agricultural Motor Control”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.172-177, 2023.
83. P. Vimal, S.Veerasingamani, R.Srihari, C.S.Satheesh, S.Saravanan, “IoT Based Optimal Power Management System For Smart Grid”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.160-165, 2023.
84. S.Abimanyu, P.Jagadheeswaran, S.Jaganath, K.Sanjay, R.Sivapranesh, K.Velmurugan, N.Mohananthini, C.S.Satheesh, S.Saravanan, “Portable Solar Tree”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.154-159, 2023.
85. J.Sriboopathi, G.Sridhar, R.Sharunesh, S.Tamilarasan, S.Saranraj and S.Saravanan, “A Dual Stage Power Electronic Converter for Electric Vehicle Charger”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.197-202, 2023.
86. M.Karthikeyan, S.Bilalahamad, V.A.Chandru, V.Deepika and S.Saravanan, “Design and Development of IoT based Motor Starter”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.178-183, 2023.
87. S.Yokesh, M.Manoj Kumar, M.Sankar, G.Dineshkumar and S.Saravanan, “Estimation of Maximum Power in Lithium Ion Batteries using IoT”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.191-196, 2023.
88. P.Preedeepa, S.Sivaranjani, M.Nandhini, M.Swathisriranjani and S.Saravanan, “Optimization of Power Quality Issues in EV Charging Station”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.203-209, 2023.
89. R. GokulRaj, N. Kannan, S. Karthick, M.Swathisriranjani and S.Saravanan, “Power Quality Enhancement in Smart Grids for Electric Vehicles Charging Station”, International Journal of New Innovations in Engineering and Technology, Vol.22, Issue.3, pp.184-190, 2023.



International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975

Impact Factor: 7.394