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IOT BASED AGRICULTURAL ROBOT

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ABSTRACT

An Agribot is a robot which is designed by agriculture purpose. The robot is autonomus and provides the facility for optional switching of ploughing system when it required. It is minimize the labor of farmers and increase the speed and accuracy of the work. As we know that almost 70 percent population of India depends on the agriculture, agriculture plays a vital role in the develop on the agricultural country. There has been increasing interest in development of robots in agricultural sectors due to current increase in labourer shortage. The intention of this robot that can help and support human in their daily lives and keep everyone safe. An IOT based agriculture robot on a very high level, IOT is ability for things that contain embedded technologies to sense, communicate, interested and collaborate with other things thus creating network of physical objects. Our robot is combination of a mobile platform, agricultural tools and sensors like soil moisture sensors, rain sensors, temperature sensor and humidity sensor, water pump etc. So it can collect agriculture data and perform the actions according to required given by its users. Whenever user gives any pre defined command to the robot from his android mobie phone, respective command signal is generated and then transmitted to the robot via Wi-Fi connectivity. When the command is received by the robot's receiver it's send to the control of robot (Aurdino Board), which generates control signals according to predefined program and robot started to perform functions accordingly.

Keywords- Aurdino Mega , Humidity Sensor , IOT, Rain Sensor , Wi-Fi

I. Introduction

As we know that, the farming is one of the oldest livelihood in the history of mankind. Modern farmers never face the challenges like never before. With the rising of the global population rate, climate changes etc. there is a huge pressure on agricultural industries to produce the more foods. Around 60-70% of Indian population (directly or indirectly) depends upon agriculture sector and currently it contributes to 16-17% of the GDP. In India agriculture is a necessary occupation and the range of human beings pursuing its career is high. Technology is developing day by day so the villages are transforming to city regions. According to the U.N calculations the world population will rise from 7.3 billion today to 9.7 billion in 2050. The world will need a

lot more food, and farmers will severe pressure to keep up with the demands. So, the robot can play a useful role which used to assist the farmers in farming. In this paper, the agriculture robot is a robot deployed for agricultural purposes. The main area of application of robots in agriculture today is at the harvesting stage. Emerging applications of robots or drones in agriculture include weed control, cloud seeding, planting seeds, harvestings, environmental monitoring and soil analysis. The proposed model of our project is to make agricultural robot which can be control remotely from a android smart phone by using a mobile applications. The robot can perform various agriculture related tasks like watering the plants, measuring the moisture level of the soil and cutting the crops etc. Functionally the robot canbe updated by more sensors and controlled to it for more or any different type of use.

1.1 Introduction of IOT

Current era, dominated by IOT (Internet of Things) devices became more important component in our daily life. In the present time IOT (Internet of Things) devices is that the entire things can be connected to the internet. These devices can be communicate and interact with others through internet, and they can be monitored and controlled. It became the mandatory choice for the future technology, which allows the man machine interconnection that can be access through the internet but there are some security challenges which is under process. IOT (Internet ofThings) has open the door for new research and invention for upcoming future generation.

1.2 IOT in Agriculture

There is a several use of IOT (Internet of Things) in agriculture uses of robots, drones, remote sensors etc. with continuing process in machine learning and tools for monitoring crops, surveying and mapping the fields and provides data to save the time and money. It refers that the use of sensors, cameras, and many more devices which can involve in the farming to collect the data. By the use of the IOT farmers can check and analysis the data to make a better decisions and predicts that what situations can be arise in the future.

II. LITERATURE REVIEW

More than 60 percent of the population in the India chooses agriculture as the primary occupation. At present, dueto increase in shortage of labourer interest has raised for the development like robots in the agricultural field. In this paper we present that our robot is used to develop the process of cultivating agricultural land without use of man power. The aim of this paper is to reduce the man power and who is physically challenged.

III. PROBLEM FORMULATION

- Data received from sensors, need to measure though multiple monitoring in order to get exact readingsand results.
- Connections of the wires which reduces the speed in data transfer.
- Reading of the data is sometimes very slow to receive and take time to process.

- For connectivity the device required an active Wi-Fi connection which break sometime using a portablehotspot.

IV. PROPOSED OBJECTIVE

- The purpose of this project is to automate slow and dull tasks for farmers, allowed them to focus moreon the improving overall productions.
- The system is easy to operate and control from a distance.
- The system is also perform an actions weed control, cloud seeding, planting seed, harvesting and soilanalysis and collect the related data.

V. METHODOLOGY / BLOCK DIAGRAM

1.1 METHODOLOGY-

In this project we use Aurdino mega 2560 (Fig.2)is a microcontroller board based on the AT mega 2560. it has 54 digital input/output pins , 16 analog input. Soil moisture sensor (Fig.3)is use to measure the volumetric water contain of soil. Rain drop sensor(Fig.4) is basically a board which nickel is coated in the form of lines. it works on the principle of resistance . DHT11 temperature and humidity sensor(Fig.5) which generate measured digital output. DHT11 is a low cost temperature and humidity sensor. ESP8266-01 Wi-Fi module(Fig.6) is self contained SOC with integrated TCP/IP protocol can give any microcontroller approach. L298N motor driver(Fig.7) module is a high power motor driver perfect for driving DC motor(Fig.8)

1.2 BLOCK DIAGRAM

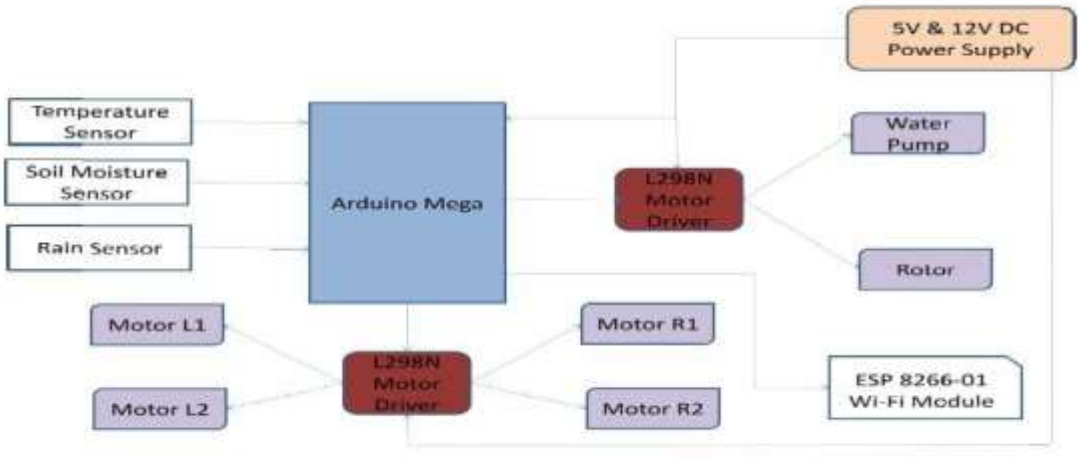

Figure 1- Block Diagram of IOT based Agricultural Robot

1.3 HARDWARES-

1. AURDINO MEGA- It has various sensors and actuators which are connected through wires to the main control unit which is in our case a Aurdino mega board. All the sensors data and control signals are processed and generated by it. The control unit is connected to the internet by using a ESP8266-01 Wi-Fi network. Our

robot has a mobile platform so it can be easily moved from here to there when a command is given by user via his smart phone.

Figure 2- Aurdino mega

2. SOIL MOISTURE SENSOR- The soil moisture sensor is used to measure the volumetric water containt of soil. This makes it ideal for performing experiments in courses as soil science, agricultural science, envirmental scince, horticulture, botany, and biology.

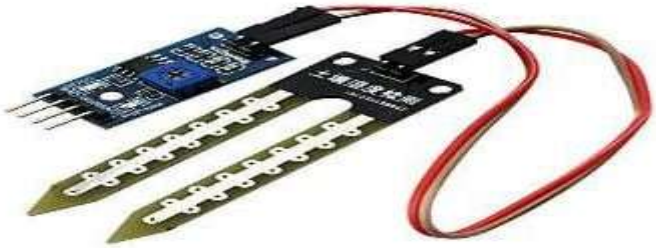

Figure 3- Soil Moisture Sensor

3. RAIN DROP SENSOR – Rain drop sensor is basically a board on which nickel is coated in the form of lines it works on the principle of resistance. Rain Sensor module allows to measure moisture via analog output pins and it provides a digital output when a threshold of moisture exceeds.

Figure 4- Rain Drop Sensor

4. DHT11 TEMPERATYRE & HUMIDITY SENSOR- DHT11 is a Humidity sensor , which generates calibrated digital output . DHT11 can be interface with any microcontroller like Aurdino ,Raspberry Pi , etc. and get instantaneous results . DHT11 is a low cost humidity temperature sensor which provides high reliability and long term stability. It uses a capacitive humidity sensor and thermostat to measure the surrounding air and output s a digital signal on the data pin.

Figure 5- DHT11 Temperature & Humidity sensor

5. ESP8266 - 01 WI-FI MODULE – The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network . The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.

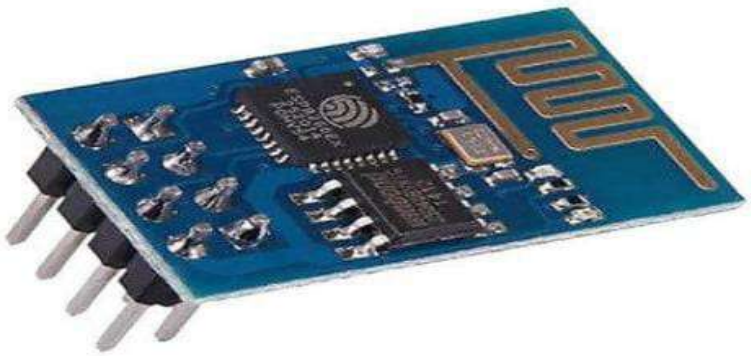

Figure 6- Wi-Fi Module(http://electronicscomp.com)

6. L298N MOTOR DRIVER MODULE- The L298N Motor Driver Module is a high power motor driver perfect for driving DC Motors and stepper Motors. It uses the popular L298 Motor Driver IC and has the onboard 5v regulator which it can supply to an external circuit . it can control up to 4 DC Motors , or 2 DC motors with directional and speed control.

Figure 7-L298N Motor Driver Module

7. DC GEAR MOTOR – A geared DC Motor has a gear assembly attached to the motor . The gear assembly helps in increasing to torque and reducing the speed . using the correct combination of gears , its speed can be reduced to any to any desirable value .

Figure 8- DC gear motor (www.google.com)

8. SOFTWARES USED – The Aurdino IDE used to write and upload the program to Aurdino compatible boards and MIT inventor apps provided by Google , it allows newcomers to computer programming to create application software.

VI. CONCLUSION

In this paper we present the IOT based agriculture robot. It has a vast scope and limitless applications. In this we try to present work of this robot, labourer problem can be reduces and energy required for the robot is less. It helps the old age people and physically challenged people.

VII. REFERENCES

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