

# Design and Development of IoT based Motor Starter

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**Abstract:** Our country, agriculture plays a vital part to keeping the frugality running. 60% of India's population depends on agriculture as a primary source of live hood. Now a day's every field preferred automation-controlled system. In daily routine growers are facing numerous issues related to irrigation system. Almost of the planter cannot afford automation system due to high original cost of product, outfit and support system. This paper tries to design a simple Low- Cost Mobile Controlled Motor Starter using STM32F103C8T6 Microcontroller system with introductory point, so planter affordable it's fluently.

## I. INTRODUCTION

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighbourhood traffic control systems, etc.

An embedded system is integration of hardware and software, the software used in the embedded system is set of instructions which are termed as a program. The microprocessors or microcontrollers used in the hardware circuits of embedded systems are programmed to perform specific tasks by following the set of instructions. These programs are primarily written using any programming software like Proteus or Lab-view using any programming languages such as C or C++ or embedded C. Then, the program is dumped into the microprocessors or microcontrollers that are used in the embedded system circuits.

A system which is essential to finish its task and send its service on time, then only it said to be a real time operating system. RTOS controls the application software and affords a device to allow the processor run. It is responsible for managing the different hardware resources of a personal computer and also host applications which run on the PC. This operating system is specially designed to run various applications with an exact timing and a huge amount of consistency. Particularly, this can be significant in measurement & industrial automation systems where a delay of a program could cause a safety hazard. The applications of an embedded system basics include smart cards, computer networking, satellites, telecommunications, digital consumer electronics, missiles, etc.



Fig.1. Embedded System Applications

## II.EXISTING SYSTEM

Now a days every field preferred robotization controlled system. In diurnal routine growers are facing numerous issues related to irrigation system. utmost of the planter cannot go robotization system due to high original cost of product, outfit and support system. This paper tries to design a simple Low- Cost Mobile Controlled Motor Starter using STM32F103C8T6 Microcontroller system with introductory point, so planter affordable it's fluently.

## III.PROPOSED SYSTEM

Starter is most one and especially designed for growers, agronomists and diligence to operate and cover ever located submersible pumps and motors. They can switch ON and switch OFF the motor pumps from their homes or anywhere by using a SMS/ CALL/ Android operation. It also saves water, time and electricity. Our GSM grounded mobile pump regulator are manufactured with advanced bedded micro regulator technology and quality process. Mobile Starter (Cell Phone Starter) is most unique and specially designed for farmers, agriculturists and industries to operate and monitor remotely located submersible pumps and motors. They can switch ON and switch OFF the motor pumps from their homes or anywhere by using a SMS / CALL / Android Application. It also saves water, time and electricity. Our GSM based mobile pump controllers are manufactured with advanced embedded micro controller technology and quality process. User can operate the motor pump from anywhere in the world through CALL / SMS / Android app.It has functions like dry run and over load protection for motor safety. User is not charged for CALL to control the motor pump.GSM Technology, Reliable operation, worldwide Connectivity.

Less Maintenance and robust device.Suitable for single / three phase motors. It has inbuilt functions of timer; low & high voltage protectionSupports motors of any HP and any capacity.Works with any models of starters.Operate with any SIM operator in your region.External antenna for better signal output.SIM card slot backside of PCB.Visible LED indications to know the power, relay (motor on) and GSM network status.SMS alerts for motor ON/ motor OFF. Live motor operation status available via SMS.Helps to use the existing mobile to operate the device.Fully programmable.No auxiliary power supply required for controller operation.Can enable access to authorized users.Microcontroller based advanced embedded technology Easy to install.

## IV.HARDWARE DESCRIPTION

An embedded system is a combination of computer hardware and software designed for a specific function. Embedded systems may also function within a larger system. The systems can be programmable or have a fixed functionality. Industrial machines, consumer electronics, agricultural and processing industry

devices, automobiles, medical equipment, cameras, digital watches, household appliances, airplanes, vending machines and toys, as well as mobile devices, are possible locations for an embedded system. While embedded systems are computing systems, they can range from having no user interface (UI) -- for example, on devices designed to perform a single task -- to complex graphical user interfaces (GUIs), such as in mobile devices. User interfaces can include buttons, LEDs (light-emitting diodes) and touchscreen sensing. Some systems use remote user interfaces as well. Markets and Markets, a business-to-business (B2B) research firm, predicted that the embedded market will be worth \$116.2 billion by 2025. Chip manufacturers for embedded systems include many well-known technology companies, such as Apple, IBM, Intel and Texas Instruments. The expected growth is partially due to the continued investment in artificial intelligence (AI), mobile computing and the need for chips designed for high-level processing.

An AC powered linear power supply usually uses a transformer to convert the voltage from the wall outlet (mains) to a different, usually a lower voltage. If it is used to produce DC, a rectifier is used. A capacitor is used to smooth the pulsating current from the rectifier. Some small periodic deviations from smooth direct current will remain, which is known as ripple. These pulsations occur at a frequency related to the AC power frequency (for example, a multiple of 50 or 60 Hz).

## V.SIMULATION

The proposed system that is going to be described in this phase is done using the Proteus model. The simulation circuit has been designed in Proteus software using the respective components present in the Proteus to get the desired output. This simulation circuit will be described in detail below. This chapter describes the design and current implementation of the Proteus dependability manager and object factory. The application requirements and the type of Aqua applications that Proteus currently supports are also described. Proteus PIC Bundle is the complete solution for developing, testing and virtually prototyping your embedded system designs based around the Microchip Technologies TM series of microcontrollers. This software allows you to perform schematic capture and simulate the circuits you design.

Once you have selected all components into the design, close the Library Browser and left-click once on any component in the Object Selector Now left-click on the Editing Window to place the component on the schematic - repeat the process to all components on the schematic.

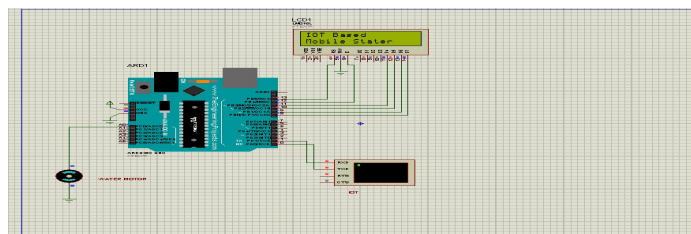


Fig.3. Simulation Diagram



Fig.4. Hardware Implementation

## VI.CONCLUSION

If you are searching for an easy solution to operate the motors in a better way and increase your productivity then use Mobile Controlled Motor Starter Using Microcontroller. Using it is a layman task as all you need to do is install a simple application called Mobile Starter and link it with your existing motor starter and you can operate this through call and SMS. The proposed of getting message via mobile during the motor ON or OFF condition and start the motor automatically without man power of starter in industrial and real time application. It is a cheap option as compared to the other products in the market and comes with a good guarantee and also the description is provided in a detailed form to handle any adverse situation.

## REFERENCES

- [1] 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.
- [2] 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.
- [3] 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.
- [4] 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.
- [5] 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.
- [6] 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.
- [7] 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.
- [8] 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.
- [9] 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.
- [10] 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.
- [11] J Mohammed siddi, 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.
- [12] 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.
- [13] K. Manikanth, P. Manikandan, V. Dhinesh, Dr. N. Mohananthini, 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.
- [14] 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.
- [15] 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.
- [16] 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.
- [17] 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.
- [18] 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.
- [19] 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.
- [20] 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.
- [21] V Deepika, S Saravanan, N Mohananthini, G Dineshkumar, S Saranraj, M Swathisriranjani, "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.
- [22] 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.
- [23] 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.

- [24] 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 RPF technique", *International Journal of Robotics and Control Systems*, Vol.2, Issue.1, pp.124-139, 2022.
- [25] 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.
- [26] 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.
- [27] 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.
- [28] 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.
- [29] 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.
- [30] C Nagarajan, K Umadevi, S Saravanan, M Muruganandam, "Performance investigation of ANFIS and PSO DFFP based boost converter with NICL using solar panel", *International Journal of Engineering, Science and Technology*, Vol.14, Issue.2, pp.11-21, 2022.
- [31] 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.
- [32] 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.
- [33] 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.
- [34] 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.
- [35] 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.
- [36] 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.
- [37] 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.
- [38] 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.
- [39] 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.
- [40] 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.
- [41] 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
- [42] S.Shenbagavalli, T.Priyadharshini, S.Sowtharya, 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.
- [43] 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.
- [44] 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.
- [45] 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.
- [46] 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.
- [47] 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.
- [48] 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.
- [49] 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.
- [50] 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.
- [51] 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.
- [52] 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.
- [53] 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.
- [54] 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.
- [55] 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.
- [56] 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.

- [57] 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.
- [58] 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.
- [59] 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.
- [60] 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.
- [61] 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.
- [62] 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.
- [63] 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.
- [64] 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.
- [65] 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.
- [66] P Muthukrishnan, P Poovarasam, 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.
- [67] 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.
- [68] 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.
- [69] 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.
- [70] 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.
- [71] 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.
- [72] 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.
- [73] 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.
- [74] 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.
- [75] 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.
- [76] 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.
- [77] 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.
- [78] 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.
- [79] S.Abimanyu, P.Jagadheeswaran, S.Jaganath, K.Sanjay, R.Sivapraneesh, 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.