Autofarming using Arduino

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Abstract – *In this paper we present low maintenance and less human effort seed sowing machine monitoring. Plant nursery is important part of agriculture field and facing many problems. The problems are availability of labours, low productivity rate and more manual efforts required for seed feeding. In plant nursery more time is required for plantation which is due to seed feeding process. For reducing these problems of plant nursery research of automatic seed feeder mechanism is used. Thus we made sowing machine which is operated manually but reduces the efforts of farmers thus increasing the efficiency of planting also reduces the problem encountered in manual planting. For this machine we can plant different types and different sizes of seeds also we can vary the space between two seeds while planting. This also increased the planting efficiency and accuracy.*

1. INTRODUCTION

A robot is handled in electro-mechanically to do operations precisely but quicker way. They have substituted human beings in performing perilous tasks which humans desire not to do, or are incompetent to do. Robot is modern autonomous robot which will move according to the will of operator. An Agri-bot is the robot which can accomplish agricultural tasks. Different types of robots can be used to do functions like spraying, fruit picking etc in the farm. This review has surveyed various aspects of the progress made so far in vision for mobile robot indoor and outdoor navigation.

Climate conditions in an agricultural environment such as field or greenhouse, the sensor station can be prepared with several sensor elements such as Temperature, humidity, light, air pressure, soil moisture and water level. The robot gave good results on different terrain, different heights crops for spraying operation. Its low cost, ease of handling and easy maintenance makes it suitable in agricultural production. Many technologists are trying to develop technology based on automation which is robust, effective and faster

An algorithm is developed which controls the vehicle remotely and safely. The communication between the client and the rover is established based on the connection parameters specified by the operator. Those computers are connected to the WiFi which will pass on serial data and also communication is established between one computer located near the robot and a microcontroller present, which controls its motion. Wireless communication plays an important role while controlling from large distances.

2. LITERATURE SURVEY

Mahesh r. pundkar ijess volume 3, issue 3. issn: 2249-9482, international journal of engineering and social science.

Summary :- stated that the seed sowing machine is a key component of agriculture field. High precision pneumatic planters have been developed for many verities of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path, in seed spacing.

Conclusion: - "frontline demonstration on bullock-drawn planter enhances yield of soya bean crop.

P.P. Shelke international journal of farm science.

Summary :- states that bullock drawn planters are becoming necessity for sowing as the skilled workers for sowing are almost diminishing. Planting distance and plant population are crucial factors in maximizing the yields of crops.

Conclusion: - "effects of sowing method and seed rate on growth and yield of wheat",

Umed ali, soomro world journal of agricultural sciences, vol. 5, no. 2, pp. 159-162

Summary :- In pakistan has evaluated three sowing methods and seed rate in a four replicated rcbd method and concluded that drilling method of sowing at seed rate 125 kg/ha is optimal for yield and quality of wheat grains.

Conclusion: - because the seed sowing method and seed rate distribute seed uniformly and desired depth which provide appropriate depth for seed germination and crop establishment.

3. EXISTING SYSTEM

At present most of the seed sowing machines are consuming too much of fuel which increases the cost of cultivation. For a farmer it is less economic .It is necessary to have a mobile and less heavy seed sowing machine with less maintenance cost.

4. PROBLEM STATEMENT

The traditional method of seed sowing process is associated with more human effort. It is difficult to achieve uniform soil depth for seed placement and to obtain uniform distance

between the seed placement. The seeds will not germinate if the depth of the seeds placed is more. In order to overcome these limitations in the existing process, Ultrasonic Sensor and Digital Compass Sensor are used with the help of Wi-Fi interface operated on Android Application to manoeuvre robot in the field. A robot is developed that can perform the seeding operation autonomously. This brings down labour dependency.

5. BLOCK DIAGRAM
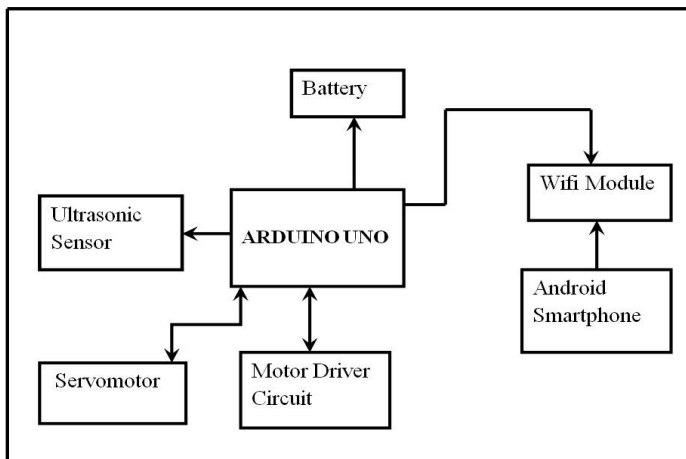
6. METHODOLOGY

The agribot is started through the initialization of WiFi module. Android Application developed using BLYNK App Inventor. The selection of wireless technologies are depends on the type of application to be developed, apart from that it has to consider the following: range, frequency and data rate. After that robot can start moving forward and performs various operations like seed sowing and simultaneously digging operation is performed as the sharp pointed iron plough is attached on the front of agribot and supporter is connected at the back so that removed soil is covered.

If obstacle is detected by ultrasonic sensor, it will stop the agribot and the seed sowing operation.

Servomotor is used to sow the seeds at constant distances. The distance between seeds can be altered by altering the program.

As the servomotor moves its arm and opens the tube opening, the seeds slide from the funnel and gets buried in soil.

Forward and backward motions of the machine is achieved by the 4 well programmed DC motors which are connected to Motor driver circuit. Tyres are attached to shaft of DC motors which forms strong grip to machine on land.

After the completion of seed sowing operation the machine is terminated by using mobile app and then power supply to Arduino is removed manually.

7. COMPONENTS REQUIRED

- Arduino Uno

- Motor driver circuit LM 292

- Servo Motor

- Wifi model ESP8266

- Android smartphone

- Funnel pipe setup

- Ultrasonic sensor

Arduino Uno

Arduino UNO ATMEGA 328 is chosen as MCU.. This is microcontroller board which uses the ATMEGA328P This Uno board is different than all other previous programming boards. The ATmega328 has 32 KB with 2 KB of SRAM and 1 KB of EEPROM. The module is programmed in such way that it transfers signals to the Arduino board. Arduino board will act as input source to the motor driver circuit (L293N) which drives motor and motion is achieved.

Ultrasonic sensor

As shown above the **HC-SR04 Ultrasonic (US) sensor** is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that

Distance = Speed × Time

Servomotor

To make this motor rotate, we have to power the motor with +5V using the Red and Brown wire and send PWM signals to the Orange colour wire. When the on-time is 1ms the motor will be in 0° and when 1.5ms the motor will be 90°, similarly when it is 2ms it will be 180°. So, by varying the on-time from 1ms to 2ms the motor can be controlled from 0° to 180°

Motor driver circuit

L293D is a monolithic integrated, high voltage, high current, 4-channel driver. Basically this means using this chip you can use DC motors and power supplies of up to 16 Volts,

thats some pretty big motors and the chip can supply a maximum current of 600mA per channel, the L293D chip is also what's known as a type of H-Bridge. The H-Bridge is typically an electrical circuit that enables a voltage to be applied across a load in either direction to an output

DC Motor

A DC engine is any of a class of revolving electric machines that change over direct current electrical vitality into mechanical vitality. The most widely recognized writes transfer on the power deliver by attractive field

Wifi module ESP8266

ESP8266 is an UART-WiFi transparent transmission module with ultralow power consumption, specially designed for the needs of a new connected world. It offers a complete and self-contained Wi-Fi networking solution, allowing it to either host the application or to offload all Wi-Fi networking functions from another application processor.

8. SOFTWARE REQUIREMENTS

- **Arduino IDE**
- **Blynk app**

9. CONCLUSION

The vision of this paper is to create an open and accessible technology aiding. The paper aimed at not only extend the advanced technology in agriculture but also make things easier for the farmer. This robot is user friendly and easy to handle. The Agri-bot Project has the potential to revolutionize the way humanity produces food both on the small and large scale. As the vision states, the project aims to create an open and accessible technology enabling everyone to grow food and to grow food for everyone. However, revolution will not be the defining metric of success in the short term. Dept. of Electrical and Electronics Engineering

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