ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

AUTOMATIC SEEDING AND WATERING ROBOT

M. Tejaswini, S. Hyma, N.S. Sravan Kumar, P. Bhuvanesh

K. Lakshmi

kadalilakshmi@gmail.com
Department of ECE, Vignan's Institute of Information Technology(A), Duvvada, Visakhapatnam, Andhra Pradesh, India.

Abstract:

This paper endeavors to evolve a robot capable of performing automatic seed sowing there have been a lot of advanced techniques got included in agricultural sectors; in that automation is one of the genres and this concept is the next level of revolution that will affect this century. Current work focuses on developing Automatic Seed Sowing Robot (ASSR). This helps to reduce human power. Consideration of specific rows and columns distance between two seeds will be entered manually. IR sensors are used to find whether the seed container is empty or not. The ultrasonic sensor is used to detect the obstacle. As this is an electromechanical vehicle DC motors are used to drive wheels. Programming of Arduino is done in assembly language.

Keywords: Arduino UNO, GSM module, Ultrasonic sensor, Motor driver, Bluetooth device.

Introduction:

Agriculture is the backbone of India [1]. For the growth of the country, agriculture plays the dominant role. For developing economic activity for India, it is important to increase the productivity in the agricultural sector. Seeding is a crucial activity for a farmer. Seed plantation is the most important task for the farmers [2]. To make ease seeding automatic seed sowing robot has been developed. To reduce the number of workers these robots can be used in real world [9]. It is capable of performing operations like seed dispensing and water distribution. This device can be in charge by providing input by android application [7]. This also reduces the wastage which happens in manual planting [8].

The manual seed sowing method has different types of problems as those based on human power and conventional old techniques. Humans cannot work in an uncertain environment and they need more time and effort. Automatic seed sowing project reduces time and human efforts. The project aims to increase the productivity and efficiency of agriculture. This project uses Arduino technology. By using the ultrasonic sensor path of the robot will be changed. Gear motors are fixed at the right and left sides of the wheels to drive the robot. IR sensor is used for the indication of seeds and water. The distance between the seeding will be depending upon the type of crop. The robot developed in this paper will perform seeding and watering for the entire crop. These are all controlled by the Bluetooth system present in the android device. For less distance, only Bluetooth will work. If the user is far more than the range of the Bluetooth then the indication alert will be sent to the mobile number directly by the use of the GSM Module.

The major objectives of this paper are [4]:

- To empower the farmer to cultivate huge areas of land within less amount of time.
- To execute automatic watering and seeding by using this machine.
- To issue manual control as a consequence of Bluetooth devices.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

- To estimate in the field using sensors and water sprinklers.

Agricultural planned systems are made use of GPS, Wi-Fi, and remote-controlled systems for the usage and indication alerts. Seed sowing operation is managed by Bluetooth device. The gear motors help in controlling the wheels. The following paper has been written to this extent of the Introduction; Literature survey are followed by Methodology in Section II. Circuit design and Implementation in Section III subsequently results in section IV. Conclusion and references in section V and VI.

II. METHODOLOGY

In this proposed system automatic seed sowing robot is completely controlled based on Bluetooth. Because Bluetooth systems use network signals and signal issues will occur in remote places. So, the systems may not work properly. In this project, this problem is eliminated by using the GSM module. After emptying the funnel and water tank, the direct alert will be sent to the user's mobile through the sim card used in the GSM module. Arduino controller is used to move robot freely in fields [5].

A. Proposed Method:

Arduino UNO is the main component in this proposed method, controller for the whole assembly. Power is supplied through the power pin. This Arduino is operated upon sensors and a battery as shown in Fig 1. The seeds are reserved in a funnel. Whenever the seeding operation gets started seed dispensing operation begins. IR sensor is nearby to perception the number of seeds in the funnel. When the seeds, water go under the threshold level prospective indicator provides alerts to the user.

Block Diagram:

Gear motors were fixed at the four wheels of the robot for the movement of the robot. Seeding is the first step followed by water pouring into each seed. As named in the above block diagram Arduino UNO is used to place the code where software can run and reacts according to the input which have given. The seeds are dispensed through the funnel. Whenever the funnel and water tank reach the minimum seed level Infrared sensor identifies and an indication will send to the user. Bluetooth will send SMS for the user regarding the operations which are performed. If there

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

is any obstacle present while the robot is moving it automatically changes its path by using the U

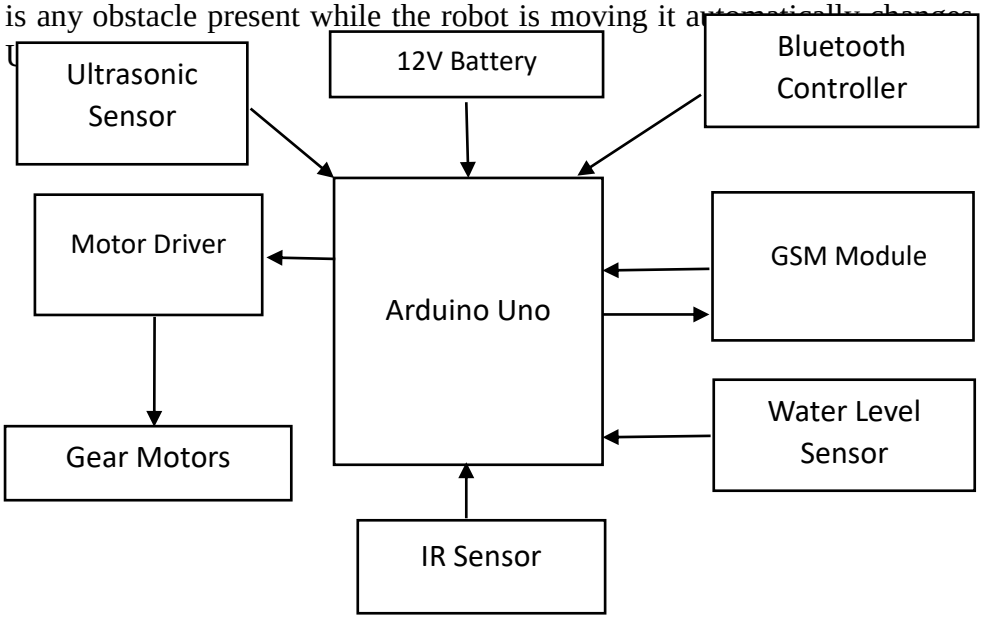
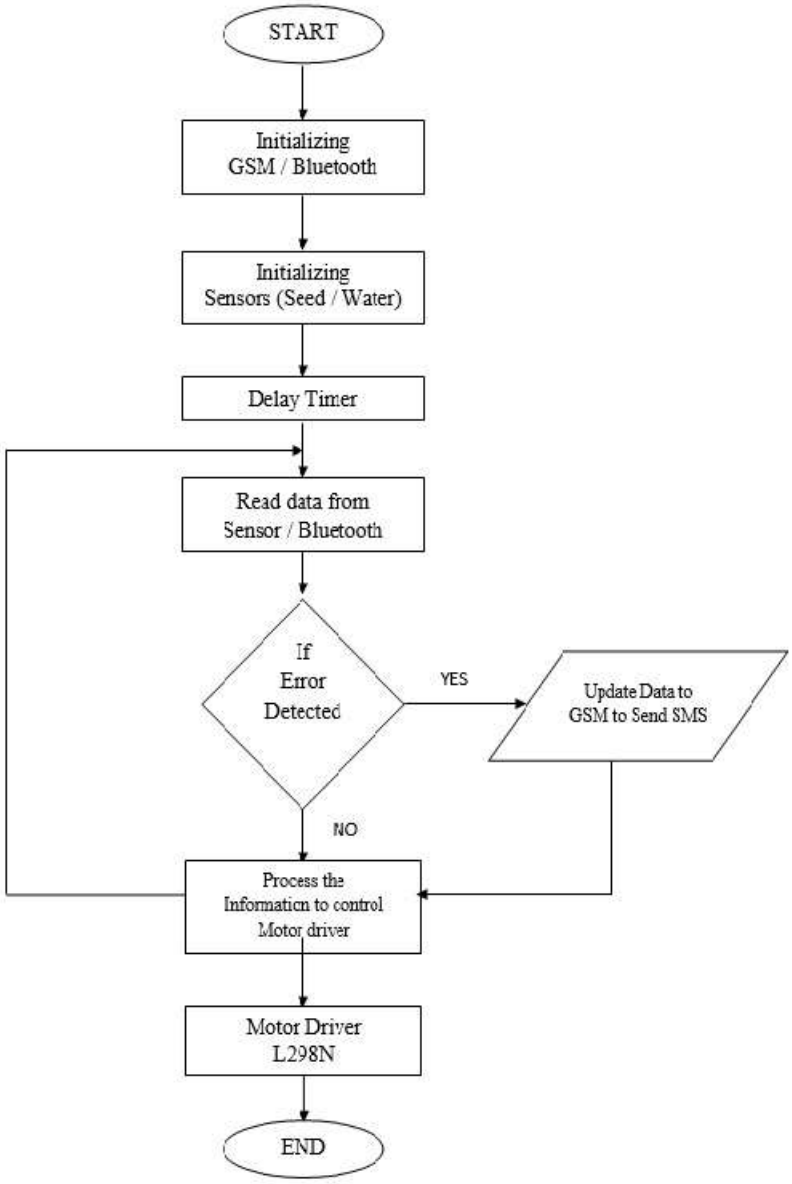


Figure 1: General Block Diagram

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

Flowchart:



The program is implemented in such a way that it can dispense seeds and pour water at a fixed distance which is specified in the program. GSM module and Bluetooth controllers are initialized for communication. Delay is established for certain intervals of time to dispense seeds. The data was read from sensor. If the funnel gets empty then SMS will be sent to the user.

III. CIRCUIT DESIGN AND IMPLEMENTATION

Arduino UNO:

Arduino UNO is the heart of this system as it holds all the commands [10]. It is a primary element of the entire system which is connected to sensors and other components to perform a task. Arduino performs according to the given inputs by sensors. It is used to control gear motors and GSM modules. Arduino UNO consists of 14 input-output pins and micro-controller. It consists of 6 Analog inputs and 6 Digital inputs, a crystal oscillator, and a USB connection. A Programming is done more efficiently to respond to changes accordingly.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

GSM Module:

A global system for mobile communication was created to describe the protocols for the digital cellular networks used by mobile phones. It works on the 2G and 3G communication system's GSM. GSM Module is a chip that is used to establish communication between a mobile device and a GSM system. In this paper, 900/1800MHz frequency is used. Whenever the seeds reach to minimum level an indication will be sent to the farmer's registered mobile number by using the GSM module.

Ultrasonic Sensor:

HC-SR04 ultrasonic sensor is used in automatic seed sowing projects. An Ultrasonic sensor measures the distance to an object using ultrasonic sound waves. While the robot is moving if there are any obstacles ultrasonic sensor senses and tend to change the path of the robot. It works at 40KHz. It detects objects which are having a distance from 2cm to 100cm.

Motor Driver:

Motor drivers act as a bridge between controller and motor. The main function of the circuit is to convert low signal to high current signal. A controller circuit needs an interface to connect with the motor as the motor is a high current device. L298N is a dual H-Bridge driver which allows speed and direction control of two DC motors at the same interval.

Bluetooth Device:

HC-05 Bluetooth Module is a Bluetooth serial port protocol module designed for the serial connection setup. To interface between Arduino UNO and computing device using HC-05 Bluetooth module has done to get the alerts directly. A Bluetooth device can connect up to 7 devices in piconet [6].

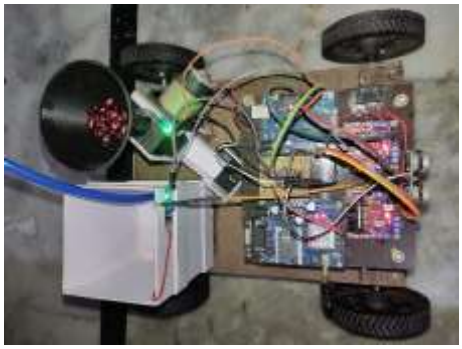
Table:1 Specifications of all components

Specifications	Model	Operating Voltage
Ultrasonic Sensor	HC-SR04	5v
Arduino Uno	Micro-Controller based board	5v
Water level Sensor	LM358	3v
GSM Module	Digital Transmitter and Receiver Using SIM	5v
Motor Driver	L-298N	4.5v-7v
Bluetooth Controller	HC-05	3.6v-6v

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

IV. Results:

The proposed project is constructed using an Arduino UNO board, Ultrasonic sensors, Infrared sensors, Bluetooth module, GSM module, and gear motors. The system will work efficiently with low power consumption. This system is dispensing seeds effectively and provides water. The results of seed dispensing is depending upon the type of land.



V. Conclusion:

The proposed robotic machine is to increase productivity. It has the capability of handling and accomplishing all the tasks. Seed sowing patterns are noticed in variety of atmospheric conditions. All the data is collected by the robot and saved in an android application for future processes. Robotics in agriculture take a part to increase the economy and growth of the country. The research agricultural scientists are mostly working on the substitution of laborers finished by robots. In our country most places are counterbalanced by implementation of robots in the future there is a lot of scope for automatic farming. The main focus of this system is to sow seeds in a proper way which results in proper germination of seeds. This is mainly used for fast farming and done work in an efficient way and this is a portable robot.

VI. References:

[1]. Prakash Kanade and Ashwini P, "Smart Agriculture Robot for Sowing Seed", International Journal of Engineering Science and Computing, Issue: June 2021.

[2]. Vidya Yedave, Punam Bhosale, Jyoti Shinde, Prof. Jagdish Hallur, "Automatic Seed Sowing Robot", International Research Journal of Engineering and Technology (IRJET), Issue: 04 April 2019.

[3]. Avula Likhitha, B.Mamatha, Agamanti Sai Kirn, Dondeti Pranitha, "IOT Based smart agriculture and automatic seed sowing robot, Issue: 02/2020.

[4]. Amrita Sneha, Abirami E, Ankita A, Mrs R. Praveena, Mrs R.Srimeena, "Agricultural Robot for Ploughing and Seeding" , International Conference on Technological Innovation in ICT for Agricultural and Rural Developing (IEEE), Issue: 2015.

[5]. P. Premalatha, Sharath Singh, "Design and Development of Automatic Seed Sowing Robot", Asian journal of electrical sciences, ISSN: 2249-6257, Vol. 8, S1, 2019, pp. 51-54.

ISSN: 2278-4632
Vol-12 Issue-01 No.01: 2022

[6]. J. Govarthini, M.E student, Mrs R. Thulasimani, M.E Assistant Professor, "Automatic seed sowing", International Journal of Advanced Science and Engineering Research, Volume :3, Issue: 1, 2018.

[7]. Prajith A S, Nowfiya B S, Nadeem Nowshad, Muhammad Ashik S, Subi S, Dhinu lal M "Automatic Agricultural Robot – Agrobot",2020 IEEE Banglore Humanitarian Technology Conference (B-HTC).

[8]. Thorat swapnil, Madhu L. Kasturi, Patil Girish V, Patil Rajkumar, "Design and Fabrication of Seed Sowing Machine" International Research Journal of Engineering and Technology (IRJET), Volume: 04 Issue: 09 | Sep – 2017.

[9]. Bhise Sanket Sunil, D.B. Kadam, Kore Vinit Vikas, Kolekar Arun Anand, "Automatic Seed Sowing Robot", Journals of Advancement in Electronics Design Volume 3 Issue 3.

[10]. Bhushan Deshmukh, Durgesh Verma, "Fabrication and Implementation of Automatic Seed Sowing Machine" International Journal of Engineering Sciences and Research Technology, January 2018.