Designing of Automated Seed Sowing And Water Pump Switching Robot For Bt Cotton

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Abstract- *To make the seed sowing process with the help of robot automated with minimal control of human,. The robot's action is controlled by motor driver and seed sowing is achieved using a seed motor. Many sensors like moisture sensor, humidity sensor, LM 35 & NPK sensors are installed inside the root for detection of moisture, temperature and NPK content in the soil. When there is any change in the moisture level(fixed rate) then a signal is sent to the water pump and which gets switched on. Using Bluetooth module we can send instructions to the PIC controller where the program for operation of robot is coded. The sensors readings are updated in the IoT(think speak cloud).*

Keywords- Seed Motor, IoT, Sensor network

I. INTRODUCTION

Seed sowing is the important process in agriculture where we a giving a high cost for labour charges. NPK content and moisture in the farmland plays an important role in the metabolism of the crop. In central states of India we are cultivating the kharif crop cotton plant.In cotto crop cultivation there is a big deal for cultivators, because of Bacillus thuringiensis bacteria. Bacillus thuringiensis bacteria cause damage to the cotton balls by eating them completely. Scientists developed cotton plants resistive to that bacteria. In the case of Bt Cotton, we have to sow the seeds in (1 or 2) numbers. So, it is a risky task for labours to achieve it. Here, in this project we are introducing the automated sed sowing process automated by the help of seed motor.

II. RELATED WORK

Seed Motor

Seed Motor is installed in the robot by which the seeds are sowed in the farmland. Seeds are stored in the seed bank. Where in a fixed number the seed picker will pick the seed and send to the seed motor. Seed motor will sow the seeds in the soil. Distance counter is used to sow the seeds in the desired interval of space. Manual sowing process takes a lot of time and labour charge is high. As an alternative method we can adapt the automated sowing process. The operations done by the robot are stored and updated in the thingspeak cloud. These methods are useful in high wetlands. This is a kharif crop, the crop is cultivated in the month of July where the monsoon starts. So soil gets highly wet in short time. During this monsoon season it is an easy task for the seed motor to sow the seeds. And robot can easily perform the task in the wet soil.

Sensor Network

Sensors play the vital role in this project for sensingof the moisture , temperature, humidity and nutrition content in the soil.When there is any decrement in the moisture level(fixed rate) then the water pump gets stared automatically . A sensor is a tool that detects and responds to a few forms of enter from the bodily environment. Sensors can monitor various aspects of the farmland, such as its moisture, humidity, temperature, nutrition content or any number of other environmental phenomena. Here we are using moisture sensor, humidity sensor, NPK sensor and LM35 sensors.

Where the sensor node is connected to the PIC microcontroller and to the IoT, the sensor readings are updated to the thinkspeak cloud. sensor networks (WSN) are gaining the floor in all sectors of life; from houses to factories, from visitors manage to environmental and habitat monitoring. Monitoring appears to be the important thing word. Wireless structures can take manage actions, too and on this manner, they compete e.g. with present system automation structures or with traditional domestic automation.

Internet Of Things (IoT)

The IoT can be any device with any shape of built-in-sensors with the ability to gather and transfer records over a network without manual intervention. The embedded era withinside the object allows them to engage with internal states and the out of doors environment, which in turn allows in choices making process. In a nutshell, IoT is a concept that connects all the devices to the internet and permit them to speak with each exclusive over the internet. IoT is a huge

network of associated devices – all of which gather and share data about how they are used and the environments in which they are operated.

IOT (Internet of Things) is an advanced automation and analytics device which exploits networking, sensing, big facts, and artificial intelligence generation to deliver complete systems for a product or service. These systems allow greater transparency, control, and usual overall performance whilst performed to any organisation or gadget. Internet of things (IoT) describes bodily objects (or businesses of such objects) with sensors, processing ability, software program and different technology that join and trade information with different gadgets and structures over the Internet or different communications networks.

III. PROPOSED METHODOLOGY

The PIC controller with the battery relates to the moisture, NPK and LM 35 sensor to sense the environmental conditions such as moisture, nutrition content and temperature level respectively. It paves the way for better performance of robot and to automatically switch on the water pump when the moisture level gets decreased below the rated level. The readings of the sensors are displayed in the LCD and these parameters are updated in the think speak cloud through IoT based technology which helps in reducing the dependency of man power.

Since the seed sowing robot are implemented with internet, an online monitoring is system which is called think speak has been used for checking the movement of robot and environmental condition in the fundamental.

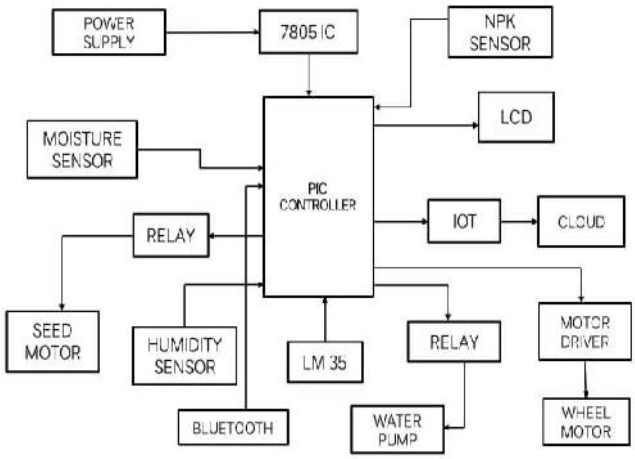

Figure 1. Block Diagram

IV. SYSTEM DESIGN

This project is the development of an automatic seed sowing robot using a combination of PIC microcontroller, LCD, IOT, relay, seed motor, Bluetooth module, motor driver, moisture sensor, humidity sensor, NPK sensor and LM 35 . The sensors will detect the moisture, humidity, nutrition content and temperature of the soil. When there is any decrement in moisture level then the signal is send to the micro controller and the water pump get switched on automatically using the relay. NPK sensor senses the nutrition content which is essential for the metabolism of the cotton crop. The LCD will be used to display the sensors readings such as moisture, humidity, temperature and nutrition content. The PIC controller, Bluetooth module, IOT, relay, and motor will be used to control the movement of the operations of robot. Instructions for the operation of the robot is sent to the PIC controller using the Bluetooth module. Finally, the Bluetooth module will allow the vehicle to be controlled by remotely. This project has the potential to enable the development of automated seed sowing robot .

V. EXPERIMENTAL SETUP

The battery produces 12 V/ 5 V power supply to the regulator that ensures a constant voltage supply through all operational conditions. It regulates voltage during power fluctuations and variations in loads. Then the constant voltage is passed to the PIC microcontroller which is the main brain of the system which is responsible for both computing and communication tasks. It regulates voltage during power fluctuations and variations in loads.

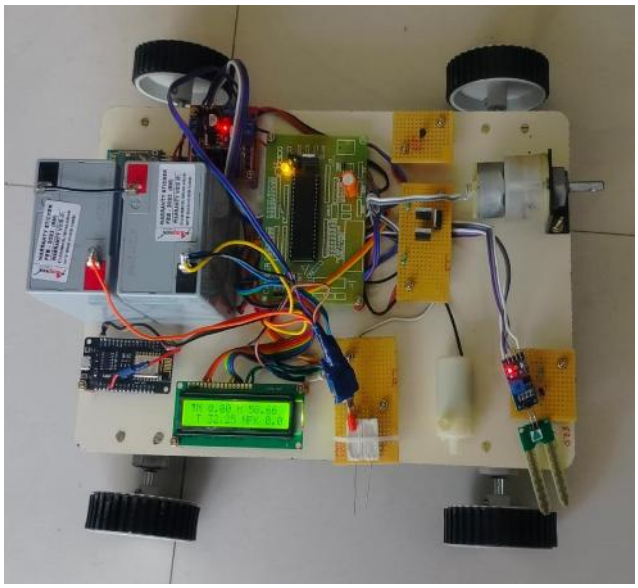

Figure 2. Snapshot Of Proposed Hardware Kit

Then the constant voltage is passed to the PIC microcontroller which is the main brain of the system which is responsible for both computing and communication tasks. All sensors, regulator, relay, motor, bluetooth, LCD, are connected to the microcontroller. Four sensors are placed in forward, right, and left direction. Humidity sensors work by detecting changes that are electrical currents or temperature in the air. The sensor will monitor the minute changes in the atmosphere in order to calculate the moisture and humidity in air.

LM 35 temperature sensor uses the basic principle of a diode, where as the temperature increases, the voltage across a diode increases at a known rate. By precisely amplifying the voltage change, it is easy to generate an analog signal that is directly proportional to tempearture. All these information's are controlled by the PIC microcontroller and inside the microcontroller some coding is written for display and for the commands given by the user in remote by using Bluetooth module. From the controller, a relay is connected with the motor to automate the power to switch the water pump on and off at specific times. The current status of the farm land like moisture content, humidity , temperature and nutrition level are viewed by the user at remote location through cloud by using IOT technology. To change the direction of the robot, the passenger can give commands to move forward, reverse, towards right and left by connecting Bluetooth module.

S.NO	PARAMETERS	EXISTING SYSTEM	PROPOSED SYSTEM
1	Efficiency	80%	90%
2	Controller	PIC Kit 1	PIC Kit 2
3	Cost	Low Cost	Economical
4	Benefit	Debugging and Rewriting of program is not possible	Debugging and Rewriting of program is possible

Table. 1 Comparison of proposed system with existing system.

VI. RESULT AND DISCUSSION

As a result, moisture, temperature, humidity and NPK content of the farm land are displayed through the LCD, which can be viewed through interfaced device with the help of Bluetooth module by IoT system in remote location.
Moisture sensor installed in the robot is the reason for switching of water pump automatically.
Seed sowing is done by the seed motor based on the code in PIC micro controller.

Figure 3.Sensor Parameters

The information's like moisture content, temperature and nutrition content are seen by means of passing this information to cloud. By installing "Thing Speak" application in any android phoneand login with the mail id of priyakaliyappan4143@gmail.com with the password of Project@1. The information which is passed through the cloud can be viewed through the above login in any remote location as in Fig.4 and Fig.5.

Figure 4. Temperaturelevel chart through IOT

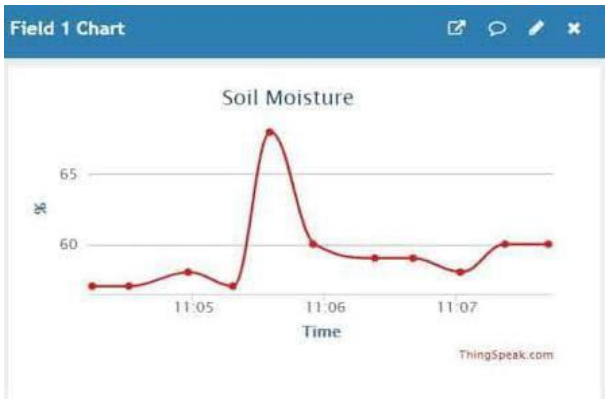

Figure 5. Moisture level chart through IOT

Now if the user likes to give commands to the brain PIC controller the brain of the robot we can give the instructions for the movement of the robot forward, backward, right, left, water pump switch on, water pump switch off, power supply on, robot off are tabulated below

Directions	Commands
Forward	#1
Reverse	#2
Right	#3
Left	#4
Stop	#5
Water Pump	#6
Seed Motor	#7

Table.2 Bluetooth commands

The most important benefit right here is multiple sensors set up within the automated seed sowing robot senses the moisture and nutrition content of the farmland and the robot's inbuilt water pump gets switched on during the decrement level in moisture sensor using a relay.

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Table. 3 Comparison of proposed system with existing system.

VII. FUTURE SCOPE

The future scope is Instead of using battery for power supply an alternative method of solar power can be used.We can install a solar panel on the robot which can be charged in the working hours of the robot in the farm land the power generated using the solar panel can be stored in a battery and later we can use it for operation of robot. Modification in the design of the robot will help in achieving the implementation of the robot for large farmlands.

VIII. CONCLUSION

In this project we have developed the automated robot which will perform the function of the seed sowing process in the farmland in the desired interval of space , if

There is any change in moisturelevel then the senor will sense it .If the amount of the moisture in soil goes below the fixed particular level then water pump gets stared automatically using a soft switching method . Here we can use a relay for soft switching purpose. Nutrition content which is essential for crop metabolism is detected using NPK sensor. The readings of the sensor is updated in the think speak cloud using IoT. The signals from the micro processor is continuously updated in the IoT. Instructions given by the user for the operation of robot is achieved using Bluetooth module.

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