

Agro bot

Dr. Chanda V Reddy^[1], Anudheep R^[2], H M Vishal^[3], Harshitha S^[4], Sai Spoorthi N^[5]

Professor and Head, Dept. of Telecommunication, KSIT

Dept. of TCE, KSIT, Bengaluru, India²⁻⁵

Abstract— Agriculture plays an important role in economic status in India. Agro-Technology is the process of applying technology in agriculture sector, which improves the efficiency of the crop produced. Compared to traditional methods this process has various advantages in sowing the seeds. Seed sowing robot is regulated and hand-operated. It slashes the exercise offarmers and increases the potential of seed sowing compared to normal planting. The proposed system is a boon which combines the robotics with agriculture. It is capable of moving around the field and sowing the seeds. It increases the planting efficiency and accuracy rate. Seed sowing robots have been built earlier but the robot which we have built can be used for small agricultural lands, backyards and large terrace farming. It is designed using low-cost equipment. It can be easily available for small scale farmers thus making it user friendly.

Keywords—Soil-Moisture, Bluetooth-controlled, obstacle-detection, Seed sowing.

I. INTRODUCTION

Automation in the agriculture is still in the developing stage due to lack of technical knowledge, advanced technology and machinery. A few years ago conventional methods such as bullock carts were used for agriculture. Later machinery such as tractors, tillers etc. came into existence. But the problem with the tractor is it causes a lot of pollution and consumes large power. As few years passed by and technology started progressing robotics came into existence helping the farmers to reduce their physical labor. Hence using the new technology in farming activity provides greater support to the common people. Seed plantation in day-to-day life is done by tractors in farms. It requires more time and the problem with man power is seen. In present scenario domestic farming is the most common problem people are facing. When compared to large agricultural fields we can use huge tractors, big robots for farming activity. For domestic purpose such as farming in small grasslands, backyards and also large terrace farming big machinery cannot be used. So we require small robots that make the job easier. Controlling of the robot mainly require some means of communication. One of the communication means is the wireless Bluetooth connectivity. The Agro-bot developed performs seed sowing process powered by external power supply and operated with the help of android application.

II. PROBLEM DEFINITION

Considering small areas such as backyards, small grasslands or even large terrace farming, we can neither use conventional method of farming nor can we use skilled farmers. The main problem of farming is seed sowing. Proper seed sowing is very necessary on which the process of plant growth is dependent. Our robot is an obstacle detecting, seed sowing robot which can detect if any obstacle present and if no obstacle is present it will move further thus by sowing the seed. Thus the robot which we have built can be used for domestic purpose but

it can be modified in such a way that it can be used in agriculture fields also. Thus we have a real time solution for a real time problem.

III. LITERATURE SURVEY

It is capable of digging the soil, seeds from the hopper are dropped into the field, and water is pumped from the tank using Arduino Mega [1]. The advantages are It is operating all control systems like ploughing, seed sowing and water sprinkling through an automated seed sowing robot. The disadvantages are Leakage in the water tank causes short circuit. Use of rechargeable battery consumes more energy.

The Bluetooth HC-05 module is fixed on to the robot which receives signals from the Bluetooth electronics app and sends these signals to the microcontroller for processing of operations [2]. The advantages are Temperature and humidity sensors measure temperature and humidity respectively. Soil moisture sensor is used to measure moisture content of the soil. The disadvantages are since a LCD display is used, the values have to be checked every time by the robot itself.

Two pairs of heterogonous sensors were employed to detect obstacles along the trail of the mobile Robot using Arduino Uno [3]. The advantages are the evaluation on the autonomous system shows that it is capable of avoiding obstacles,

ability to avoid collision and change its position. The disadvantages are it is slightly difficult to control without Bluetooth or Wi-Fi.

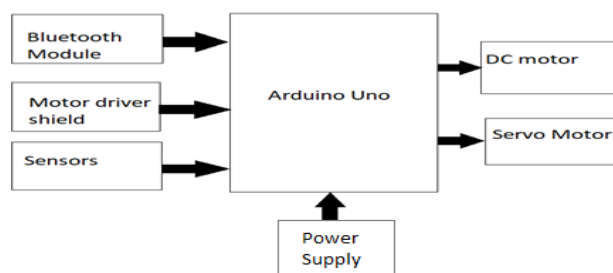
When Object is near the sensor, it measures the distance and gives output When object near the sensor the LEDs are On and when object is away from the sensor then LEDs are Off[4]. The advantages are it can be used as a movable Surveillance System. It can be controlled remotely. The disadvantages are it is use for short distance only. The range of the Bluetooth module is less.

In this project corn cultivation is done. Many different processes in the system likes seed sowing, leveling and water spraying is done using Ardiuno Mega [5]. The advantages Increases the speed of sowing process and accuracy of seed placing .It can measure the space between the seeds. Thedisadvantages It is being restricted to only one kind of seed electrical energy is being consumed due to the batteries which has been used .

IV. METHODOLOGY

The main objective of the project is to enhance the seed sowing process. HC-05 Bluetooth module is used to operate the robot through mobile app. Soil moisture sensor is used to check the moisture conditions of soil. Seed sowing is done with the help of 360-degree continuous rotation servo motor. Ultrasonic sensor which can transmit and receive ultrasonic pulses can detect the obstacles within the mentioned range. The codes required for seed sowing process and to detect obstacle are written and dumped into an Arduino Uno. The controlling system consists of microcontroller, motor driver shield, dc motors and different sensors which is mounted on the model and synchronized with the mechanical part. As shown in the block diagram, input to the Arduino Uno are Bluetooth module, motor driver shield which is used to run DC motors and different sensors. In the output part, DC motors are used for the movement of robots and servo motors are used for seed sowing process and with soil moisture sensor.

BLOCK DIAGRAM



VI. COMPONENTS

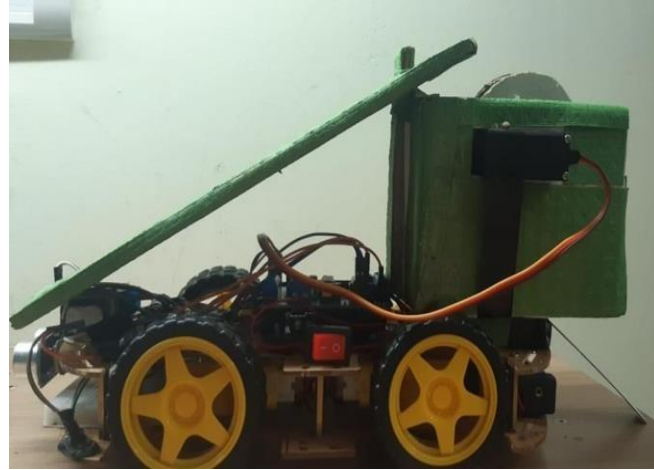
1. Soil moisture sensor--The fork-shaped probe, which has two exposed conductors, works as a rheostat (basically a potentiometer) whose resistance varies in proportion to the amount of water in the soil. This resistance is inversely proportional to soil moisture, meaning that the more water within the soil, the greater the conductivity and therefore the lower the resistance. The less water within the soil means poor conductivity and can end in a better resistance. The sensor produces an output voltage consistent with the resistance, which by measuring we will determine the moisture level.

2. Ultrasonic sensor--An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. By emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound.

3. ArduinoUno--The Arduino Uno is an open-source microcontroller board based on the Microchip Atmega328P. The board has digital and analogue input/output (I/O) pins that can be used to connect to expansion boards (shields) and other circuits. The board contains 14 digital I/O pins and 6 analogue I/O pins, and it can be programmed using the Arduino IDE (Integrated Development Environment) over a USB connection.

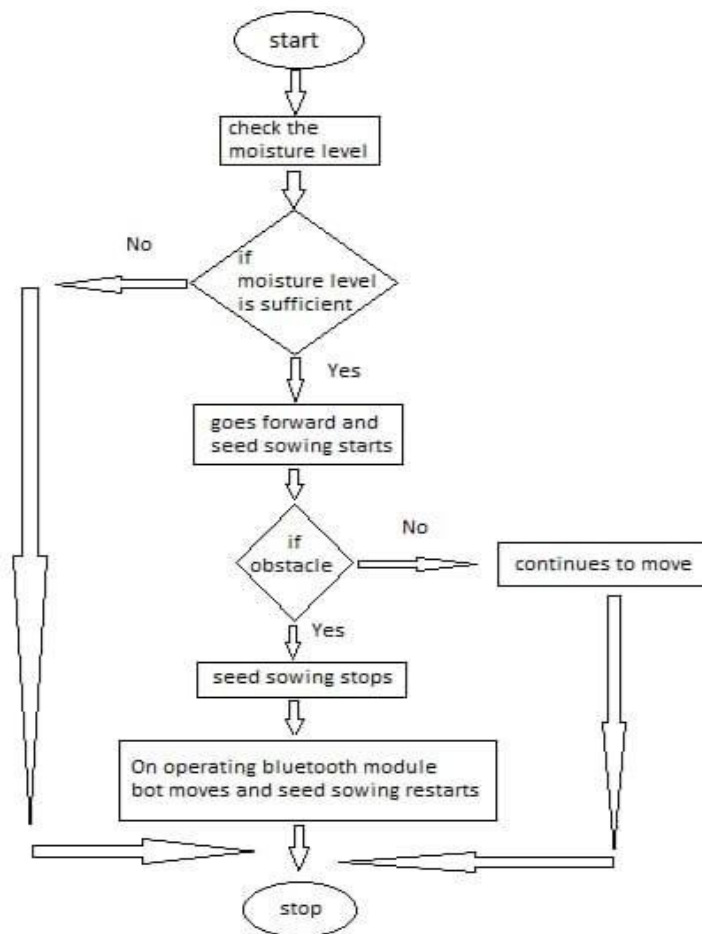
4. Bluetooth module--The HC-05 Bluetooth Module may be a simple Bluetooth SPP (Serial Port Protocol) module that permits you to line up a transparent wireless serial connection. It communicates by serial transmission, making it simple

to connect to a controller or a computer. The HC-05 Bluetooth module allows you to modify between master and slave mode, which suggests you'll use it to send and receive data.



Bot Image

VII. FLOW CHART



VIII. ADVANTAGES AND DISADVANTAGES

Advantages -It reduces human effort and work .It is of Low cost. It is very small in size and light weight which makes it easy to carry. Moisture sensor checks the moisture level of soil which helps us to decide whether to sow the seed or not. No complexity in operating the robot thus making it user friendly.

Disadvantages -The range of the Bluetooth module is very less therefore it is confined to a small area. Only small seeds can be used for sowing.

IX. CONCLUSION

In this system we are operating an automated seed sowing robot .It consists of Arduino At mega 328P microcontroller l293ddriver, battery, servomotor, ultrasonic sensor , soil moisture sensor. Robot will sow the seed on the ground until it finds an obstacle. If the obstacle is found it stops and before sowing the seed on the field it usually turns right thus moving forward. The servo motor is used to enable the moisture sensor into the ground to check the moisture content of the soil and thereby helps in sowing the seeds into the ground.

X. FUTURE WORK

The solar panels can be used to recharge the battery. Waterpump and pesticides can be mounted on the robot.

XI. REFERENCES

- [1] V.Thirumaran , B.Vignesh , V.Vanjinathan “Automation in Seed Sowing by using Smart Agri Robot, International Journal for Research in Applied Science & Engineering Technology (IJRASET), Apr 2019.
- [2] Nagashree R N Asst Prof, Dept. of TE GSSSIETW Mysore India “A Multipurpose Agricultural Robot for Automatic Ploughing, Seeding and Plant Health Monitoring. IETE – 2020.
- [3].Madhavan, S.Vigneshkumar, M.Dineshkumar, Bannari Amman Institute of Technology “AUTOMATIC CORN SEED SOWING PROCESS BY USING MOBILE ROBOT”. International Journal of Advanced Research Trends in Engineering and Technology (IJARTET), March 2017
- [4] Oladimeji Ayamolowo and Samuel Olushola Dada, Afe Babalola University, Nigeria. “DEVELOPMENT OF AN ARDUINO-BASED OBSTACLE AVOIDANCE ROBOTIC SYSTEM FOR AN UNMANNED VEHICLE”. ARPN Journal of Engineering and Applied Sciences, FEBRUARY 2018.
- [5]R.VAIRAVAN [1], S.AJITH KUMAR [2], “Obstacle Avoidance Robotic Vehicle Using Ultrasonic Sensor, Android And Bluetooth For Obstacle Detection”. PSN College of Engineering and Technology Tirunelveli, Feb- 2018.
- [6] B. Annapurna, B. Anusha, S.V.S Prasad, B. Soma Naidu,” Automated Seed Showing Machine Using Atmega2560”. International Journal of Innovative Technology and Exploring Engineering (IJITEE), March, 2019.
- [7] Shalini S, Kalaiselvi S, Logeshwari M, Pavithra P, “Implementation of Farm Weeding and Soil Moisturization Techniques using Agribot”. International Journal of Engineering and Advanced Technology (IJEAT), February 2020.
- [8] 1 M.Aravind kumar,2 Akkarapalli sanjeev reddy, 3 k.sagadevan., “AUTOMATIC SEED SOWING & IRRIGATION AGRIBOT USING ARDUINO”. International Journal of Pure and Applied Mathematics, 2018
- [9] Mrs.R.Thulasimani, “AUTOMATIC SEED SOWING”. International Journal of Advanced Science and Engineering Research, 2018
- [10] Praveen Barapatre, Jayantilal N. Patel , “Determination of Soil Moisture using Various Sensors for Irrigation Water Management”. International Journal of Innovative Technology and Exploring Engineering (IJITEE), May, 2019.