Agni College of Technology Chennai was established in the year 2001 by **Sri Balaji Charitable and Educational Trust** with the objective of producing high quality engineers and technocrats. Electrical and Electronics Engineering program was introduced at Agni College of Technology in the academic year 2001-02 with an intake of 60 students. The demand for Electrical Engineers in industries, state electricity boards and private sectors engaged in electricity generation is more than the engineers available. The periodical revision of the syllabi and introduction to electronics related subjects enables Electrical engineers to get acquainted with latest developments in the Electrical and Electronics Engineering field and handle the present solid state electronic devices.

The Department of Electrical and Electronics Engineering has excellent industrial relations and institutional interactions which provide services like consultancy, designing and testing. Since the commencement of the program, the department has made sincere efforts in the development of students through training and industrial visits. The students from Electrical Engineering Department have won prizes in co-curricular and extra-curricular activities. The Department has a trekking group and a student's association (ELITE) for the overall development of the students.

- B.E. Electrical and Electronics Engineering
- M.E. Power Electronics and Drives

The Department has approved Research Centre from Centre for Research, Anna University, Chennai.

INDEX

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DESIGN OF WIRELESS POWER TRANSMITTING EV CHARGING ROAD

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Abstract*— Road transportation is the majorly used transportation in the entire world. Usage of the car has drastically increased and the need for petrol and diesel has increased. So recently, Electric vehicles (EVs) are becoming popular, as they decrease reliance on fossil fuels and reduce greenhouse emissions. The problem of the Electric Vehicle is nothing else but the electricity storage technology, which is the major drawback today due to its unsatisfactory energy density, limited lifetime, and high cost. So our project proposes a novel idea to charge the Electric vehicle wirelessly through the inductive power transfer principle using the transmitting and receiving coil while simultaneously decreasing the battery size and improving the convenience and without the requirement of the cable. The electric vehicle can be charged both by the static wireless power transmission (SWPT) and dynamic wireless power transmission (DWPT) method.

Keywords*—Electric Vehicle (EV), Inductive power transfer, transmitting coil, Receiving coil, Wireless power transmission (WPT).*

1. INTRODUCTION

With the development of human society, the problem of global warming caused by greenhouse gas emissions and the emission from fossil fuels has intensified accordingly, and the importance of energy conservation and emission reduction becomes more significant. As most of the industries releasing greenhouse gas emissions, the transportation industry has attracted the attention of countries all over the world. As a well-known clean energy source, electrical energy can be converted to renewable energy sources. Compared to the traditional vehicles powered by fossil fuels, Electric Vehicles, which are driven by electric energy, have a unique zero-emission advantage. That is why EVs are undoubtedly the best choice for the transportation industry to promote energy structure optimization. However, the high cost, limited capacity, and the cruising range of electric vehicle battery packs limit the further promotion of EVs. Compared to the traditional plug-in-charging method, there is no physical connection between the source and the load during the wireless power transmission (WPT) charging process, therefore the charging process is flexible and safer, which makes WPT a significant method. The Wireless power transfer technology is divided into static wireless power transmission(SWPT) and dynamic wireless power transmission (DWPT). DWPT charging is developed based on SWPT charging, which can effectively reduce the volume of the vehicle's battery pack, increases the cruising range, and further and improves the convenience of charging. The main objective of the project work area, the installation of the wireless charging path (WCP) in the Electric Vehicle Service Road (EVSR) since service roads will be easy for charging the electric vehicles wirelessly while traveling. To provide the non-cable system. To reduce the complexity of the charging process of electric vehicles. The power required to charge an electric vehicle is generated from the solar panel.

2. EXISTING SYSTEM

In the existing system, a charging module is installed under slots of parking roads in public places. The drawback of this system is that an EV can only be charged when it is parked at a dedicated location that is installed with a charging point. This creates many serious problems. First, an EV must leave the dedicated parking space immediately after being charged, so that the charging point can be used to serve another EV. This may not happen all the time. Second, with increasing EV penetration, all parking spaces may require the installation of a charging point. This will increase the cost of providing charging infrastructure which may not be utilized 100% of the time.

3. SIMULATION MODEL

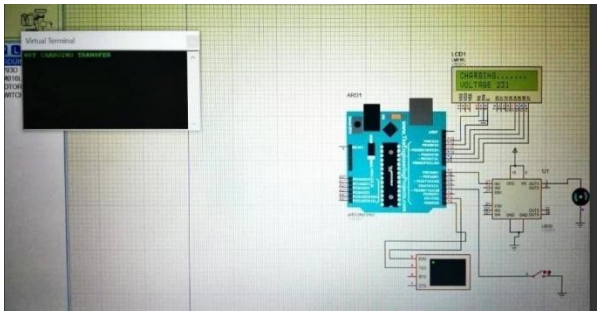
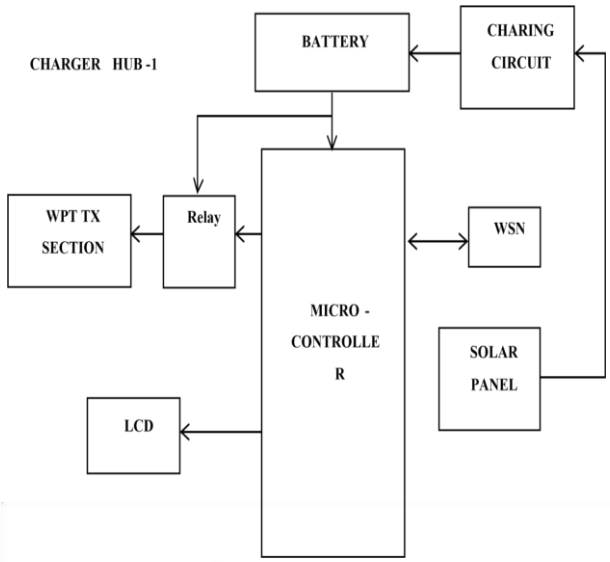
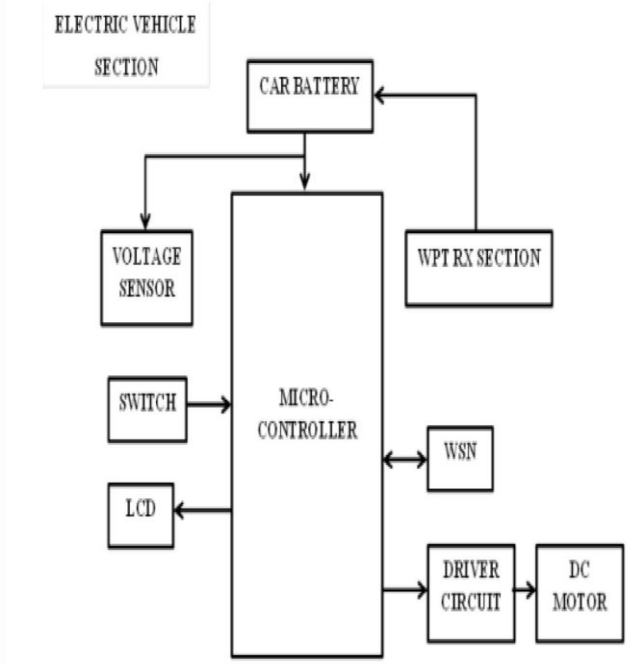


FIGURE 1: SIMULATION MODEL

4. BLOCK DIAGRAM



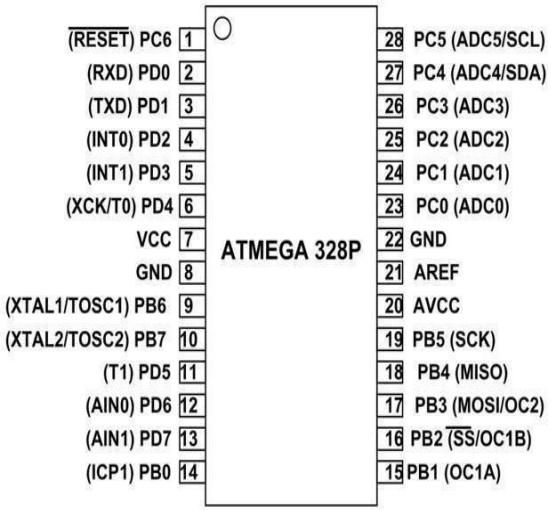


5. METHODOLOGY

A. Microcontroller:

The Arduino Uno board is used in our project to dump the codings necessary to carry out functions in the project for example to control the relay pin, to display the output in the LCD, etc. The boards are equipped with sets of analog and digital input/output (I/O) pins that may be interfaced to various expansion boards (shields) or Breadboards (other circuits on them). Arduino Uno is a microcontroller board based on ATmega328P. It has a power jack, 14 digital input/ output pins (of which 6 can be used as PWM outputs), 6 analog inputs, an ICSP header, a 16 MHz quartz crystal, a reset button, and a USB pin connection. It contains everything needed to support the microcontroller, The input voltage (7–12V) to the Arduino board when it‘s using an external power source (as opposed to 5 v from the USB connection).

The (digital I/O) on the Arduino board is used to connect the Arduino sensors, actuators, and other IC. The Arduino is used to do useful things, such as reading switch inputs, light indicators, and control the output of the relay.



B . WIRELESS SENSOR NETWORK(WSN)

Wireless Sensor Network (WSN) is used to transmit the signal wirelessly from the Electric vehicle section to the charging hub section. When the driver of an electric vehicle requests for charging the signal is sent wirelessly through the wireless sensor network(WSN) to the charging hub and the relay is closed and the power is transmitted wirelessly to the electric vehicle battery and the DC motor starts to rotate. When the driver of an electric vehicle requests for charging the signal is sent wirelessly through the wireless sensor network(WSN) to the charging hub and the relay is closed and the power is transmitted wirelessly to the electric vehicle battery and the DC motor starts to rotate Supply voltage 5V DC, Detection range (10-30m) frequency2.4 GHz

FIGURE 4: WIRELESS SENSOR NETWORK(WSN)

C.VOLTAGE SENSOR

The voltage sensor is used to sense the voltage present in the battery of the Electric vehicle. The signal is sent to the charging hub to halt the charging when the voltage sensor senses that the voltage of the battery exceeds the 100% rated capacity of the battery. Under-voltage, over-voltage, or voltage band models Powered from sensing input lines or from separate AC supply Available with time delays on pull-in and/or drop-out or with customized voltage-time trip curves The Voltage Sensors are equipped with a microcontroller that improves the sensor accuracy, precision, and consistency of the readings. They are supplied calibrated and the stored calibration (in Volts) is automatically loaded when the voltage source is connected.

FIG 5 VOLTAGE SENSOR

D. RELAY

A relay is an electromagnetic switch is operated by a small current t controlled by the Arduino Uno board by dumping the necessary Coding for the function of the relay. when the signal is sent from the Electric vehicle section to the charging hub section through the Wireless sensor network(WSN) the Pulling relay pin goes high and closes the relay and the power is transmitted to the transmitting coil. The features of the single - Channel Relay module is good in safety. In a power system, the lower current can control the higher one. The single-channel high voltage system output, meeting the needs of single-channel control Wide range of controllable voltage.

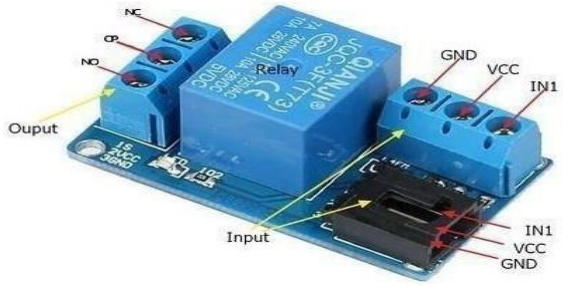


FIGURE 6: RELAY

E. 16*2 LCD

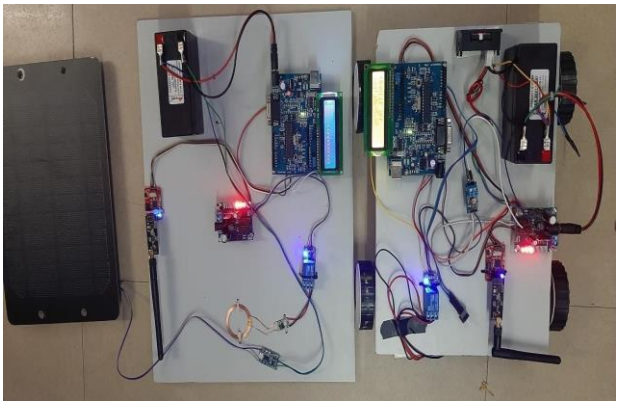
The LCD is used in our project to display the vehicle information, to display whether the vehicle is ON/OFF, the display voltage at which the Electric vehicle is charging, to display the charging status in the charging hub section. Display requires data in a serial format, which is detailed in the user guide below. The LCD requires a 5v power supply. The supply voltage should not exceed 5V, as this will cause damage to the device. The voltage of 5V is best generated from the E- blocks Multi programmer or a 5V fixed regulated power supply. The16 x 2 intelligent alphanumeric dot matrix displays are capable of displaying 224 different characters and symbols

FIGURE 7: LCD

6. WORKING

There are two sections in the block diagram of our project namely the Transmitting block and the Receiving block. The Transmitting block is the Electric vehicle charging hub and the Receiving block is the Electric vehicle section. The Electric vehicle charging hub consists of a polycrystalline solar panel for the generation of the electric power required to charge the electric vehicle. From the solar panel, the power is stored in the battery since solar energy is the renewable form of energy and the energy is not available throughout the day so it is necessary to store the power in the battery via a charging circuit. In the microcontroller, the programming is dumped necessary to carry out the functions required for our project. A Wireless Sensor Network (WSN) is used to transmit the signal wirelessly from the Electric vehicle section to the charging hub section. The LCD is used to view the vehicle information and the status of charging of the electric vehicle from the transmitting section the power is transmitted wirelessly to the receiving section by the inductive power transfer. And the power is stored in the electric vehicle section battery. The voltage sensor is used to sense the voltage in the Electric Vehicle battery. When the driver of electric vehicle requests for charging the signal is sent wirelessly through the Wireless Sensor Network (WSN) to the charging hub and the relay is closed and the power is transmitted wirelessly to the electric vehicle battery and the DC motor starts to rotate. The signal is sent to the charging hub to halt the charging when the voltage sensor senses that the voltage of the battery exceeds the 100% rated capacity of the battery. The wireless power transmission (WPT) can be both static wireless power transmission (SWPT) and dynamic wireless power transmission (DWPT). In the static wireless power transmission (SWPT) the electric vehicle is parked at the dedicated parking place for charging in this single transmission and a single receiving coil is used for charging. In the Dynamic wireless power transmission (DWPT) the charging is done when the vehicle is in motion in the multiple transmitting coils and the single receiving coil is used for charging.

7. RESULTS



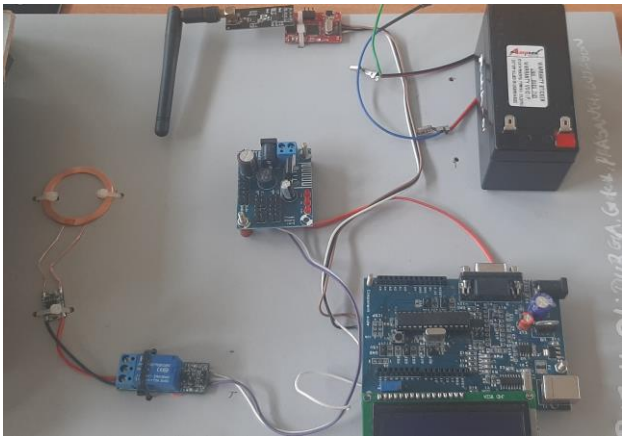


FIGURE 8: CHARGING HUB SECTION

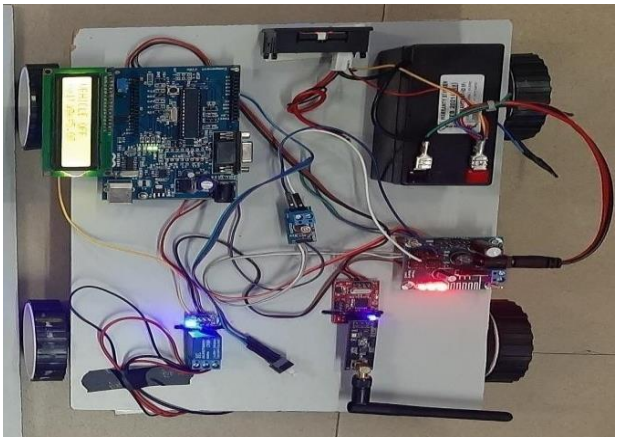


FIGURE 9: ELECTRIC VEHICLE SECTION

FIGURE 10: EV CHARGING IS PLAYED

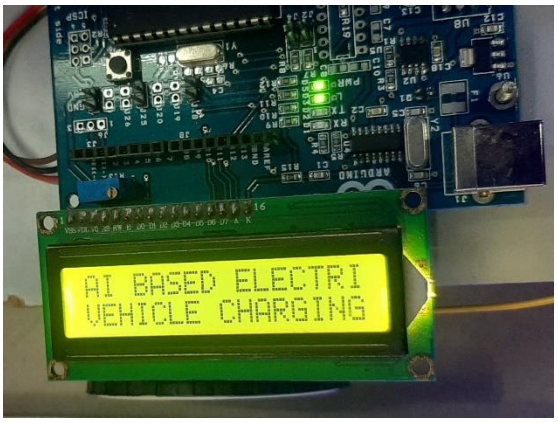


FIGURE 11: AI-BASED EV CHARGING DISPLAYED ON LCD

FIGURE 12: EV ON AND CHARGING AT 5V

8. CONCLUSION

This project presented a novel wireless charging system that comprises a wireless charging system and a wireless communication system. The wireless communication system enables the system to function as the ZigBee and provide communication without human intervention. wireless charging provides the charging of the Electric Vehicle Battery wirelessly with the help of the transmitting coil and receiving coil in the static wireless power transmission (SWPT) the electric vehicle is parked at the dedicated parking place for charging in this single transmission and single receiving coil is used for power transmission. In the Dynamic wireless power transmission DWPT) the charging is done when the vehicle is in motion in the multiple transmitting coils and the single receiving coil is used for power transmission the transmitting coil is placed beneath the road. This project **"DESIGN OF WIRELESS POWER TRANSMITTING EV CHARGING ROAD" was** designed with the hope that it is very convenient and helpful to charge the electric vehicle wirelessly without any physical connection.

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SMART ROBOTIC LAWNMOWER

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Abstract— This system was a fully automated grass-cutting robotic vehicle powered by battery energy that also avoids obstacles and is capable of fully automated grass cutting without the need for any human interaction. The best lawn mower integrated with recent technological features would be one way to ensure a more attractive lawn at a cheaper price. This proposed smart lawnmower would be user-friendly and helpful to maintain a beautiful lawn with reduced manpower. This Robotic lawn mower is safe, reliable, and can do much more for us. The main idea behind this project is to cut the grass automatically using the Microcontroller in a cost-efficient manner.

Keywords— Arduino Nano,Ultrasonic sensor, DC Motor, 4-channel Relay Module.

1. INTRODUCTION

In the past and even until now, cutting of grasses in the education institution, sports tracks, fields, industries, hotels, public centers, etc. was done with a cutlass. This method of manual cutting is time-consuming because human effort is needed for the same. The self-powered objective is to come up with a cutter that is portable, durable, easy to operate and maintain. It also aims to design a self-powered cutter of an electrical source; a cordless electric grass mower. The heart of the machine is a battery-powered DC electric motor. The system used 12V batteries to power the vehicle movement motors as well as the grass cutting motors. The grasscutter and vehicle motors are interfaced with an Arduino family microcontroller that controls the working of all the motors. Here we have interfaced with an ultrasonic sensor for object detection. The microcontroller moves the vehicle motors in a forwarding direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the microcontroller thus stops the grass cuter motor to avoid any damage to the object/human/animal whatever it is. The microcontroller then turns the robotic as long as it gets clear of the object and then moves the grass cutter in the forwarding direction again. The present technology that was commonly used for trimming the grass is a manually handled device. The device consists of a blade that is operated with the help of the motor, the power supply for the motor is by using the battery. The battery can be charged by using a power supply.

2. EXISTING SYSTEM

In the existing system, humans spend their time mulching the grass of their homes, education institution, sports tracks, fields, industries, hotels, public centers, etc. This task can be only semi-automated.So, we go for a novel proposed system.

3. BLOCK DIAGRAM

The project is implementedusing Arduino Nano, Ultrasonic Sensor, DC Motor, Four-Channel Relay Module.

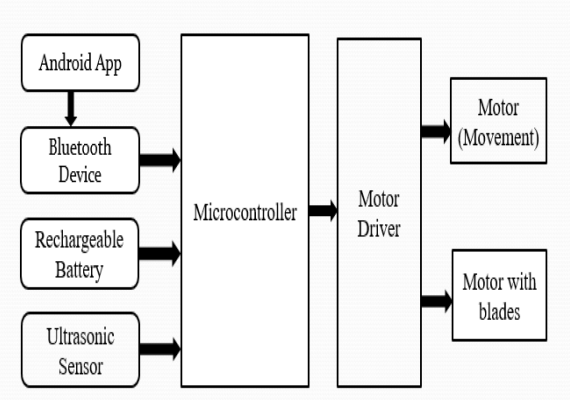


FIGURE 1: BLOCK DIAGRAM OF THE SYSTEM

4. METHODOLOGY

4.1 Arduino Nano

Arduino nano is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a mini-USB jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a mini-USB cable. You can tinker with your NANO without worrying too much about doing something wrong, in the worst-case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The UNO board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform and Arduino nano is very similar to UNO. (IDE = integrated development environment) The input voltage (7 – 12 V) to the Arduino

board when it's using an external power source (as opposed to 5 volts from the mini-USB connection). You can supply voltage through the Vin pin.

FIGURE 2: ARDUINO NANO

4.2 ULTRASONIC SENSOR

The ultrasonic transmitter emitted an ultrasonic wave in one direction and started timing when it launched. Ultrasonic spread in the air and would return immediately when it encountered obstacles on the way. At last, the ultrasonic receiver would stop timing when it receives the reflected wave. The distance of the sensor from the target object iscalculated.

FIGURE 3: ULTRASONIC SENSOR

4.3 DC MOTOR

Geared dc motors can be defined as an extension of dc motors. A geared DC Motorhas a gear assembly attached tothe motor. The speed of the motoris counted in terms of rotationsof the shaft per minute and is termed as RPM. The gear assembly helps in increasingthe torque and reducing the speed. Using the correct combination of gears in a gearmotor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. A DC motor can be used at avoltage lower than the ratedvoltage. But, below 1000 rpm, the speed becomes unstable,and the motor will not run smoothly.

FIGURE 4: DC MOTOR

4.4 FOUR-CHANNEL RELAY MODULE

The **four-channel relay module** contains four 5V relays and the associated switching and isolating components, which makes interfacing with a microcontroller or sensor easy with minimum components and connections. There are two terminal blocks with six terminals each, and each block is shared by two relays. The terminals are screw type, which makes connections to mains wiring easy and changeable. The four relays on the module are rated for 5V, which means the relay is activated when there is approximately 5V across the coil. The contacts on each relay are specified for 250VAC and 30VDC and 10A in each case, as marked on the body of the relays.

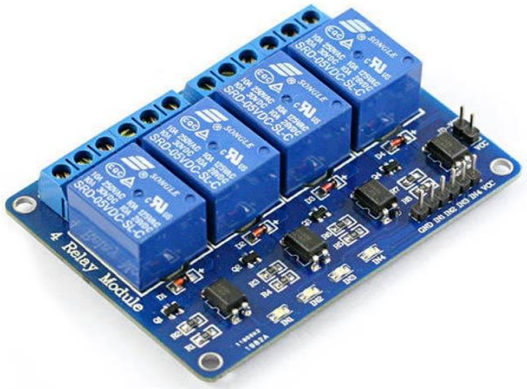
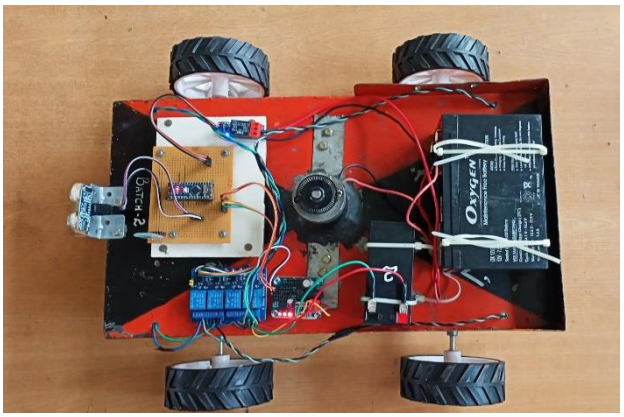


FIGURE 5: FOUR-CHANNEL RELAY MODULE

5. WORKING

In this system, the ultrasonic sensor is used to detect the obstacles in the work environment. The sensor is interfaced with the microcontroller. When it detects the obstacle, the lawnmower changes its direction. Two motors are used for the movement of the lawnmower. And a separate powerful motor is used for grass cutting. The motors are connected to a motor driver circuit. The microcontroller gets input from the ultrasonic sensor and commands the motor drivers and changes the direction pattern accordingly.

6. RESULT



7. CONCLUSION

The overall summary of the project work carried out and enhancement that will be implemented in the future is also discussed. This lawnmower will meet the challenge of the low cost of operation since there is no cost for fuelling. This automation also reduces the human effort and consequently the cost of the whole process. This project **"SMART ROBOTIC LAWN MOWER"** is specially designed with the hope that it is very much economical and this would be user-friendly.

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SMART SHOPPING TROLLEY WITH AUTOMATED BILLING SYSTEM

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Abstract*— *Modern technology has increased the standard of living of humans. There has been a large queue near the billing counter which reduces the interest for the customers during shopping. This project describes how to build an automated and time-saving system that makes the shopping experience easy, customer-friendly, and secure. In present method has resulted in large crowds at shopping malls which makes long queues near the billing counter because the cashier has to scan every item and then put separate bills to the products. The present billing system is a bit time-consuming. So, we have a project which solves this problem in shopping malls. "Smart Shopping Trolley with Automated Billing System" is a project that gives a solution to the problem in malls and supermarkets.

***Keywords*—** *Raspberry pi, Raspberry pi camera, SD card, Card reader, USB cable, Ethernet cable, and LCD.*

1. INTRODUCTION

A shopping mall is a place where almost every people in the city goes shopping for the daily requirements of life such as food, clothing, electrical products. Almost all weekends of the week are meant for shopping at these kinds of shopping malls and supermarkets. Shopping malls are very common in modern cities when compared to towns. All the products which are present in the shopping malls are provided with barcodes. Every product has a barcode that has been placed at the back of the product. Shopping Trolleys are normally used in malls for shopping purposes. The crowd that occurs near the counters for billing is very time-consuming.

All shopping malls have trolleys and baskets for customers to store the purchased products. When shopping is over, customers have to proceed to checkout at the billing counter. This process is quite a time consuming and have to employ more human resource at the billing section. So, in this project 'Smart Shopping Trolley with Automated Billing System' will reduce the time of customers and will decrease the manpower at the billing section.

Customers will go to the billing counter only for payment and the overall total bill is already displayed on the LCD screen which is connected to raspberry pi and the customer is already aware of the total bill. This system is also beneficial for the customer who has a certain budget limit. This automated shopping trolley will provide a solution to customers as the customer will not stand in a long queue to know the total amount of the product which they have purchased.

2. EXISTING SYSTEM

The present system is used in the shopping malls is the Barcode System. This system has replaced the previous manual system but has some disadvantages. The Barcode system requires the barcode on the back of the products. A scanner can read products only one at a time. Barcodes define the type of every product but can't do it uniquely. Some of the packages in python are installed in it. When the barcode or QR code is scanned through the webcam then the information of the product is transferred to the PC. Product details will be displayed on the pc and touch screen LCD.

3. BLOCK DIAGRAM OF PROPOSED SYSTEM

Barcodes are read the only type and can't be overwritten. The barcode system runs on laser technology. Barcode requires manpower and human effort. The barcode system requires the customer to stand in long queues to get their products scanned and their bills generated. This process also consumes a lot of time of the customers, thereby adding to their frustration. With many disadvantages, the Barcode system is still in use. There is a need to bring on a smarter and more efficient system.

4. PROPOSED SYSTEM

This shopping trolley makes note of all the scanned commodities of the particular trolley with allotment number and is linked with the supermarket's backend database which contains details of the product such as cost price, available stock, the quantity of the product, and weight of the product. In this system, the trolley is linked with various devices such as Raspberry Pi, Raspberry pi camera, and Ethernet cable, and touch screen LCD. Raspberry pi is a mini computer when compared with the computer it has a special feature like can connect sensors in raspberry pi. A web camera is used to scan the barcode which contains product details. USB cable is used

to give power supply to Raspberry pi and a Web camera. Ethernet cable is used to connect raspberry pi and PC.

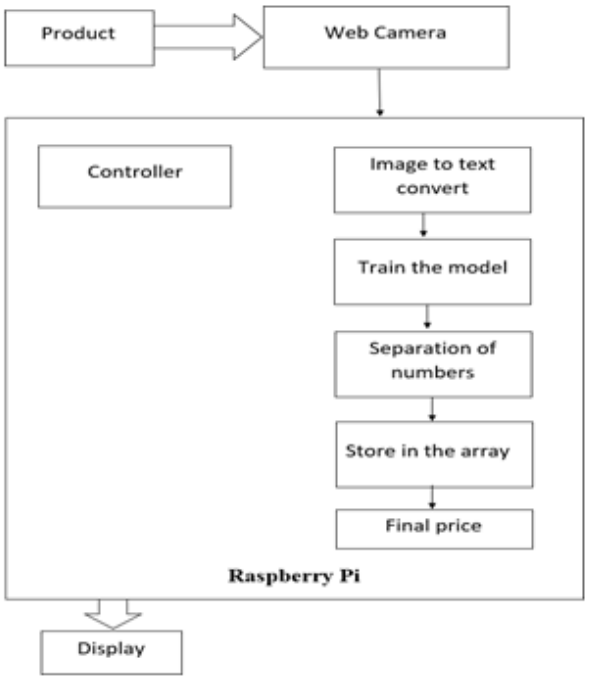

FIGURE 1: BLOCK DIAGRAM OF PROPOSED SYSTEM

5. METHODOLOGY

A. RASPBERRY PI 3 B+

It is a mini-computer that needs the OS to be installed in it. There are so many OS versions available out of which "RASPBIAN JESSI" works fine. Monitor, Keyboards, and Mouse are used to create a system set up with Raspberry pi 3 b+. When compared to the computer it has a special feature to connect the sensor with it. The Raspberry Pi 3 Model B+ is an improved version of the Raspberry Pi 3 Model B. It is based on the system-on-chip (SoC), which includes a 1.4 GHz quad-core ARMv8 64bit processor and a powerful Video Core IV GPU. The Raspberry Pi can run ARM GNU/Linux distributions, including Snappy Ubuntu Core, Raspbian, Fedora, and Arch Linux, as well as Microsoft Windows 10 Iot Core.

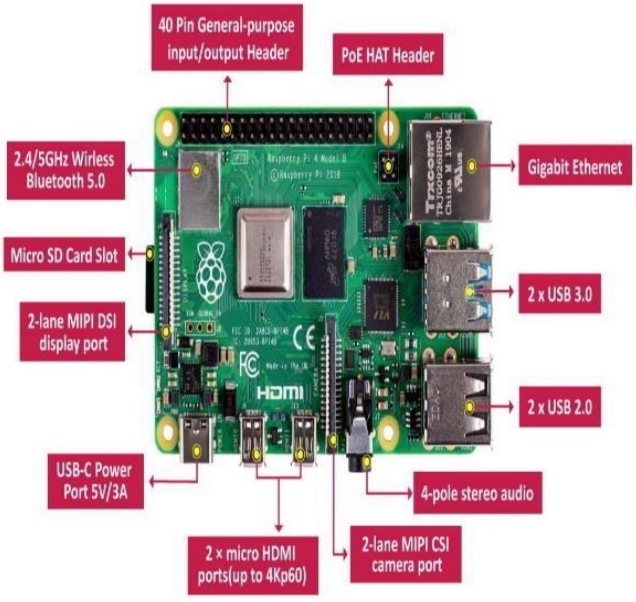

FIGURE 2: RASPBERRY PI 3 b+

B. RASPBERRY PI CAMERA

Raspberry Pi web camera is used to scan the bar code or QR code that is interfaced with the product. So that they are decoded later and the product can be recognized easily. When the product has been recognized the details which are encoded into the barcode or QR code are displayed in the LCD. This Raspberry Pi Camera Module is custom-designed for Raspberry Pi.

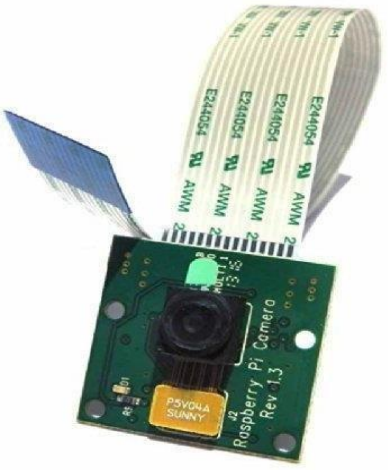

FIGURE 3: RASPBERRY PI CAMERA

C. SD CARD

It is used to install OS and packages which help to run the Raspberry Pi and Raspberry pi camera. It is a part of the Raspberry Pi and it provides the initial storage for the Operating System and files. When the Raspberry Pi is 'switched on, that is connected to a power supply, a special piece of code called the boot loader is executed, which reads more code from the SD card that is used to start up the Raspberry Pi. When SD Card is not inserted, it will not start. Do NOT push in or pull out an SD card while the Raspberry Pi is connected to the power, as this is likely to corrupt the SD card data.

FIGURE 4 SD Card D.CARD READER

A card reader is an input device that reads data from a storage medium. Punched cards that were used during the first several decades of the computer industry to store information and programs for computer systems. Modern card readers can read plastic cards embedded with either a barcode, magnetic stripe, or another storage medium. A card reader is used for communication with a memory card. A magnetic card reader is a device used to read credit cards. A business card reader is a device used electronically to save printed business cards.

FIGURE 5: CARD READER

E. USB CABLE

Term USB stands for "Universal Serial Bus". USB cables are used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more. This used to give power supply to raspberry pi and raspberry pi cameras. The USB cable assemblies are designed with several distinct connector types. The most common types. They are called Type A and Type B.

FIGURE 6: USB CABLE

F. ETHERNET CABLE

It is used to interface Raspberry Pi, Raspberry camera, and LCD. Ethernet is a computer networking commonly used in local area networks (LAN), metropolitan area networks (MAN), and Ethernet support higher bits, a greater number of nodes, and longer distances. Systems communicating over Ethernet divide large data into shorter pieces called frames. Each frame contains source, destination addresses, and error-checking data so that damaged frames can be detected and discarded.

FIGURE 7: ETHERNET CABLE

G. RASPBERRY PI TOUCH SCREEN DISPLAY

It is used to display the product details which are stored in barcode and QR code. It is designed for Raspberry Pi Model B/B+, an ideal alternative solution for HDMI monitor 320×480 resolution, better display Convenient Men-Machine. interface for Raspberry Pi, combined with the portable power, can use anywhere anytime it Supports the Raspbian system, enables your system to Play videos, and Support software keyboard (without keyboard/mouse).

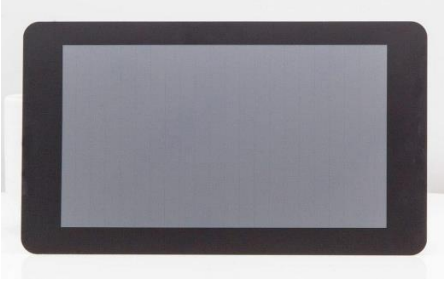

FIGURE 8: RASPBERRY PI TOUCH SCREEN DISPLAY

6. WORKING

The components used in this proposed system are Raspberry pi, Raspberry pi web camera, SD Card, Card Reader, USB Cable, Ethernet Cable, and LCD. This raspberry pi is a low-cost minicomputer. When compared to the computer it has a special feature like can connect sensors in it. SD card is used to install OS and packages which can run on PC. When code is read by the card reader which runs on PC and helps to run the raspberry pi. Raspberry pi web camera is interfaced with raspberry pi. In this, the corresponding code should be written on pc which runs the raspberry pi and raspberry pi camera. Putty application is to be installed from Google. After the installation, Open putty as user administrator and login as pi, and enter the password as raspberry. When the power supply is given through USB cable to raspberry pi and raspberry web camera, product details are stored in SD Card. when the barcode or QR code is shown in raspberry pi web camera will capture it. Barcode or QR code that has the product details which is displayed through LCD.

7. HARDWARE IMPLEMENTATION

FIGURE 9: HARDWARE IMPLEMENTATION

8. RESULT OF PROPOSED SYSTEM

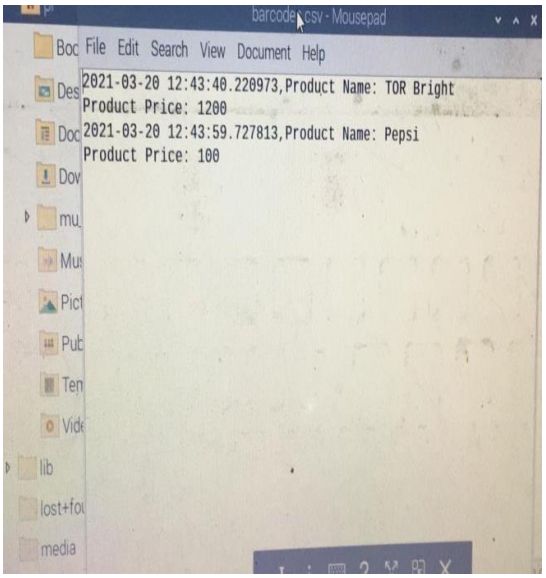

FIGURE 10: RESULT OF PROPOSED SYSTEM

9. ADVANTAGES OF PROPOSED SYSTEM

- It saves customer's time.
- It also reduces manpower.
- It doesn't need a line of sight.
- It is easy and very economical.

10. CONCLUSION

This project implementation will provide the facility to customers to self-scan the products which the customer wants to purchase. A wireless smart device scan products of the trolley which is linked with the supermarket backend database which contains the detail of the products such as price and stock. As we have provided the self-scan facility to the user and the wireless smart devices which make up all the scanned products and are connected with the supermarket database. The scan products are automatically billed in the wireless smart device for their purchase. At the time of purchasing the products, the customer is aware of the total bill. This system will help all the people who are shopping in the supermarket and face the problem of standing in a long queue for final billing. This device is simple to operate and does not need any help during shopping in supermarkets and shopping malls. The project "**SMART SHOPPING TROLLEY WITH AUTOMATED BILLING SYSTEM**" implementation is easy, very economical, and will reduce the billing time. We designed an automated shopping trolley for billing system, which can be used in any supermarket and by any person easily.

11. FUTURE SCOPE

- In addition to the product details, nutrition facts of the eatables can be added.
- Automatic detection in the movement of the cart can be implemented by using various sensor technologies.
- When the limit exceeds buzzer should beep.
- Providing an option to the shoppers to create a shopping list.
- The same system can be used in various places.

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AUTONOMOUS BOT FOR AGRICULTURE

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Abstract*— Agricultural is one of our most important industries for providing food, feed, and fuel necessary for our survival. Certainly, robots are playing an important role in the field of agriculture for the farming process autonomously. Normally, the farming process includes plowing, seeding, and cultivating. All these processes are not being done by using a single robot. The proposed system focuses on implementing all the farming processes. In India, nearly about 70% of people are dependent upon agriculture. So, the agriculture system in India should be advanced to reduce the efforts of farmers. Various operations are performed in the agriculture field like ploughing, seeding, and pesticide spraying, etc. Very basic and significant seed on precision agriculture concept is the newly emerging technology. The main reason behind the automation of farming processes is saving the time and energy required for performing repetitive farming tasks and increasing the productivity of yield by treating every crop individually using the precision farming concept. Designing such robots is modeled based on a particular approach and certain considerations of the agriculture environment in which it is going to work. These considerations and different approaches are discussed in this system, also the prototype of an autonomous.

Keywords*—Arduino UNO, Ultrasonic sensor, DC Motor, HC-05 Bluetooth Module, L928 Motor Driver, Solar Panel.*

1. INTRODUCTION

The agriculture sector reduces the dependency on manpower by doing the works automatically and also enables the ladies and some disabled persons to do farming. Autonomous on-field guidance is to guide the vehicle following crop rows without over run-on crops. Food is the basic necessity of mankind Smarter world is the result of smarter technology. Agriculture was implemented in the nine of sedentary human civilization and it is the backbone of our Indian Economy. Today scarcity of manpower became the main threat. There has been a tremendous increase in population over the past decade around the globe. This notifies that due to the increase in population there has been a problem of food shortage in developing as well as developed countries. Robots are non-tiring, non-emotional objects which are high in precision and accuracy and are known for repeatability Robots may be staffed in place of workers in farms for future commercial farms. These robots will identify, sprinkle and pick individual pieces of produce from plants, even when their targets are producing rice and wheat in the agriculture fields. Many driverless tractors have been developed in past by the engineers. But these tractors have failed to have an ability to embrace the complexity of the real world. Scientists in past had assumed agriculture farming robots as industrial robots such that, everything was known beforehand where machines would work in predefined ways- such that robots which work on the production line. But now new approaches and trends are to be studied which would not only upgrade the existing agriculture robots but would also help in complete autonomous farming. These smart machines would now be intelligent enough to work in an unmodified or semi-natural environment. Today more and more lands are being developed for the production of a large variety of crops.

2. EXISTING SYSTEM

Nowadays, the Agriculture field they are using many robots for using single purpose. Manpower is required for operating machines and navigation also. It can control through Bluetooth; Operating distance is limited. We extend the operating distance. It requires more components so the cost is also high.

3. BLOCK DIAGRAM

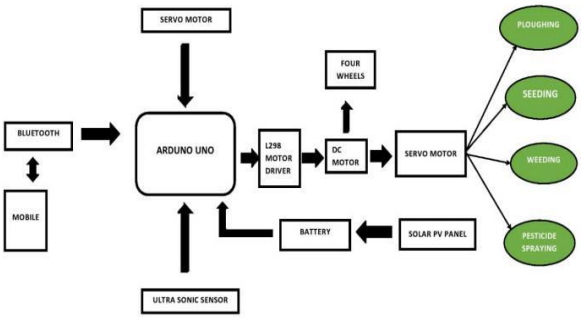

FIGURE 1: BLOCK DIAGRAM OF THE SYSTEM

The project is implemented using Arduino Uno, Ultrasonic sensor, HC-05 Bluetooth module, L928 Motor Driver, Solar panel, Servo motor, DC motor, Battery.

4. SIMULATION MODEL

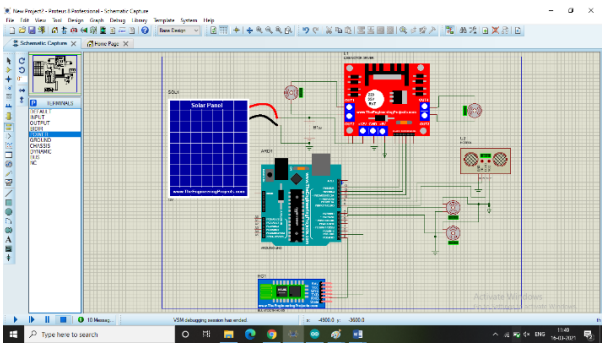

FIGURE 2: SIMULATION MODEL

5. METHODOLOGY

A. ARDUINO UNO

In Our project, we are using the Arduino UNO microcontroller. Arduino is an open-source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. **It acts as the brain of the project. It controls all the devices.** Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) or Breadboards (other circuits on them). Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, in the worst-case scenario you can replace the chip for a few dollars and start over again. ―Uno‖ means for one in Italian and was chosen to mark the release of Arduino Software(IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards and the reference model for the Arduino platform. (IDE = integrated development environment).

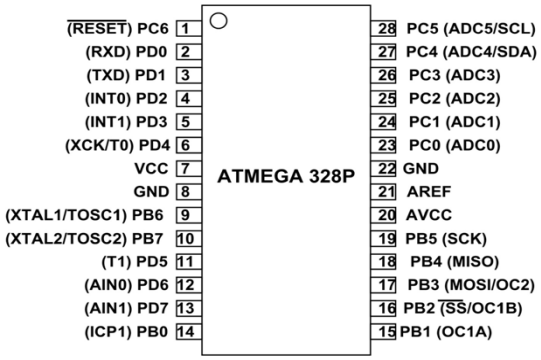

FIGURE 3: PIN DIAGRAM OF ATMEGA 328P

B. ULTRASONIC SENSOR

An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound. HC-SR04 is an ultrasonic ranging module that provides a 2 cm to 400 cm non-contact measurement function. The ranging accuracy can reach 3mm and the effectual angle is < 15°. It can be powered by a power supply. **In this project, it is used to identify the obstacles in the field and sends the trigger to a microcontroller.**

FIGURE 4: ULTRASONIC SENSOR

C. HC-05BLUETOOTH MODULE

The **HC-05** is a very cool module that can add two-way (full-duplex) wireless functionality to your projects. You can use this module to communicate between two microcontrollers like Arduino or communicate with any device with Bluetooth functionality like a Phone or Laptop. Many android applications are already available which makes this process a lot easier. The module communicates with the help of USART at a 9600 baud rate hence it is easy to interface with any microcontroller that supports USART. We can also configure the default values of the module by using the command mode. So if you looking for a Wireless module that could transfer data from your computer or mobile phone to a microcontroller or vice versa then this module might be the right choice for you. However, do not expect this module to transfer multimedia like photos or songs; you might have to look into the CSR8645 module for that.

FIGURE 5: HC-05 BLUETOOTH MODULE

D. L928 MOTOR DRIVER

This **L298N Motor Driver Module** is a high-power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. **L298N Module** can control up to 4 DC motors, or 2 DC motors with directional and speed control.

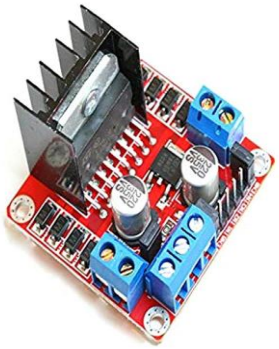

FIGURE 6: L928 MOTOR DRIVER

E. DC MOTOR

A 12V DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in a part of the motor. It controls the wheels of the vehicle.

FIGURE 7: DC MOTOR

F. SERVO MOTOR

A servo motor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity, and acceleration. **It consists of a suitable motor coupled to an ultrasonic sensor for position feedback**

FIGURE 8: SERVO MOTOR

G. SOLAR PANEL

Solar panels are those devices that are used to absorb the sun's rays and convert them into electricity or heat. A solar panel is a collection of photovoltaic cells, which can be used to generate electricity through the photovoltaic effect. A solar panel works by allowing photons, or particles of light, to knock electrons free from atoms, generating a flow of electricity. **We are using a 10W, 12V solar panel for generating power.**

FIGURE 9: SOLAR PANEL

H. BATTERY

A twelve-volt battery has six single cells in series producing a fully charged output voltage of 12.6 volts. A typical 12-volt battery used in an RV or marine craft has a rating of 125 AH, which means it can supply 10 amps of current for 12.5 hours or 20-amps of current for 6.25 hours. A battery is a device consisting of one or more electrochemical cells with external connections for powering electronic devices such as Arduino Uno, Wi-Fi (ESP8266), GPS(NEO6M), DC motors, and Servo motors.

FIGURE 10: BATTERY

6. WORKING

This project combines the following three technologies mainly robotics, embedded systems, and solar power vehicles. In this project, it doesn't need manpower to operate it can operate autonomously once turned on through signal from farmers via Bluetooth. Servo motor is used to lift the ultrasonic sensor. There are two servo motors are used. One servo motor lift is 9 grams. Another will lift 450 grams. One servo motor is the fixed front side of the vehicle. An ultrasonic sensor is used to sense the obstacles. It can rotate up to 90 degrees.it will find interrupts occur.it senses the signal to the servo motor. Another servo motor was fixed on the backside of the vehicle. Backside attachments are seeding, ploughing, and pesticide spraying. This servo motor can rotate up to 180 degrees. It contains three major systems there are one is obstacles detection system, bot navigation system, and attachment system. The obstacle detection system contains an ultrasonic sensor and micro servo motor, but once reached the end of the field the ultrasonic sensor detects and finding the path and sends the digital signal to Arduino Uno. And next bot navigation systems once received the signal from ultrasonic sensor its starts to operate based on pre-code given to Arduino board. An attachment controlling system is used to control all those attachments like ploughing pesticide spraying and seeding attachment.

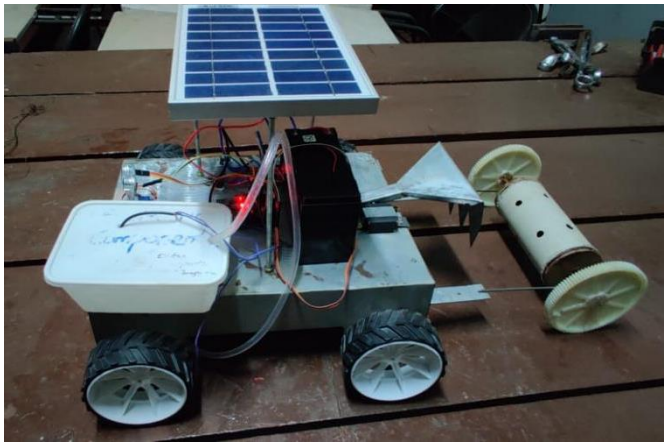

FIGURE 11: HARDWARE OUTPUTS

7. RESULTS

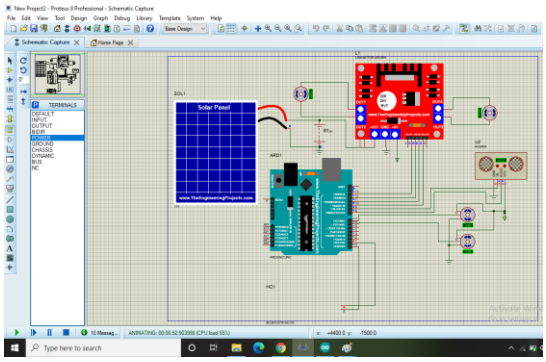

FIGURE 12: SIMULATION RESULT

8. CONCLUSION

The system is having multiple features like plowing, seeding, and pesticide spraying. And this system is overcoming the drawback of an existing system and also, it's easy to use. Hence our system is one of the innovations that help our farmers to grow, maintained, and monitor the crops.

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VORTEX BLADELESS WIND TURBINE

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Abstract*— The abstract of this project is to investigate the possible extraction of power from wind energy by using a new conceptual vortex bladeless wind generator. It is designed by a hollow-shaped bluff body called a mast made up of four the body experiences vortex-induced vibration. layers(carbon pylac, poly fiber, synthetic resin, PVC) which are to be placed vertically on the ground. When the air passes through this bluff body, Due to the vortex shedding fluid phenomenon such vibration energy of the body can be converted into electrical energy. The traditional wind turbines are used to produce energy but their cost is very high and it may have many disadvantages like maintenance cost, running cost, friction loss and it is also dangerous to birds and is noisy as well.

***Keywords*—** *Mast, Oscillating coupler, Base, Carbon pylac, poly fiber, synthetic resin, PVC*

1. INTRODUCTION

Wind power represents 10.1% of the total installed power capacity in India as of 2020. Only Tamil Nadu and Gujarat installed wind projects. Wind installations in India were up about 117% in the third quarter of 2020, according to data from the Ministry of New Renewable Energy(MNRE). The increasing size of wind turbines is making wind power to be one of the most relevant energy sources.

However, in the distributed energy sector, where energy is generated close to the point of use, there is currently great interest in developing power generators based on renewable energy. While wind farms are now appearing across the landscape, they have met opposition in terms of their size and environmental impact on the quantity of electricity they can generate. About large-scale wind power, the vortex bladeless wind turbine is very promising. New wind generators with different characteristics exploitation of clean energy sources. Current wind power generators generally employ wind turbines These systems are inefficient and expensive to construct and maintain. They are also noisy, intolerant to damage, and relatively difficult to transport.

2. EXISTING SYSTEM

When the wind flows through the turbine blade, it creates kinetic energy which is converted into mechanical energy using shafts. The shaft is connected to the generator or alternator which is used to generate electric energy. From the generator the power flows through a rectifier which converts AC to DC and DC link is used to limit the fluctuations and then the DC is converted into AC using an inverter. "Control board and communication" the wind farm controller's function is “power management”.

It can initiate and shut down turbine operation as well as coordinate the operation of numerous wind turbines in response to environmental and operating conditions. The wind turbine supervisory controller manages the individual turbine operation. End-to-end communication forms the basis for the automation of wind turbines. Through self-optimization, automated wind turbines achieve a greater electricity yield. Measurement data and information about the status of the turbine are transmitted to the control room. A wind turbine is a revolving machine that converts kinetic energy from the wind into mechanical energy. The rotor is the area of the turbine that consists of both the turbine hub and blades. As wind strikes the turbine’s blades, the hub rotates due to aerodynamic forces. This rotation is then sent through the transmission system to decrease the revolutions. The transmission system consists of the main bearing, high-speed shaft, gearbox, and low-speed shaft.

3. PROPOSED SYSTEM

The proposed system is dependent on the speed of the wind, consider the speed of the wind is 6 m/s then the expected output will be 35 Wand for a nominal speed the expected output will be 100 W. Vortex bladeless wind turbine runs on the principle that when the wind is allowed to strike the column mast, it tends to vibrate and further converted to electrical energy via a linear generator. The output of the linear generator is passed to the controller unit, the output is stabilized and the pulsating output is given to the converter. In a converter, the voltage from the alternating current is converted into a direct current and it can be stored for future use or can be connected with the load.

4. BLOCK DIAGRAM OF PROPOSED SYSTEM

Below is the figure showing the block diagram of the system.

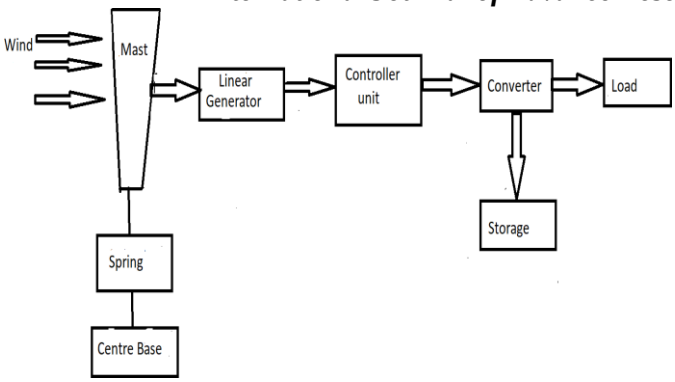

FIGURE 1: BLOCK DIAGRAM OF THE PROPOSED SYSTEM

5. METHODOLOGY

A. MAST

It is designed by a hollow-shaped bluff body called a mast made up of four layers (carbon pylac, poly fiber, synthetic resin, PVC) which is to be placed vertically on the ground. When the air passes through this bluff body it experiences vortex-induced vibration. Due to the vortex shedding fluid phenomenon such vibration energy of the body can be converted into electrical energy. Hence electricity is generated by a linear alternator.

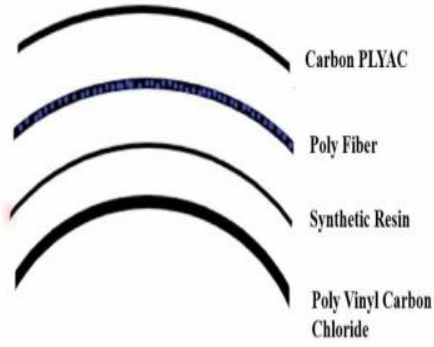

FIGURE 2: TYPES OF LAYERS USED FOR CONSTRUCTION OF MAST

TYPES OF LAYERS

[1] Polyvinyl chloride layer- provides strong structure to the mast.
[2] Synthetic rubber resin layer - prevents the mast from heat and acts as good heat resistance.
[3] Poly Fiber-It gives the grip required for the mast when the wind flows on it.
[4] Carbon Plyac - It prevents the generator from dust and other environmental defects.

B. PVC

The thickness required for the construction of the mast is 12 mm. Full polyvinyl chloride, a synthetic resin made from the polymerization of vinyl chloride. Second only to polyethylene among the plastics in production. A lightweight, rigid plastic in its pure form, it is also manufactured in a flexible "plasticized" form. Pure PVC applications are in the construction trades and structures where its rigidity, strength, and flame resistance are useful in pipes, conduits, siding, window frames, and door frames.

Synthetic resin

The synthetic resin thickness is required. for the construction of mast is 0.33 mm. they are industrially produced resins, typically viscous substances that convert into rigid polymers by the process of curing, to undergo curing, resins typically contain reactive end groups, such as acrylates or epoxides. Some are manufactured by esterification of organic compounds. The main difference between resin and plastic is that resin is mainly derived from plants whereas plastic is derived from petrochemicals. It can be normal for some resins, when poured in a thin layer, to be bendy. Poly Fiber-It gives the grip required for the mast when the wind flows on it.

Poly fiber

The thickness of poly fiber required for the construction is 0.8 mm. Poly-fiber is the only VINYL system on the market today. As it dries, it bonds extremely well to today's polyester fabrics and remains flexible. There are lightweight options, so it maintains the mast weight balanced. Poly-Fiber is not particularly sensitive to heat, cold, or humidity during the application or throughout its service life. Poly-Fiber offers choices in fabric weights and types of topcoats and has options for every aircraft from simple ultralight to the most.

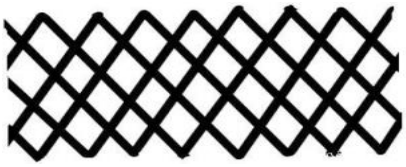

FIGURE 3: POLY FIBER

C. OSCILLATING COUPLER

Rotational–vibrational coupling occurs when the rotation frequency of an object is close to or identical to a natural internal vibration frequency. The animation on the right shows a simple example. The motion depicted in the animation is for the idealized situation that the force exerted by the spring increases linearly with the distance to the center of rotation. Also, the animation depicts what would occur if there would not be any friction. In rotational vibration coupling, there is an oscillation of the angular velocity.

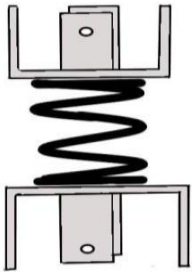

FIGURE 4: OSCILLATING COUPLER

D. BASE SECTION

The base section is mainly made up of two layers namely carbon place and Polyvinyl chloride. Base section is providing support to the mast because it holds the linear generator. It consists of three generator coils which are connected in series and placed in a generator tray. Each generator coil produces 4 volts ultimately the expected output voltage is 12 v.

FIGURE 5: BASE

6. HARDWARE COMPONENTS

A. BRIDGE RECTIFIER

The voltage source(linear generator) is connected with the bridge rectifier to convert AC to DC. Bridge Rectifier is a full-

wave rectifier that uses four or more diodes, diodes in bridge filters even the small frequency. The purpose of selecting a bridge rectifier is to control the current from bi-directional to uni-directional.

FIGURE 6: BRIDGE RECTIFIER

B. CAPACITOR

The output of the rectifier is given to the capacitor. It's a device used to store an electric charge, consisting of one or more pairs of conductors separated by an insulator. In power supplies, capacitors are used for filtering pulsating DC output after rectification.

FIGURE 7: CAPACITOR

C. INDUCTOR

Inductor – In-circuit, inductor is placed to resist change in current. An inductor also called a coil, choke or reactor is a passive two-terminal electrical component that stores energy in a magnetic field when electric current flows through it. The inductor is further connected with FET.

FIGURE 8: INDUCTOR

D. FIELD-EFFECT TRANSISTOR

FIGURE 9: FET

Field Effect Transistor – The components including capacitor, inductor, FET, and silicon diode are used to act as chopper circuits. The FET is a type of transistor that uses an electric field to control the flow of current. The output of FET is fed to a silicon diode.

E. SILICON DIODE

A diode is a widely used two-terminal circuit element that minimizes current in one direction(reverse bias), while easily carrying current in the other direction (forward bias). Finally, the chopper circuit regulates the output voltage and gives variable voltage to the load.

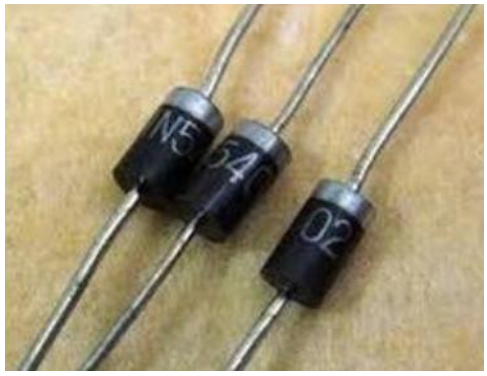

FIGURE 10: SILICON DIODE

F. GENERATOR COIL

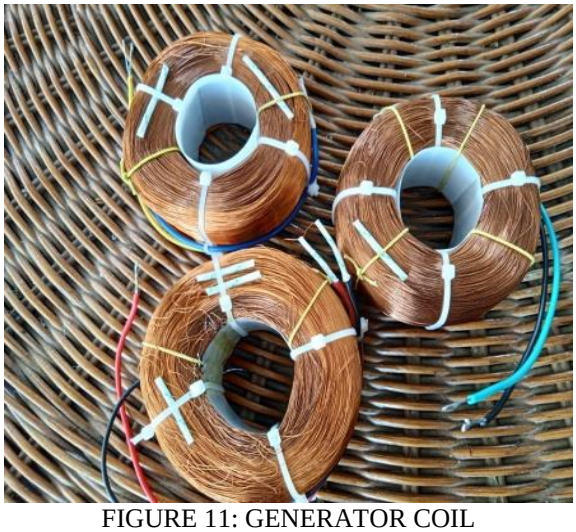

FIGURE 11: GENERATOR COIL

A field coil is an electromagnet used to generate a magnetic field in an electromagnetic machine, typically a rotating electrical machine such as a motor or generator. It consists of a coil of wire through which a current flow.

G. BATTERY

A battery is a device that stores chemical energy and converts it to electrical energy. The chemical reactions in the battery involve the flow of electrons from one material(electrode) to another, through an external circuit. It is used in a circuit to power other components. A battery produces direct current (DC) electricity (electricity that flows in one direction and does not switch back and forth).

FIGURE 12: BATTERY

7. CIRCUIT DIAGRAM

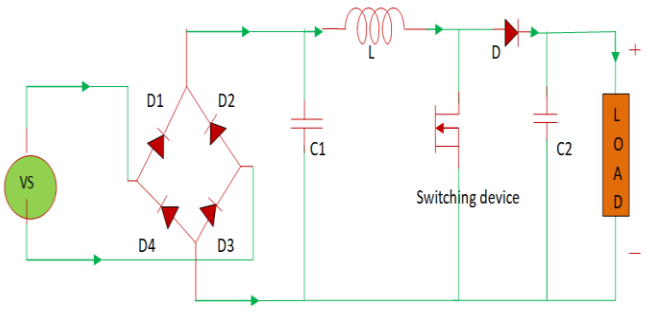

FIGURE 13: CIRCUIT DIAGRAM

The novelty is the use of linear generators. The voltage from the linear generator is considered to be a voltage source. Further, the voltage source is connected with a bridge rectifier to generate DC. Diodes present in the bridge rectifier are capable of filtering even the small frequency. In power supplies, a capacitor (C1) is used for filtering the pulsating DC output after the rectification so that a constant dc voltage is supplied to the load. The remaining components (inductor, silicon diode, FET, give variable voltage to the load. The expected output voltage is 12 v.

8. HARDWARE IMPLEMENTATION

FIGURE 14: HARDWARE KIT

9. RESULT OF PROPOSED SYSTEM

VBWT is designed for the rated power of 22W. The expected output voltage is 12 v. In the future, this prototype can be implemented and an output of 600W can be generated.

FIGURE 15: RESULT

10. ADVANTAGES

- A vortex turbine is 80% weight lesser than a conventional wind turbine.
- For maintenance, it does not need oil because there's no gear or moving parts in contact.
- It requires lesser land than a conventional wind turbine.

11. CONCLUSION

As such, this new technology would have enormous positive social, environmental, and energy impacts. Wind power currently produces about 1 .5% of worldwide electricity and has become one of the leading electricity-producing power sources in various countries. In the modern era, we don't have any sophisticated technologies in renewable resources so we move to the next level. VBWT is designed for the rated power of 22W. A vortex turbine is 80% weight lesser than a conventional wind turbine. It can be used in the sectors like Industries, agriculture, telecoms, off-grid lighting, off-grid rail signaling, off-grid power for rail signaling.

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SMART FLOOR CLEANING ROBOT

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***Abstract*— Households of today are becoming smarter and more automated. Home automation delivers convenience and creates more time for people. Domestic robots are entering the homes and people's daily lives, but it is yet a relatively new and immature market. However, growth is predicted and the adoption of domestic robots is evolving. Several robotic vacuum cleaners are available on the market but only a few implements wet cleaning of floors. The purpose of this project is to design and implement a Vacuum Robot and automatic water spraying system along with a floor cleaner.**

***Keywords*—** *Arduino Uno, Ultrasonic sensor, DC Motor, Blower*

1. INTRODUCTION

A robot is an electro-mechanical machine and is used for various purposes in industrial and domestic applications. Robot appliances are entering the consumer market, since the introduction of I-Robots. Many related appliances from various companies have been followed. Initially the main focus was on having a cleaning device. As time pass on many improvements were made and more efficient appliances were developed. In this research work a floor cleaner robot based on Arduino UNO- has been developed. This cleaner robot is an electric home appliance, which works in two modes as per the user convenience "Automatic and Manual". Unlike other floor cleaner robots, this is not a vacuum cleaner robot. It performs sweeping and mopping operations. The detachable mop is used for wet mopping. It works on a 12V supply. In the automatic mode, the robot performs all operations itself. Firstly, robot starts it moves forward and performs cleaning action. For obstacle detection and to avoid hurdles Laser TOF sensors have been used. If any hurdle is detected then the robot changes the lane automatically, does not stop cleaning action. It follows a zigzag path for user convenience, water sprayer is attached which automatically sprays water for mopping, therefore is no need to attach wet cloth again and again for mopping. Motor driver circuits have been used to drive the motors.

2. EXISTING SYSTEM

In the existing system is every day many men and women spend their time cleaning the floor of their homes. This task can be only manual. So, we go for a novel proposed system.

3. BLOCK DIAGRAM

The project is implemented using Arduino UNO, Ultrasonic Sensor, DC Motor, Blower.

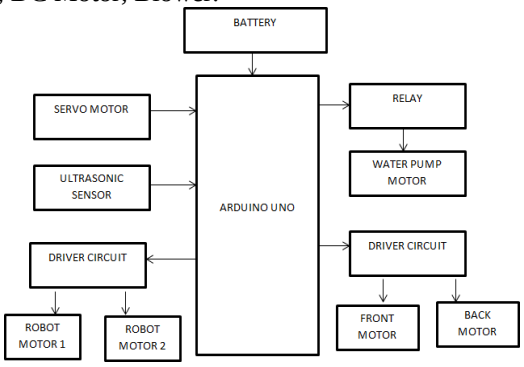


FIGURE 1: BLOCK DIAGRAM OF THE SYSTEM

4. METHODOLOGY

A. ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. Arduino Uno has several facilities for communicating with a computer, another Arduino board.

FIGURE 2: ARDUINO UNO

B. ULTRASONIC SENSOR

The ultrasonic transmitter emitted an ultrasonic wave in one direction and started timing when it launched. Ultrasonic spread in the air and would return immediately when it encountered obstacles on the way. At last, the ultrasonic receiver would stop timing when it receives the reflected wave. The distance of the sensor from the target object is calculated.

FIGURE 3: ULTRASONIC SENSOR

C. DC MOTOR

Geared dc motors can be defined as an extension of dc motors. A geared DC Motor has a gear assembly attached to the motor. The speed of the motor is counted in terms of rotations of the shaft per minute and is termed as RPM. The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. A DC motor can be used at a voltage lower than the rated voltage. But, below 1000 rpm, the speed becomes unstable, and the motor will not run smoothly.

FIGURE 4: DC MOTOR

D. BLOWER

The Suction motor is one of the most important parts of a vacuum cleaner. It is this motor that takes the electrical power from the power source and converts it into mechanical power in the form of suction with airflow. The suction motor on most vacuum cleaners typically draws seven to twelve amperes of current from the electrical power source.

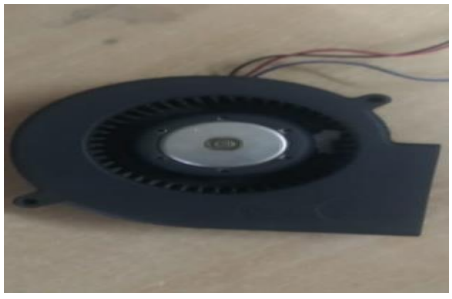
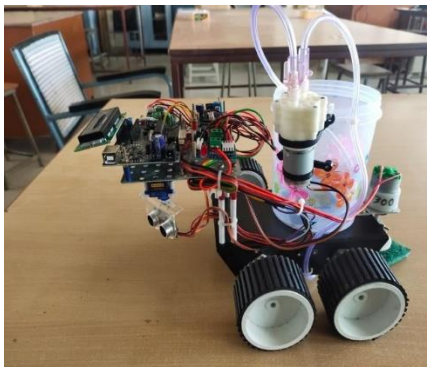


FIGURE 5: BLOWER

5. WORKING

Arduino UNO is the heart of the Our project. It Controls the overall function of this project. It operates at a 5V power supply. Coding is Dumbed in the microcontroller. We are used six motors in our robot. one motor is used to control the ultrasonic sensors moment right and left direction for the obstacle Detection. Another motor is used for mopping purposes and it's a 300rpm motor. Another motor is the pumping motor is used to spraying the water to the mopping position of the robot. Another two motors are 30 rpm motor these two are controlling the movement of the vehicle. Finally, one is blower motor is used to collect the dust on the floor it's a 500-rpm motor the collected dust is stored in the container fixed bottom of the robot.

6. RESULT



7. CONCLUSION

These systems providing useful solutions while making the floor cleaning mechanism by using the robot. The cost of the system is less and it gives reliable output as compared to another system which i s useful for society. To have safe and it is mainly implemented on a long scale for the better results and problem-free solutions in the future. This project **"SMART FLOOR CLEANING ROBOT"** is designed with the hope that is very much economical and helpful for people.

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PV POWERED AGRI PUMPING SYSTEM BASED MPPT ALGORITHM

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Abstract*—Solar water pumping systems are a modern but field-proven means of pumping water in locations where access to grid power is not available, or where the grid is not reliable. These projects use photovoltaic cells to convert sunlight into electricity to power DC pumps which can be used to pump groundwater or surface water. This system provides power at all times even on cloudy days. To increase efficient irrigation in agriculture. This system to achieve dc supply to ac supply can be used for pumping application. Dc-Dc Buck-Boost converter used in pumping system is to stabilize the voltage for induction motor. The buck-boost converter is used to step up and step down the input voltage. A solar photovoltaic water pumping system consists of a PV array, motor pump set, associated electronics, and an on/Off switch.

Keywords*—MPPT, LCD Display, Electrical Transformer, Rectifier, Filters, PIC Microcontroller.*

1. INTRODUCTION

Solar water pumping systems are a modern but field-proven means of pumping water in locations where access to grid power is not available, or where the grid is not reliable. These systems use photovoltaic (PV) cells to convert sunlight into electricity to power DC pumps which can be used to pump groundwater or surface water. A solar-powered water pumping system is made up of two components, a Solar panel - Photovoltaic module Pumps Centrifugal -Submersible Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. A photovoltaic (in short PV) module is a packaged, connected assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions, and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230-watt module will have twice the area of a 16% efficient 230-watt module. There are a few commercially available solar panels available that exceed 22% efficiency and reportedly also exceeding 24%. Centrifugal pumps are a sub-class of dynamic axisymmetric work-absorbing turbomachinery. Centrifugal pumps are used to transport fluids by the conversion of rotational kinetic energy to the hydrodynamic energy of the fluid flow. The rotational energy typically comes from an engine or electric10 motor. The fluid enters the pump impeller along or near the rotating axis and is accelerated by the impeller, flowing radially outward into a diffuser or volute chamber (casing), from where it exits. A submersible pump is a device that has a hermetically sealed motor close-coupled to the pump body. The whole assembly is submerged in the fluid to be pumped. The main advantage of this type of pump is that it prevents pump cavitation, a problem associated with a high elevation difference between the pump and the fluid surface. Submersible pumps push fluid to the surface as opposed to jet pumps having to pull fluids.

2. EXISTING SYSTEM

The main objective is to design a low-cost and time-based irrigation system with the help of a renewable energy system. The performance of a solar-powered water pump was as equal to a pump powered by a conventional one. The efficiency of solar-based water pumps is much higher than conventional power-based water pumps. The main advantage of this type of pump is that it prevents pump cavitation, a problem associated with a high elevation difference between the pump and the fluid surface. Submersible pumps push fluid to the surface as opposed to jet pumps having to pull fluids.

3. BLOCK DIAGRAM

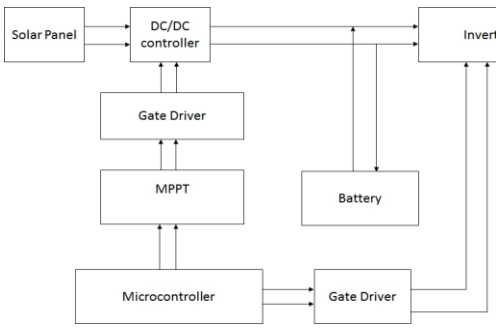

FIGURE 1: BLOCK DIAGRAM

4. METHODOLOGY

A. PIC CONTROLLER

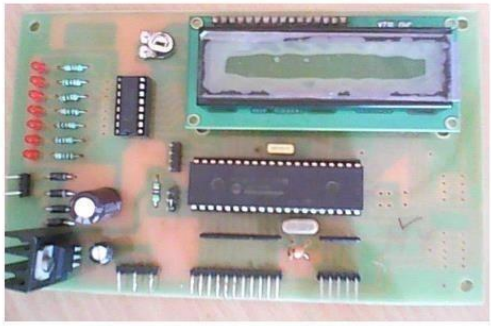

FIGURE 2: PIC CONTROLLER

PIC 16F877 is one of the most advanced microcontrollers from Microchip. This controller is widely used for experimental and modern applications because of its low price, a wide range of applications, high quality, and ease of availability. It is ideal for applications such as machine control applications, measurement devices, study purposes, and so on.

B. SUBMERSIBLE PUMP

A submersible pump is a centrifugal pump (Figure 1), which is attached to an electric motor and operates while submerged in water. The sealed electric motor spins a series of impellers (Figure 2). Each impeller in the series forces water through a diffuser into the eye of the one above it. In a typical 4-inch submersible pump, each impeller will add approximately 9 psi of pressure. For example, a typical 10-stage pump will develop a pressure of about 90 psi at its outlet (i.e.10 impellers x 9 psi). The capacity of the pump is determined by the width of the impeller vanes and its pressure by the number of impellers. As an example, a 1/2 horsepower 7-stage pump may deliver a high volume of water at low pressure while a 1/2 horsepower 14-stage pump will deliver a lower volume but at a greater pressure. Like all other centrifugal pumps, an increase in good depth or discharge pressure will reduce the capacity.

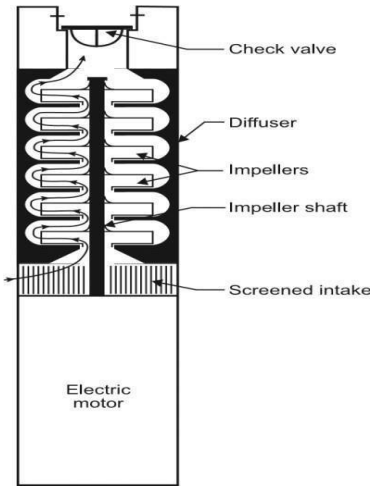

FIGURE 3: SUBMERGIBLE PUMP

C. DUAL POWER SUPPLY

The power supply gives supply to all components. It is used to convert AC voltage into DC voltage. Transformer used to convert 230V into +12V and - 12V AC.12V AC is given to diode. The diode range is 1N4007, which is used to convert AC voltage into DC voltage. AC capacitor used to charge AC components and discharge on ground. LM 7805 and LM 7905 regulator is used to maintain voltage as constant. Then the signal will be given to the next capacitor, which is used to filter unwanted AC components. The load will be LED and resister. The LED voltage is 1.75V. if the voltage is above level beyond the limit, and then it will be dropped on the resister.

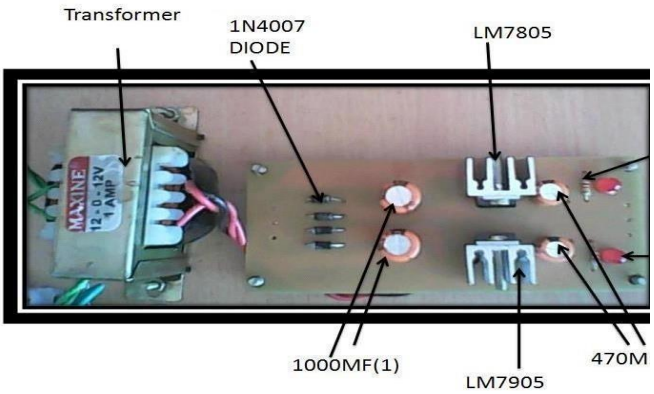

FIGURE 4: DUAL POWER SUPPLY

D. ELECTRICAL TRANSFORMER

A Transformer is an electrical device that takes electricity of one voltage and changes it into another voltage. In AC circuits, AC voltage, current, and waveform can be transformed with the help of Transformers. Transformer plays an important role in electronic equipment.

FIGURE 6: ELECTRICAL TRANSFORMER

AC and DC voltage in Power supply equipment is almost achieved by transformer's transformation and commutation. A Transformer changes electricity from high to low voltage or low to high voltage using two properties of electricity. In an electric circuit, there is magnetism around it. Second, whenever a magnetic field change (by moving or by changing strength) a voltage is made.

E. LCD DISPLAY

Liquid Crystal Displays (LCDs) have materials, which combine the properties of both liquid and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped in an ordered form similar to a crystal. An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates is coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules maintain a defined orientation angle. One each polarizer is pasted outside the two glass panels. This polarizer would rotate the light rays passing through them to a definite angle, in a particular direction. When the LCD is in the off state, light rays are rotated by the two polarizers and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction.

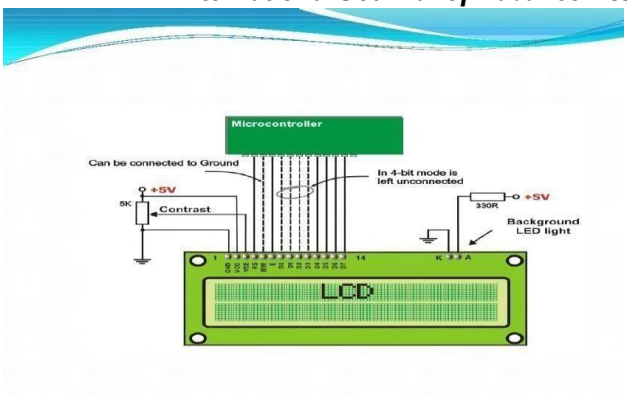

FIGURE 7: LCD

5. WORKING

In this proposed system we used MOSFET, IGBT Inverter, and battery backup system. The MOSFET is used in this system to provide the constant dc voltage. The IGBT inverters are used to convert dc to ac voltage. This system is used a three-phase squirrel cage induction motor for pumping application. The battery backup method is used in this system to store the energy in the daytime and is used for night times. Maximum power point tracking (MPPT) is a technique used commonly with wind turbines and photovoltaic (PV) solar systems to maximize power extraction under all conditions. The fuzzy logic method is used in this paper. fuzzy logic is a form of much-valued logic in which the truth values of a variable may be any real number between 0&1 considered to be "fuzzy". By contrast, in Boolean logic, the truth values of variables may only be 0 or 1, often called "crisp "values. Fuzzy logic has been employed to handle the concept of partial truth, where the truth value may range between completely false. Furthermore, when linguistic variables are used, these degrees may be managed by specific (membership) functions. The battery backup method is to provide power at all-time even on cloudy days. The main aim of the system is to achieve dc supply to ac supply which can be used for pumping applications. In these three phases, ac supply is used for pumping application.

6. RESULTS

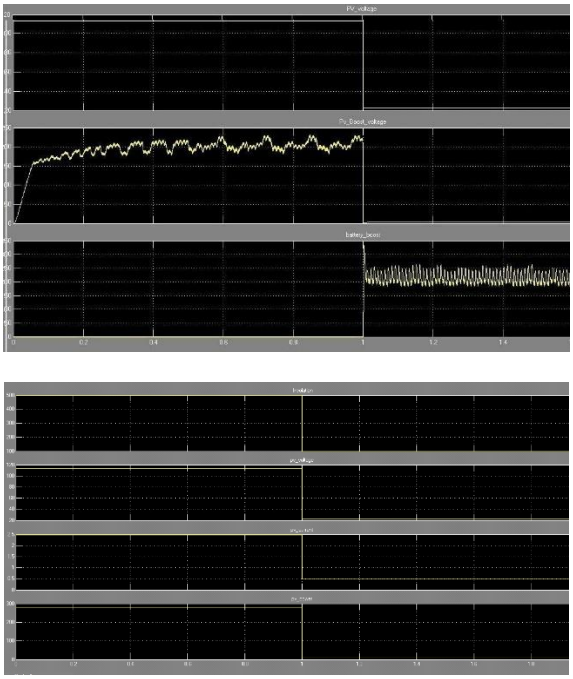

FIGURE 8: PV RESULT

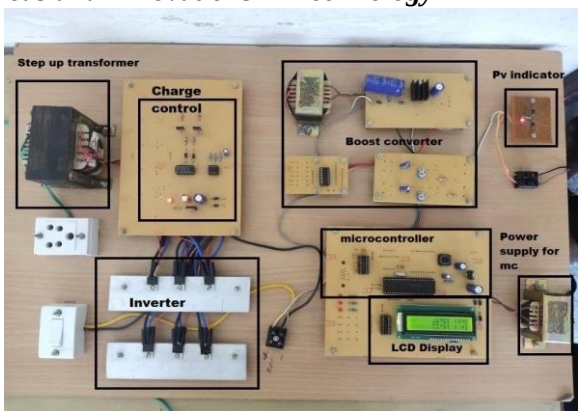

FIGURE 9: COMPLETE HARDWARE KIT

FIGURE 10: SOLAR PANEL

FIGURE 11: VOLTAGE 12, AMPERE 7.5AH

FIGURE 12: OUTPUT OF THE SUBMERSIBLE PUMP

7. CONCLUSION

Solar-powered water pumping systems have become commercially popular due to proper financing schemes by the government. MPPT techniques are being used to improve the performance of solar-powered water pumping systems during fluctuations in solar intensity. The following major limitations of Solar powered water pumping systems are identified. The main aim of the system is to achieve dc supply to ac supply which can be used for pumping applications.

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ARDUINO AND LORA BASED BUSSTOP REMINDER

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Abstract*— Many bus stops also change their names at times or sometimes new bus stops to are added into existing routes. So here we propose a bus stop indicator system using Arduino Uno and Lora technology. We use Arduino Uno-based circuit along with Lora receiver-based circuit to be placed in buses. Also, we use an LCD to display the names of bus stops as they arrive. We use Lora transmitter-based circuits which will be placed on bus stops. This system does not need any bus stop names or route names to be stored in the bus system.

Keywords—*Arduino UNO, Lora Module, Lora Antenna, Inter-Integrated Communication.*

1. INTRODUCTION

In our habitual life peoples are moving from one place to another place by using transports. Government of Tamil Nadu and India providing public transport for peoples in their comfort zone. Here we considered one of the public transports is a bus, buses travel through several routes and crossing number of a bus stop in a day. some inevitable situations and many through several routes and crossing number of a bus stop in a day. Some inevitable situation and many times buses change their routes, peoples find difficulties to find bus stop names. So, we configured a bus stop reminder to remind bus stops by using Arduino and Lora technology. The Arduino and LORA-based bus stop reminder project can be made will be more powerful, efficient, and robust. A system that is integrated with an IOT platform. The IOT communication will enable the remote monitoring of bus stops and planning of alternate routes in case of emergencies.

2. EXISTING SYSTEM

is signal range detecting and in some cases bus changes their route from their original path of way leads to being very difficult. This will increase the cost of providing infrastructure which may not be utilized 100% of the time.

3. BLOCK DIAGRAM

Figure 1 shows the block diagram of the system.

4. PROPOSED SYSTEM

We use Arduino and Lora-based circuits along with RF receiver-based circuits to be placed in buses. Also, we use an LCD to display the names of bus stops as they arrive. We use RF transmitter-based circuits which will be placed on bus stops. This system does not need any bus stop names or route names to be stored in the bus system. Each bus stop system has a code and our receiver circuitry can be fed with as well as edited of existing bus stop names using a USB keyboard interface. Each bus stop system constantly transmits a unique bus stop code. When the bus comes in a range of a bus stop the code is picked up by the bus system and it

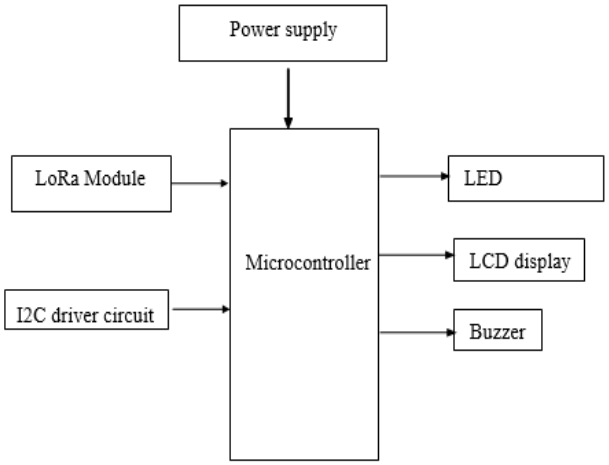

FIGURE 1: BLOCK DIAGRAM

The existing system will consist of a Raspberry single-board computer, RF transmitter, Rf receiver, LCD screen, and a sound speaker. It announces the bus stop names by using an RF transmitter and RF receiver. the main drawback of this system automatically feeds it to the controller. The controller processes this information to find out the name of a corresponding bus stop and immediately converts it to a voice command.

5. METHODOLOGY

A. LORA MODULE

LORA(short for long range) is a spread spectrum modulation technique derived from chirp spread spectrum (CSS) technology. It is a long-range low-power wireless platform that has become the de-facto technology for IOT networks worldwide. cell range urban 2-5km, rural 15-20km. Frequency band-ISM Bands: 433 MHZ/868 MHZ/780 MHZ/915 MHZ.

B. LCD

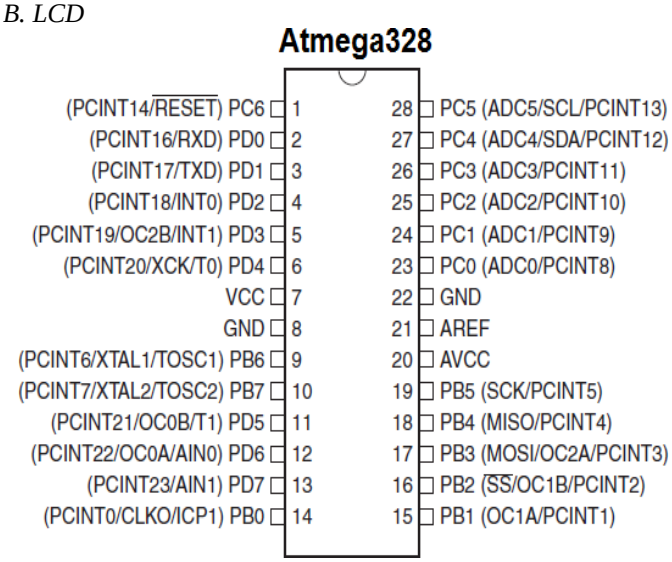

FIGURE 2: PIN DIAGRAM

FIGURE 3: LORA

C. ARDUINO UNO

Arduino Uno is a microcontroller board based on the ATmega328P.It has 14 digital input/output pins of which 6 can be used as PWM outputs, 6 analog inputs, a 16MHZ Quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

FIGURE 4: ARDUINO UNO

The operating voltage of this LCD is 4.7V-5.3V. It includes two rows where each row can procedure 16-characters. The utilization of current is 1mA with no backlight. Every character can be built with a 5* 8-pixel box. The alphanumeric LCDs alphabets and numbers. Its display can work on two models like 4-bit & 8-bit. These are obtainable in blue and green backlight.

FIGURE 5: LCD

D. INTER-INTEGRATED COMMUNICATION

The character LCD is ideal for displaying text, numbers, and special characters. LCD incorporates a small add-on circuit(backpack) mounted on the back of the LCD module. The module features a controller chip handling I2C communications and an adjustable potentiometer for changing the intensity of the LED backlight. An I2C advantage is that wiring is straightforward, requiring only two data pins to control the LCD

FIGURE 6: INTER-INTEGRATED COMMUNICATION

E. LORA ANTENNA

Low-cost single-chip 2.4GHz GFSK RF transceiver IC. Range with Antenna:250kb rate in an open area greater than 1000 meters. power range is ultra-low power consumption and its input voltage is 3.3V. It has 5V tolerant pins.

FIGURE 7: LORA ANTENNA

6. WORKING

we use Arduino and Lora-based circuits along with RF receiver-based circuits to be placed in buses. Also, we use an LCD to display the names of bus stops as they arrive. We use RF transmitter-based circuits which will be placed on bus stops. This system does not need any bus stop names or route names to be stored in the bus system. Each bus stop system has a code and our receiver circuitry can be fed with as well as edited of existing bus stop names using a USB keyboard interface. Each bus stop system constantly transmits a unique bus stop code. When the bus comes in a range of a bus stop the code is picked up by the bus system and it automatically feeds it to the controller. We are expecting to remind the bus stop of the bus and let the users know the location. So that one can manage their time efficiently and get the reminder just before the bus arrives or take an alternate means of transport if they miss the bus stop or they are running late. The controller processes this information to find out the name of a corresponding bus stop and immediately converts it to a voice command.

7. HARDWARE IMPLEMENTATION

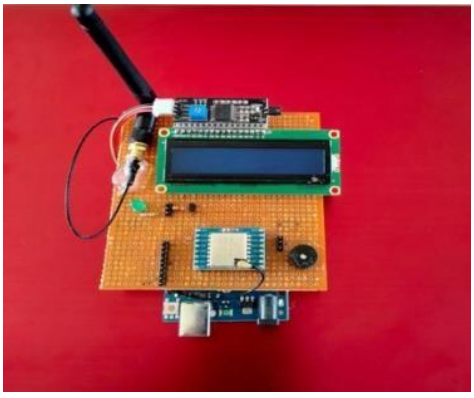

FIGURE 8: TRANSMITTER

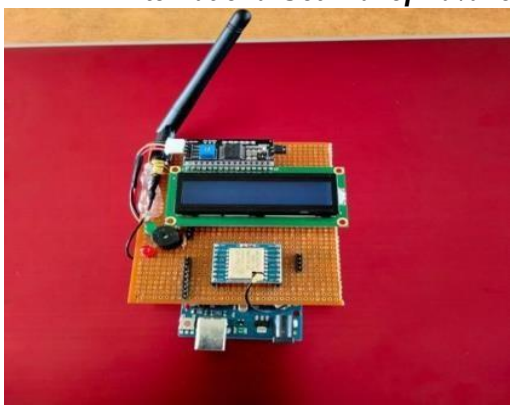

FIGURE 9: RECEIVER

8. RESULTS

A. RESULT OF TRANSMITTER

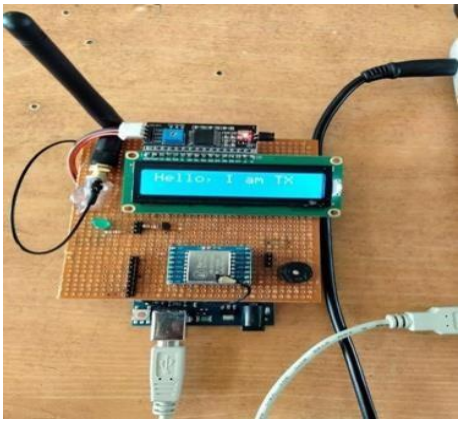

FIGURE 10: TRANSMITTER RESULT 1

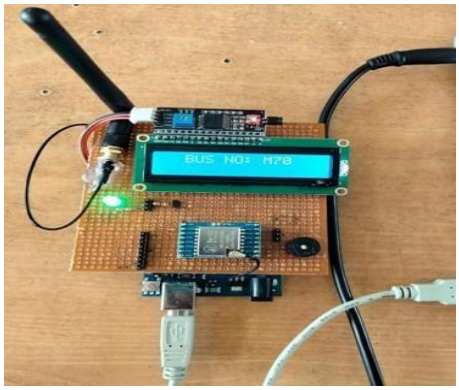

FIGURE 11: TRANSMITTER RESULT 2

B. RESULT OF RECEIVER

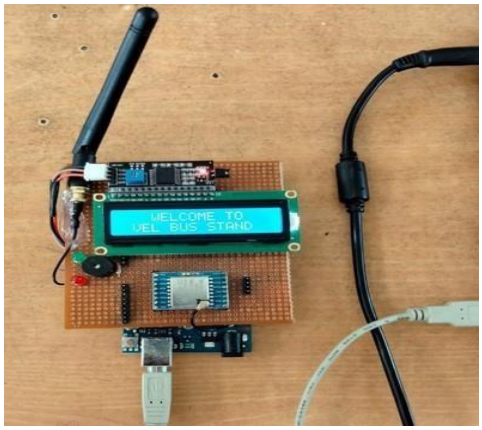

FIGURE 12: RECEIVER RESULT 1

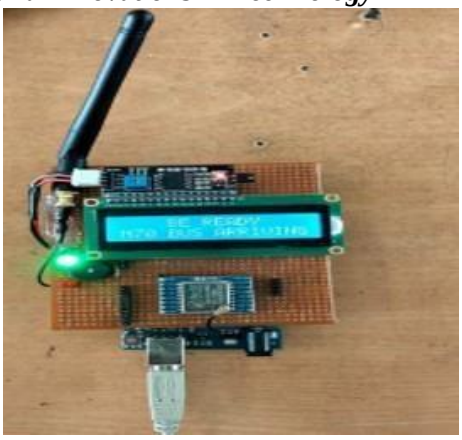

FIGURE 13: RECEIVER RESULT 2

9. CONCLUSION

The Bus stop confusion problem has been eliminated Moreover; the project phase is completed successfully by using IOT. This project is made with pre-planning, which provides flexibility in operation. This innovation has made it more desirable and economical. This project **"ARDUINO AND LORA BASED BUS STOP REMINDER"** is designed with the hope that it is very much economical and helpful for passengers and as well as conductors during Journey.

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SURVEILLANCE BOT

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Abstract*— Cloud robotics is a field of robotics that attempts to invoke cloud technologies such as cloud computing, cloud storage, and other internet technologies centered on the benefits of converged infrastructure and shared services for robotics. Our project is a cloud robot that is used in industrial and manufacturing environments. It works on a ROS platform. Here we use a Raspberry Pi controller to control the various devices attached to it. For testing, this implementation, an Android phone, camera, DC motor, sensors, and a Raspberry pi controller have been used. The movement of the robot is provided by DC motors and the direction is controlled from an android environment using Robot operating system (ROS). The controller and the receiver end are connected by Wi-Fi. The data input from the gas, temperature, and infrared sensors is given to the Raspberry Pi controller. A camera is used to provide visual input of the surrounding environment to the robot. The data obtained by the sensors and camera are processed by the controller and stored in the cloud.

Keywords—*Raspberry Pi, Temperature sensor, Gas sensor, IOT, Web camera*

1. INTRODUCTION

Cloud robotics is a field of robotics that attempts to invoke cloud technologies such as cloud computing, cloud storage, and other Internet technologies centered on the benefits of converged infrastructure and shared services for robotics. Our project is a cloud robot that is used in an industrial and manufacturing environment. It works on a ROS platform. Here we use a Raspberry Pi controller to control the various devices attached to it. For testing, this implementation, an Android phone, camera, DC motor, sensors, and a Raspberry pi controller have been used. The movement of the robot is provided by DC motors and the direction is controlled from an android environment using Robot Operating System (ROS). The controller and the receiver end are connected by Wi-Fi. The data input from the gas, temperature, and Infra-Red sensors is given to the Raspberry Pi controller. A camera is used to provide visual input of the surrounding environment to the robot. The data obtained by the sensors and camera are processed by the controller and stored in the cloud. The proposed system has a Raspberry Pi-controlled robot that moves in a specified path. Raspberry pi controls the DC motors to move in a specified path. A camera is also connected to the system to monitor industrial activities. The system is also equipped with Temperature Sensor, Gas Sensor, IR sensor to obtain the readings. The lamp will be used in the absence of light. The absence of light can be identified by using LDR Sensor. A cooling fan will be used when the system temperature is high. The room temperature is obtained with the help of the temperature sensor. When the system goes into a critical situation, the system will go loud using Speaker. The loads are controlled with the help of the relay board. And all these data are transmitted to the cloud using the Built-in Wi-fi.

2. EXISTING SYSTEM

Existing system that exists where it monitors industrial activities individually and operated manually. The existing system needs Special maintenance work and needs human work. Application-wise costs and maintenance are high when compare to our proposed system. Gas monitoring and temperature monitoring system works separately.

3. BLOCK DIAGRAM

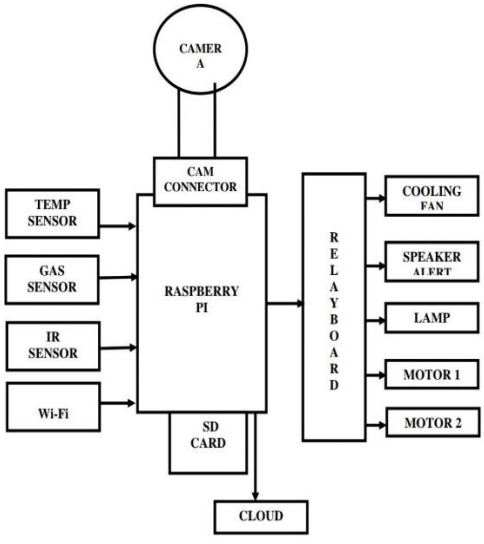


FIGURE 1: BLOCK DIAGRAM OF THE SYSTEM

The project is implemented using Raspberry pi, Temperature sensor, Gas sensor, IOT, web camera.

4. METHODOLOGY

A. RASPBERRY PI 3+

The Raspberry Pi 3 is the third generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016. The Raspberry Pi 3 has an identical form factor to the previous Pi 2 (and Pi 1 Model B+) and has complete compatibility with Raspberry Pi 1 and 2. The best part about all this is that the Pi 3 keeps the same shape, connectors, and mounting holes as the Pi 2.Dual Core Video Core IV® Multimedia Co-Processor. Provides Open GL ES 2.0, hardware-accelerated Open VG, and 1080p30 H.264 high-profile decode

FIGURE 2: RASPBERRY PI CONTROLLER

B. WEB CAMERA

A webcam is a video camera that feeds or streams its image in real time to or through a computer to a computer network. When "captured" by the computer, the video stream may be saved, viewed, or sent on to other networks via systems such as the internet, and email as an attachment. When sent to a remote location, the video stream may be saved, viewed, or sent there. Unlike an IP camera (which connects using Ethernet or Wi-Fi), a webcam is generally connected by a USB cable, or similar cable, or built into computer hardware, such as laptops.

FIGURE 3: WEB CAMERA

C. TEMPERATURE SENSOR

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling.

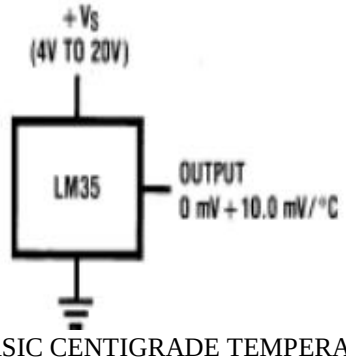


FIGURE 4: BASIC CENTIGRADE TEMPERATURE SENSOR (+2°C TO +150°C)

The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4° over a full −55 to +150°C temperature range. The LM35's low output impedance, a linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a −55° to +150°C temperature range, while the LM35C is rated for a −40° to +110°C range (−10° with improved accuracy).

D. GAS SENSOR

This is a simple-to-use liquefied petroleum gas (LPG) sensor, suitable for sensing LPG (composed of mostly propane and butane) concentrations in the air. The MQ-6 can detect gas concentrations anywhere from 200 to 10000ppm. This sensor has high sensitivity and a fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC. This LPG Gas Sensor (MQ6), ideal sensor for use to detect the presence of a dangerous LPG leak in your home, car, or in a service station, storage tank environment. This unit can be easily incorporated into an alarm unit, to sound an alarm or give a visual indication of the Combustible Gas / LPG concentration. The sensor has excellent sensitivity combined with a quick response time.

FIGURE 5. GAS SENSOR

E. RELAY

A relay is an electromechanical switch that is activated by an electric current. A four-relay board arrangement contains a driver circuit, power supply circuit, an isolation circuit. A relay is assembled with that circuit. The driver circuit contains transistors for switching operations. The transistor is used for switching the relay. An isolation circuit prevents reverse voltage from the relay which protects the controller and transistor from damage. The input pulse for switching the transistor is given from the microcontroller unit. It is used for switching four devices.

FIGURE 6: RELAY

F. EXHAUST FAN

A DC fan is a device used for cooling purposes in many systems. when a supply is given to a device it starts rotating. The direction of the fan can be changed by reversing the supply. DC or direct current fan works on the principal, when a current-carrying conductor is placed in a magnetic field, it experiences a torque and tends to move. The fan has a DC

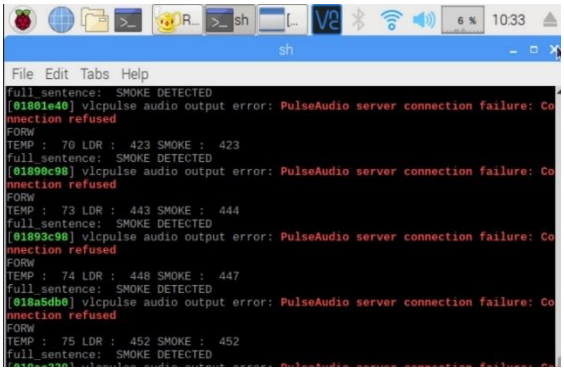
brushless motor, with an operating voltage of 5V, and is rated at 360mA. Keeping the temperature down in your project can often be a necessity, and this fan can help. When designing the electronics that interface to a DC brushless cooling fan, it is critically important to be aware of this behavior.

FIGURE 7: EXHAUST FAN

5. WORKING

Here we use Raspberry pi, 3+ model. It is used as the heart of our invention because it is an open-source where one can get a lot of related information so we can able to customize the system depending on the needs. It is used as a CPU of our BOT. The supply is given in two ways. The first one is 5v from the power bank for Raspberry pi. And the second one is a 12v supply from the battery to the IOT then followed by a relay. Now the bot is ready for monitoring. We can see what the bot is monitoring by using pc and mobile. To start the bot before we want to connect the Raspberry Pi to our mobile or pc by using a hotspot. Here we provide a separate username and password for Raspberry pi. Also, provide a server for getting stored data by using username and password. We use an App to run the bot and getting the image and data. Once the connection is done then give the run command in our App. The motor now starts the bot in is the path.

6. RESULTS



7. CONCLUSION

Is impedance control a topic where it is still worth investing in research resources? The authors believe that, as long as the work is oriented towards bridging the gap between theory and practical implementation, there is still plenty of space for new contributions. In the present paper, several points related to this approach have been touched, from the role of IJC positional control to joint elasticity to fiction in the joints. The result is a control scheme that can be implemented without accurate knowledge of the dynamics of the manipulator and without redesigning the motion control system. Nice results have been already obtained and shown, while other experiments, involving tasks where the rotational impedances enter the game, are presently under work.

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