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Multi Purpose Agricultural Robot

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ABSTRACT: Agriculture is one of the main aspect in the history of human being civilization. It is one of the oldest and important activities of human beings. We know the ace of industrialization and urbanization growth in the world, even then approximately fifty percentage of the working population adopted agriculture has their profession. And we developed a six wheel robot which can survey on rocky places. This robot will do multiple functions like automate the irrigation system , it monitors the field 24/7 and it has the additional functions of night time insect catcher when required and it also play the human voice to avoid the entry of animals.

KEYWORDS: Surveillance, Irrigation, Six wheel robot,

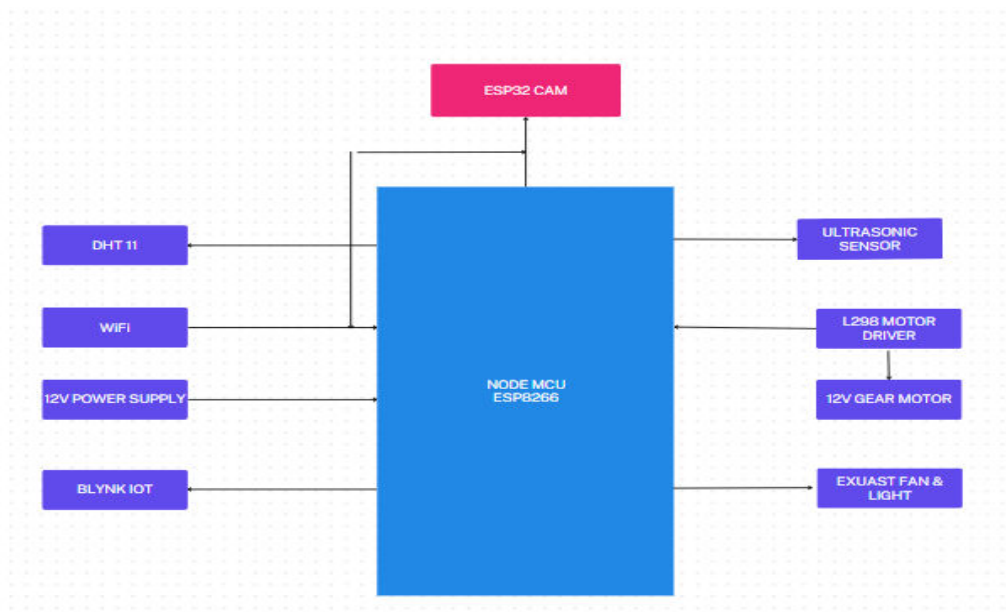
I. INTRODUCTION

The recent technology(AI, IOT & ML) has made the human’s daily life easier and effortless by developing the physical devices which are smart and intelligent.If we implement this technology in Agriculture and Farming it will facilitate the farming.In agriculture , insects plays an important role in pollination This project has three major functions. they are irrigation system, 24/7 surveillance, night time insect catcher & animals avoider.If the animals enter into the field then it will definitely destroy the crops and plants

II. PROPOSED SYSTEM

Our rover can automate the irrigation system.It has the esp8266 camera to surveillance the field.It stores the video in the memory card and also stores the data in a cloud server.It has the insect catcher system which has light to attract insects and the attracted insects were absorbed by the rotating fan and push the insects in to the water.It will emits the ultrasonic sounds waves, sound will induce auditory stress to rodents and make them to move away.

BLOCK DIAGRAM





BLOCKDIAGRAM DESCRIPTION

The power source of this project is renewable energy, thus we used a solar panel to generate electricity, rechargeable batteries to store it and non-powered locations to utilize the battery power. Here we use the variety of sensors to monitor the field. Including sensors for the temperature, humidity, ultrasonic, ESP32 cam and ultrasonic sound repellent. We use the Node MCU to transmit the data to the firebase cloud. Motor driver is used to control the six motors which are connected in the wheel. The exhaust fan is additionally added to catch the insects in the field. The robot is operated with the help of Blynk app, which is installed in the mobile phone.

COMPONENTS USED

NODE MCU:

The ESP8266 Wi-Fi Module is an independent System on Chip with coordinated TCP/IP, any microcontroller access to Wi-Fi. Facilitating an application or offloading all Wi-Fi organizing capacities from substitute application processor is done by this module. ESP8266 module are pre-modified with an AT order set firmware which means Arduino gadget is essentially attached and get greater Wi-Fi capacity. It is an incredibly financially savvy board with an immense and ever developing network.

MOTOR DRIVER:

The L293D is a 16-pin Motor Driver IC which can control a set of two DC motors simultaneously in any direction. The L293D is designed to provide bidirectional drive currents of up to 600 mA (per channel) at voltages from 4.5 V to 36 V.

ESP32 CAM:

The ESP32-CAM is a small size, low power consumption camera module based on ESP32. It comes with an OV2640 camera and provides onboard TF card slot. The ESP32-CAM can be widely used in intelligent IoT applications such as wireless video monitoring, WiFi image upload, QR identification.

ROCKER BOGIE:

A Rocker bogie mechanism is a mechanism primarily used in the Mars rovers to overcome the rough terrains while maintaining stability. It is NASA's favorite mechanism for space vehicles & rovers. It consists of two arms with wheels mounted to each. Both arms are connected through a movable joint.

DC MOTOR:

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. It has a stationary set of magnets in the stator and an armature with one or more windings of insulated wire wrapped around a soft iron core that concentrates the magnetic field.

EXHAUST FAN:

Exhaust fans are also known as cooling fans, they are an ideal solution for application that requires high efficiency and silent operation. The cooling fans work by sucking the cold air at the bottom vent, and then by realizing hot air from the top vent as the heat rises upward.

ULTRASONIC SENSOR:

An Ultrasonic sensor is a gadget that can gauge the separation to an article by utilizing sound waves. We will utilize this sensor to recognize and stay away from impediments while our wanderer is moving self-ruling.

DHT-11 DIGITAL TEMPERATURE AND HUMIDITY SENSOR:

The DHT-11 Digital Temperature and Humidity Sensor is a basic, Ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin.



ARDUINO SOFTWARE (IDE):

It is open source software that is used to write codes and upload it to the Arduino board. The Arduino IDE contains a text editor for writing codes, a message area, a text console, a series of menus along with a toolbar with buttons. The programming codes are known as sketches. The sketches are saved with the file extension .ino. It runs on Windows, MAC and LINUX. Thus through this software we can code for the robotic movements and also for the sensors interfaced with the Arduino board.

BLYNK IOT APP:

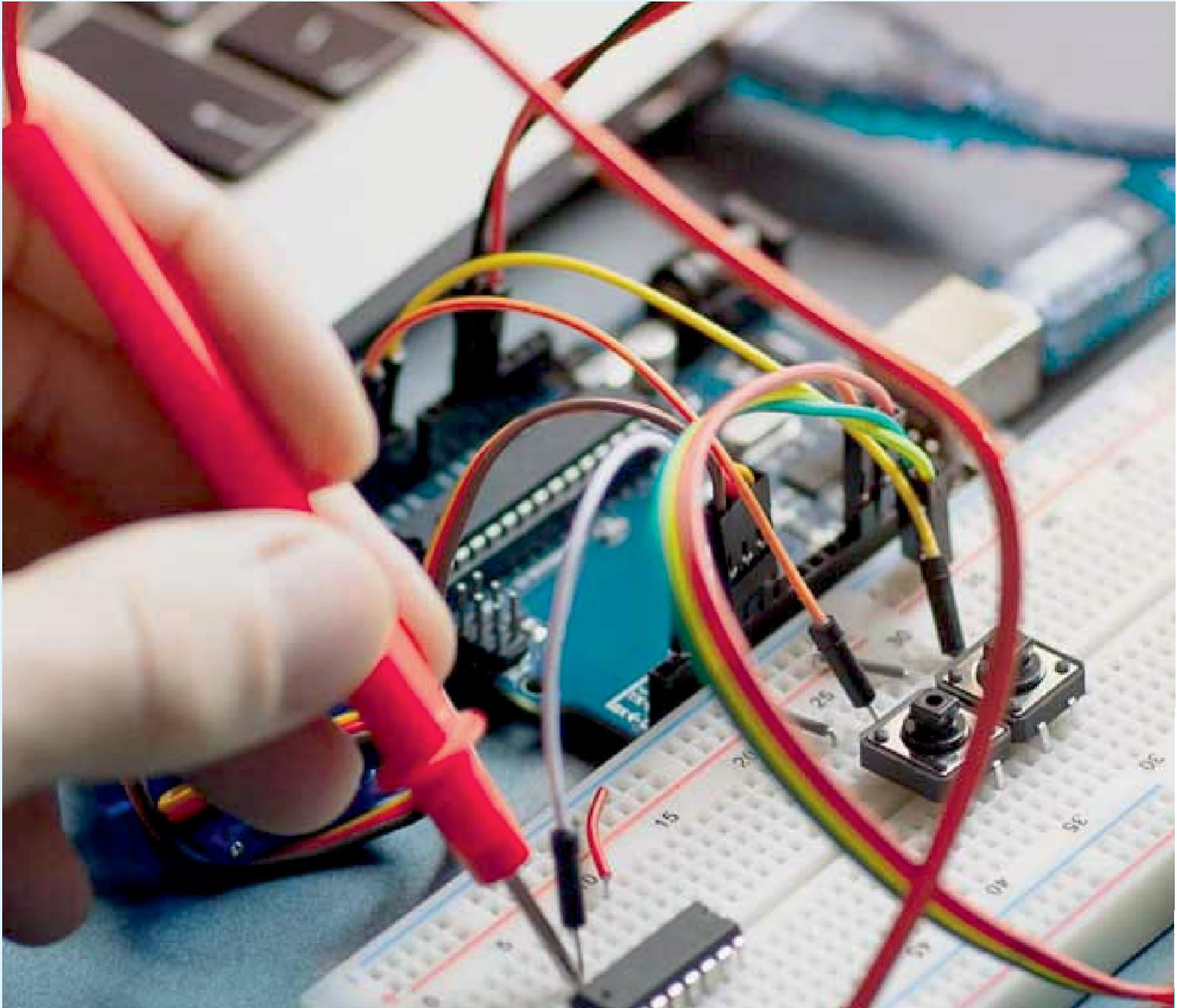
Blynk is an IoT platform for iOS or Android smartphones that is used to control Arduino, Raspberry Pi and NodeMCU via the Internet. This application is used to create a graphical interface or human machine interface (HMI) by compiling and providing the appropriate address on the available widgets.

III. CONCLUSION

This rover will protect the plants from insect attack, animal destroy and it will also protect the field from human theft. And this system will monitor the field for 24/7. It will also reduce the farmers work using automatic irrigation system. Thus in future we can add grass cutter, plant disease identifier using MATLAB and etc., to this system.

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