



AUTOMATIC CORN SEED SOWING PROCESS BY USING MOBILE ROBOT

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Abstract - This paper is focused on an agriculture seed sowing process using a mobile vehicle. The integral construction of the robot is made simple to use. Recently in agriculture, the required manpower is not available as well as the aging farmer and increasing world population are causing a threat to the future. Automation in agriculture would provide one of the feasible solutions. For that, we are going to automate the corn seed sowing process. This process has a mobile robot controlled by a Smartphone. This project focuses on developing the mobile robot to minimize the working cost and increase the accuracy of seed planting. A 12v battery is used which gives supply to the overall system of the robot. An Arduino Microcontroller is used as a processor in the robot desired target and a Bluetooth interface is used to navigate the robot.

Key Words: microcontroller, leveling, DC motor, and Bluetooth.

1. INTRODUCTION

In the future less skilled manpower for that, we are automatically the sowing process and weeding process. This robot is controlled that means it moves straight and programmed to the controller when the obstacles are in front of the robot to turn left or right. The robot is fully controlled by the microcontroller and also remote. When the Bluetooth module signal it gives the signal to the transmitter and transfer to a receiver and indicates the signal in the remote. The robot starts running the first hook is front the robot it located in left side and level bar is the back side of the center of the robot. Seed sowing mechanism can be done by DC motor which is placed in the middle of the tank. Spoon wheel mechanism is used to have the uniform distance between two seeds. The Feedback mechanism is used to drive the

motor. It works when the vehicle is going straight line & it will not work while turning the vehicle and changing the row. And the battery is rechargeable by means of the charger. [2] discussed about Intelligent Sensor Network for Vehicle Maintenance System. Modern automobiles are no longer mere mechanical devices; they are pervasively monitored through various sensor networks & using integrated circuits and microprocessor based design and control techniques while this transformation has driven major advancements in efficiency and safety.

2. METHODOLOGY

In this project we are cultivating process can do for corn because overall world corn cultivation major problem occurs. So many different processes in the system likes seed sowing, leveling and water spraying it require more manpower in this area explaining the process is given below

Seed sowing

Seed sowing process is done by rotating the motor in a top of the tank and under the side of the shaft the circular disc the scoop it carries one corn. It takes one semicircle rotation. The distance covered by the robot it takes spacing between the two seeds.

Leveling

Leveling is processed after the sowing another hook gives the corn will level by means of sand. The robot is designed for move forward and turn right or left based on obstacles found from the sensor it may turn left or right based on the space.

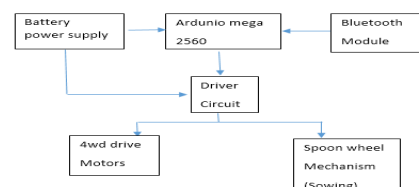


Fig No 2.2 Block diagram



3. COMPONENTS FOR ROBOT

The component which is used in our project is described below.

- 12V Battery
- Arduino mega 2560
- Bluetooth Module
- Driver Circuit
- Motors
- Smart Phone with Application
- Spoon Wheel Mechanism

12V Battery

The battery is a storage device its store the charge and release when if need it. Specification of the battery is shown below.

12V 4.5 Amps/ 20 HR

Rechargeable Value Regulated Lead-Acid Battery

Constant voltage charge (25deg c)

Type	VOLTAGE REGULATION	INITIAL CURRENT
Standby use	13.6-13.8v	Less than 1.35 A
Cycle use	14.00-14.50v	Less than 1.35A

Fig No 3.1 Specification for 12V battery

Arduino mega 2560

Arduino Mega 2560 is a microcontroller board. It act has a controller of the robot. while using a control and connections are simple to use. While uploading the program .remove the input connection after uploading the program reset the board to control. Specification of Arduino mega shown below

Microcontroller	ATmega2560
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	54 (of which 14 provide PWM output)
Analog Input Pins	16
DC Current per I/O Pin	40 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	256 KB of which 8 KB used by bootloader
SRAM	8 KB
EEPROM	4 KB
Clock Speed	16 MHz

Fig No 3.2 Specification for Arduino mega 2560

Bluetooth module

The hc-05 module is easy to pair and communicate with Arduino board. the Bluetooth module is designed for wireless communication and transmitting power up to 4dBm transmit power. Bluetooth is operated by 3.3v

Driver circuit

L293D is a typical motor driver IC which allows the DC motor to drive in either direction. L293D is a 16-pin IC which can a set of four motors simultaneously in any direction. Dual H-bridge Motor integrated circuit(IC).

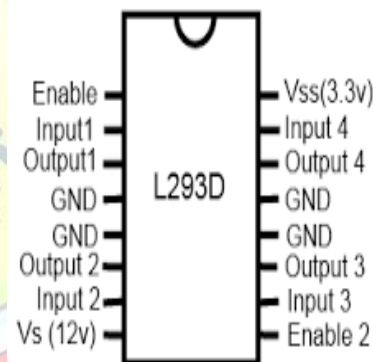


Fig No 3.4 Pin Diagram for Driver Circuit

Motor

Dc motor is used for seed sowing mechanism. it is the fixed center of the tank and motor is operated by 12v. the connections are directly given to battery.

Smart Phone with Application

The Smartphone is used to control or navigate the robot by using android application (Arduino control car).in this application, it has four directions forward, backward, left, right and another option is Bluetooth ON and OFF.

Spoon Wheel Mechanism

Here spoon is fixed to the wheel and wheel is connected to link rod interconnected to the dc motor shaft. When the DC motor rotates at the constant speed in the clockwise direction, corn takes to form the tank and placed in the funnel and dropped it.



4. WORKING PRINCIPLE

When the robot switched on the power supply goes to Arduino controller. In this controller already the program uploaded to a board, it interfaces with Bluetooth module and driver board. The robot is fully controlled by the android application(Arduino control car).seed sowing part is fixed to the top of a board, here spoon wheel mechanism is used to carry a corn from the tank and main drive motor is connected to the mechanism. While rotating the mechanism the corn take place from the tank to a funnel, at the same time vehicle is moving condition. At the bottom in front of the robot hook is fixed in a center and the level bar is fixed same as a rear side.

- I. Hook create a path while moving a robot in a center.
- II. Spoon wheel mechanism is done and corn dropped.
- III. Level bar is fixed at the rear side it levels the soil.

5. SCHEMATIC DIAGRAM

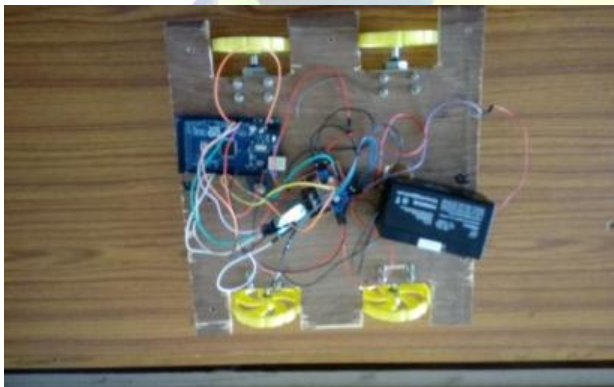


Fig No 5.1 circuit for Robot



Fig No 5.2 Robot assembled setup

6. RESULT AND CONCLUSION

In this paper, the robot is controlled by using the smart phone. we are providing a solution to increases the speed of sowing process and accuracy of seed placing. it can measure by space between the seeds.

7. FUTURE WORK

we are trying to implementing automatic charging by using solar panel. In future process monitoring by camera control system.

8. ACKNOWLEDGEMENT

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9. REFERENCES


- [1] A. Rohokale ,(2004) "International journal of advanced agriculture system with proper seed spacing"
- [2] Christo Ananth, C.Sudalai@UtchiMahali, N.Ebenesar Jebadurai, S.Sankari@Saranya, T.Archana, "Intelligent sensor Network for Vehicle Maintenance system", International Journal of Emerging Trends in Engineering and Development (IJETED), Vol.3, Issue 4, May 2014, pp-361-369
- [3] Ramesh.D, Girishkumar H.P (2014) "Agriculture Seed Sowing Equipments : A Review "International Journal of Science, Engineering and Technology Research (IJSETR)
- [4] Kyada, A. R , Patel, D. B.(2014)" Design And Development Of Manually Operated Seed




onal Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
pecial Issue 7, March 2017

- Planter Machine" All India Manufacturing Technology, Design and Research Conference(AIMTDR).
- [5] Usha.P, Maheswari.V, and Nandagopal.V, (2015)" design and implementation of seeding agricultural robot"Journal of Innovative Research and Solutions(JIRS).
- [6] Swetha S and Shreeharsha G.H,(2015) "Solar Operated Automatic Seed Sowing Machine" International Journal of Advanced Agricultural Sciences and Technology (JJAAS).
- [7] Hannure.O.K. shirsagar.S.P, Kodam.V.S, Patange.O.N, and Nakod.V.S.(2016)" Literature Review on Automatic Seed Feeder" International Journal of Engineering Trends and Technology (IJETT)


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