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# Design and Development of E-Vehicle Based on Roller

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**ABSTRACT:** Rollers is a part of Agricultural tools, which is used in many ways. Accordance with the help of motorized machinery .We generally owns a reliable renewable energy source, principally in the form of solar radiation. In an effort to help to improve the returns of many applications in an environmentally acceptable way, the project's objective is to investigate the feasibility of Electric vehicle, The observed solar energy can be utilized and stored into the battery which shall be able to use collect sugarcane waste using generated from renewable energy that is stored in the battery and it connected to PIC Controller.

**KEYWORDS:** Bluetooth module, Battery, PIC Controller, DC geared motor.

## I. INTRODUCTION

This project based on developing a Roller using combination of solar power to decrease fuel vehicle for Agriculture and also reduce the pollution. Agricultural electric tools, were developed and employed nearly a hundred years ago but vanished with the increasing availability of fossil fuels and the progress in the development of combustion engines. The design of an roller has to consider the specific properties of the electric motor and its controls in conjunction with the Renewable energy source It consists of the reduced autonomy together with the relatively long recharging time for classic batteries and high costs for battery replacement. Taking into consideration these aspects advanced technologies has been proposed to design and renewable solar energy plays crucial role in the proposed system. The system is designed to maximize the output power by constantly adjusting the PV panel. Additionally, the design of a roller has to consider the specific properties of the electric motor and its controls in conjunction with the onboard energy source. Compared to a combustion engine driven tractor, this leads to a different configuration of the drive train and the associated energy supply system. The project's aim is to evaluate the feasibility of an electric micro system for collect sugar cane waste that can be propelled by locally generated renewable energy.

## II. EXISTING SYSTEM

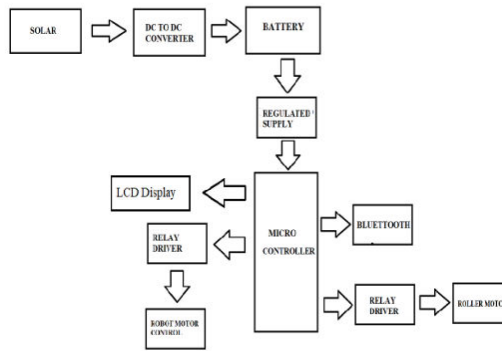
In this system the battery is connected to the regulated supply Transformer is a device used either for stepping-up or stepping-down the AC supply voltage with a corresponding decreases or increases in the current. Small batteries such as flashlight and radio batteries are primary cells. This concept bases on exchangeable battery packs for the tractor when working in plantations for an extended period. The tractor transports a trailer with a set of exchangeable battery packs to the place of work. Whenever a battery pack on the tractor is exhausted, it is replaced with a fully charged one. Work continues until the last battery pack is down to a margin, which ensures a return to the base.

To exploit this concept to a maximum, a second set of mobile exchangeable battery pack is simultaneously charged at the home base. And the microcontroller controls and it runs the BLDC motor and also relay driver to runs the application.



**III. PROPOSED SYSTEM**

Solar panel is used as renewable energy resource. An DC to DC converter is used to store the produced energy to a battery by tracking maximum power point..



**Figure 1 : Block Diagram**

It is shown in above block diagram of proposed System The Bluetooth is interfaced for controlling the vehicle via remotely. The micro controller is used to control the system based on the input. Robotic motor and Roller motor are connected with the motor driver. And this is completely triggered by the Bluetooth for directional movement

**A. PIC Controller**

The PIC16F877 is an 8-bit microcontroller from Microchip. The 40-pin IC has 14 Channel 10-bit ADC making it suitable for applications which require more ADC inputs. The IC also has 2 Comparators, 2 Timers (8-bit and 16-bit) and supports SPI, I2C and UART communication protocols. a synchronous serial port that can be configured as either 3-wire Serial Peripheral Interface (SPI™) or the 2-wire Inter-Integrated Circuit bus and an Enhanced Universal Asynchronous Receiver Transmitter (EUSART). And the controller was easy to operate. All of these features make it ideal for more advanced level A/D applications in automotive, industrial, appliance.

**B. Photovoltaic Cell**

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Photovoltaic modules use light energy (photons) from the Sun to generate electricity through the photovoltaic effect. The majority of modules use wafer-based crystalline silicon cells or thin-film cells. The structural (load carrying) member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture. Most modules are rigid, but semi-flexible ones based on thin-film cells are also available. The cells must be connected electrically in series, one to another.



Figure 2 : Photovoltaic Cell

### C. Lead Acid Battery

The lead-acid battery is the oldest type of rechargeable battery. Despite having a very low energy to weight ratio and a low energy-to-volume ratio, its ability to supply high surge currents means that the cells have a relatively large power-to-weight ratio. These features, along with their low cost, make them attractive for use in motor vehicles to provide the high current required by automobile starter motors. This project is using dual 6v battery on the roller.

### D. DC Geared Motor

It is a classical motor and has been used in motor control for a long time. All the power involved in electromechanical conversion is transferred to the rotor through stationary brushes which are in rubbing contact with the copper segments of the commutators.



Figure 3: Gear motor

It requires certain maintenance and has a shorter life time. However, it is suitable for low power application. It has found applications in electric wheel-chair, transporter and micro-car. Today, most of the golf-carts are using DC motors. In this project, by using Geared motor on 12v, 60 RPM rating is shown in the figure

### E. Relay Module

The Relay is an electrically operated switch. Relays are used to control a circuit by a low- power signal (with complete electrical isolation between control and controlled circuits), or where several circuits need to be controlled by signal. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the contact of the switch. The rating of relay is 12V/5A..

### F. LCD Monitoring

LCD use a liquid crystal to produce a visible image .Liquid crystal display screen works on the principle of blocking light rather than emitting light.16\*2 display the input of motor speed is given the motor runs and the output is displayed in the display.



### G. Boost Converter

A boost converter is one of the simplest types of switch mode converter. As the name suggests, it takes an input voltage and boosts or increases it. All it consists of is an inductor, a semiconductor switch (these days it's a MOSFET, since you can get really nice ones these days), a diode and a capacitor. Also needed is a source of a periodic square wave. As you can see, there are only a few parts required to make a boost converter. It is less cumbersome than an AC transformer or inductor. They're so simple because they were originally developed in the 1960s to power the electronics systems on aircraft. It was a requirement that these converters be as compact and as efficient as possible.

### H. Bluetooth Module

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data.

## IV. SIMULATION

Proteus Design Suite (designed by Lab center Electronics Ltd.) is a software tool set, mainly used for creating schematics, simulating Electronics & Embedded Circuits and designing PCB Layouts. Proteus ISIS is used by Engineering students & professionals to create schematics & simulations of different electronic circuit

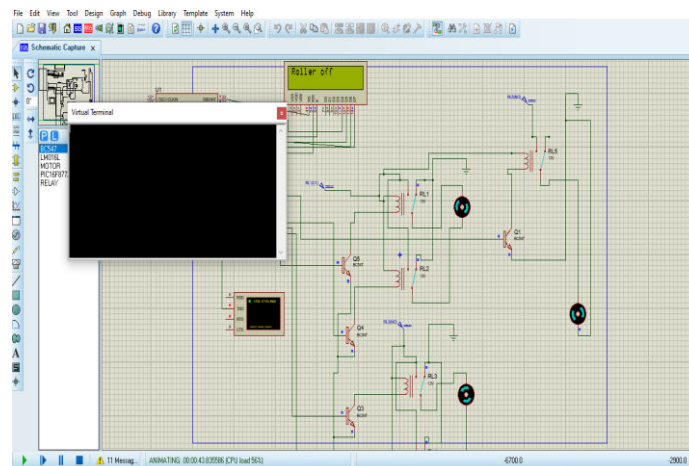
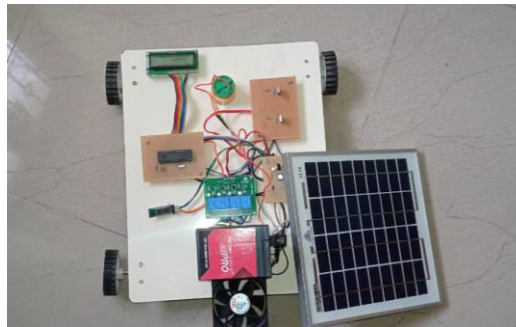


Figure 4 : Simulation Result

## V. HARDWARE IMPLEMENTATION

The Design of E-vehicle is a vehicle powered by solar energy that collects the sugarcane waste after the harvest. The system uses 12V batteries to power the vehicle movement motors as well as the roller motor. We also use a solar panel to charge the battery so that there is no need of charging it externally. The vehicle motors are interfaced to an PIC microcontroller that controls the working of all the motors. The rate of electric vehicle is controlled by bluetooth. In order to provide an efficient acceleration of an electric vehicle, we use gear motor. The results confirm that petrol and diesel can be exists for current scenario, so future scope depends only on electric vehicle The solar panel gives power to boost converter.



**Figure 4 : Hardware Implementation**

The boost converter is used for the step up the voltage and it the power goes to the battery. The battery gives power to the PIC16F887A and the board gives output to regulator for controlling the speed of the motor. It is connected to the vehicle Today available e-vehicle are use 3-4 no's of 12v batteries. Now days the machines are used for that purpose only. This project helps to make the vehicle for prevent pollution and it also used for various agriculture applications. The components is cheap and available

## VI. CONCLUSION

For agricultural applications in remote areas without (or with) access to the grid, the electric system provides the option to utilize locally generated renewable energy. In equatorial regions with a reliable and low-cost energy source in the form of a solar. It last but not least, it should also not be forgotten that with this change of technology significant benefits will be expected for the environment in addition to economic opportunities for the local population. The development of this is efficient than the previous solar related systems .This device may be considered as important for its eco-friendly nature and low cost involvement. A solar panel of is used to charge the battery to operate the roller. The power generated through solar panel is stored in a battery for the effective functioning of system the during the presence of sunlight. The Bluetooth module is interfaced with PIC controller and LCD display.

## REFERENCES

1. R. Anand, S. Saravanan "A Correlative Study of Perturb and Observe Technique and GA- RBF-NN Method Supplying a Brushless DC Motor," International Journal of Circuits and Systems, 2016, vol.7, pp 1653-1664.
2. C.Sowmiya, N.Mohananthini, 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.
3. S Prasanth, G Praveenkumar, V Sridhar, S Saranraj, Dr.S Saravanan, "Paddy Harvesting Using Vacuum Inhalation Mechanism", International Journal of Innovative Research in Technology (IJIRT), ISSN: 2349-6002, Volume 6, Issue 11, April 2020.
4. 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.
5. 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.
6. 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.
7. 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.

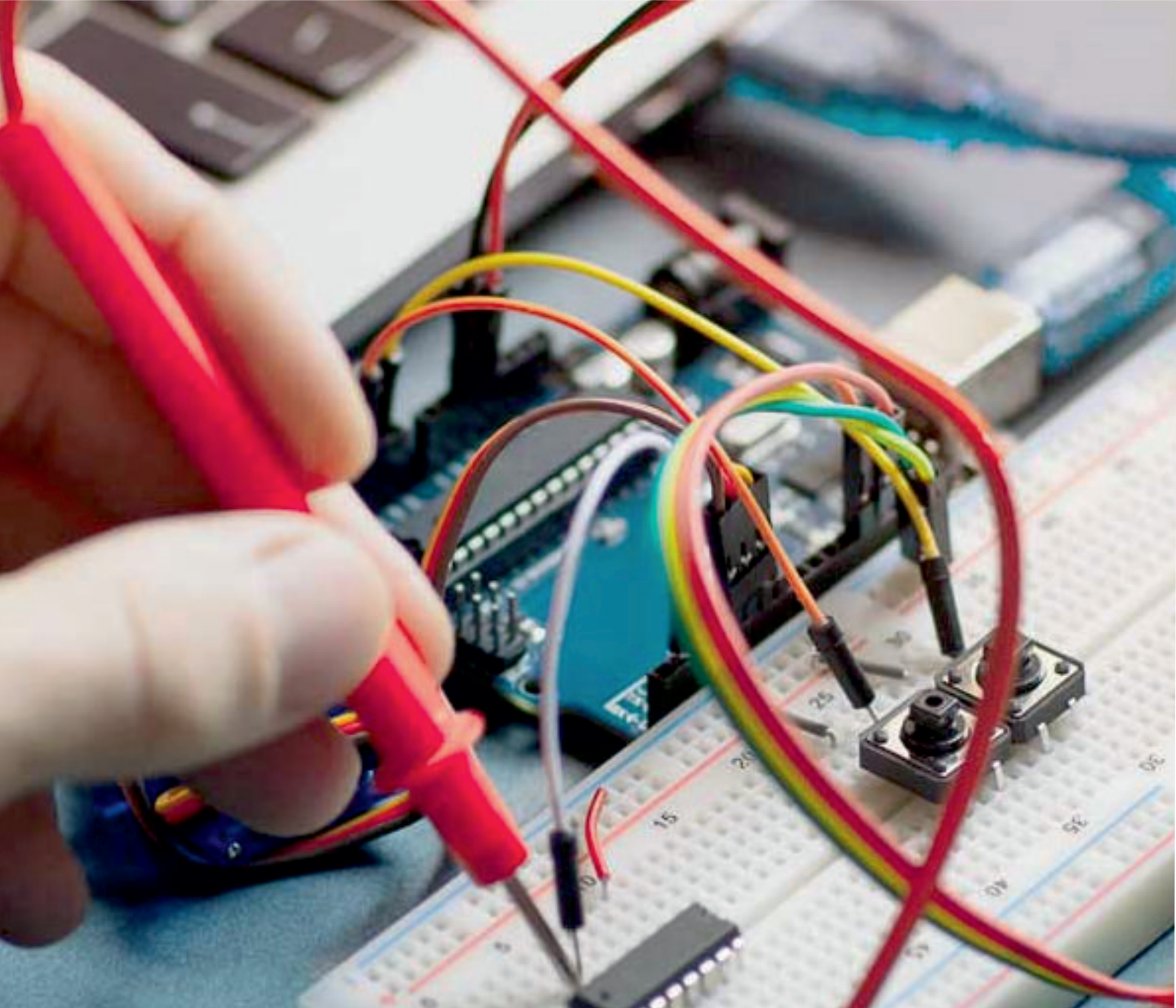


8. S. Raveendar, P.M. Manikandan, S. Saravanan, V. Dhinesh, M. Swathisriranjani, “Flyback Converter Based BLDC Motor Drives for Power Device Applications,” International Research Journal of Engineering and Technology, Vol.7, Issue 2, pp.1632-1637, 2020.
9. T.R. Vignesh, M.Swathisriranjani, R.Sundar, 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.
10. G. Poovarasam, 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.
11. 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.
12. 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.
13. Dr.S.Saravanan, S.Karthick, K.Rajeshkumar,S.Sriramachandran, P.Surjeethkumar,” Fishermen Border Alert System,” International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.9, Issue, 03, pp.236-241, 2020.
14. A.Ananthan, A.M.Dhanesh, J.Gowtham, R.Dhinesh, G.Jeevitha, Dr.S.Saravanan,” IoT Based Clean Water Supply”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.154-162, 2020.
15. S.Karthikeyan, A.Krishnaraj, P.Magendran, T.Divya, Dr.S.Saravanan,” The Dairy Data Acquisition System”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.163-169, 2020.
16. A.Arulkumar, S.Balaji, M.Balakrishnan, G.Dineshkumar, S.Saravanan,” Design and Implementation of Low Cost Automatic Wall Painting Machine”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.170-176, 2020.
17. N.Harish, R.Jayakumar, P.Kalaiyarasam, G.Vijayakumar, S.Saravanan,” IoT Based Smart Home Energy Meter”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.177-183, 2020.
18. M.Amaran, S.Mannar Mannan, M.Madhu, Dr.R.Sagayaraj, Dr.S.Saravanan,” Design and Implementation of Low Cost Solar Based Meat Cutting Machine”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.184-190, 2020.
19. R.Anbarsan, A.Arsathparvez, K.S.Arunachalam, M.Swathisriranjani, Dr.S.Saravanan,” Automatic Class Room Light Controlling Using Arduino”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.3, pp.192-201, 2020.
20. S.Monika, M.Priyadharshini, R.Rajalakshmi, T.Rajeshwari, C.Ramkumar, Dr.S.Saravanan,” Design and Implementation of Electrochemical Etching Machine”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.37-44, 2020.
21. V.Periyasamy, S.Surya, K. Vasanth, Dr.G.Vijayakumar, Dr.S.Saravanan,” Design and Implementation of IoT Based Modern Weaving Loom Monitoring System”, International Journal Of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.11-18, 2020.
22. M.Yogeshwaran, D.Praveenkumar, S.Pravin, P.M.Manikandan, Dr.S.Saravanan,” IoT Based Intelligent Traffic Control System”, International Journal of Engineering Technology Research & Management”, Vol.4, Issue.4, Pp.59-63, 2020.
23. S.Shenbagavalli, T.Priyadharshini, S.Sowntharya, P.Manikandan, Dr.S.Saravanan,” Design and Implementation of Smart Traffic Controlling System”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.28-36, 2020.
24. R.Pradhap, R.Radhakrishnan, P.Vijayakumar, R.Raja, Dr.S.Saravanan,” Solar Powered Hybrid Charging Station For Electrical Vehicle”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.19-27, 2020.



25. M.Pavithra, S.Pavithra, R.Rama Priya, M.Vaishnavee, M.Ranjitha, Dr.S.Saravanan” Fingerprint Based Medical Information System Using IoT”, International Journal of Engineering Technology Research & Management, Vol.4, Issue.4, Pp.45-51, 2020.
26. S.Umamaheswari, M.Thilagavathi, S.Sivaranjani, N.Mohananthini, M.Selvakumari, S.Saravanan,” A Study Of Renewable Energy In Smart Grid Technology”, International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.
27. D.Ajithkumar, J.S.Akilan, K.Dileep, R.Lokesh, E.Viswanathan S.Tamilselvan S.Saravanan,” Design and Development of Electric Two Wheeler With Fast Charging”, International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.
28. V.Annamalai P.S.Isaiyalagan T.Manikandan T.Premkumar N.Sathya R.Prakash S.Saravanan,” Design and Implementation of Automatic Rope Robot for Supplying Poultry Feeds”, International Journal of Engineering Technology Research & Management, Vol.05, Issue.09, Pp.94-101, 2021.
29. S.Arvinthraj, M.Arun, S.Inbhakumar, R.Sagayaraj, S.Saravanan,” Multipurpose Hybrid Electric Vehicle for Agricultural Applications”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7366-7371, 2021.
30. G.Boopathi raja, K.Dhinesh, S.Gobi, G.Nandakumar, G.Nagarajan, G.Vijayakumar, S.Saravanan,” Cotton Harvesting Machine”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7372-7377, 2021
31. S.Anbarasu, K.Hariharan, S.Hariharan, R.Vinoth, T.Divya, N.Mohananthini, S.Saravanan,” Battery Monitoring for E-Scooter Using Internet of Things”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7384-7389, 2021
32. S.Mangalraj, L.Manimaran, C.Kumaresan, R.Manikandan, G.Srinivasan, A.Gokulraj, S.Saravanan,” IoT Based Smart Energy Meter”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7390-7395, 2021
33. M.Dhanarasan, T.Jothimurali, S.U.Manishkumar., G.Dineshkumar,P.Sakthilakkia, A.Senthilkumar, S.Saravanan,” Gas Booking Using IoT”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7396-7400, 2021
34. D.Manoj kumar, C.Kavinkumar, S.Kesavan, S.Saranraj, M.Selvakumari, P.Dhivyabharathi, S.Saravanan,” Intelligent Water Level Management for Domestic Application Using GSM”, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, Vol.10, Issue.10, Pp.7401-7404, 2021





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