

REVIEWING AND MODELLING OF SEED SOWING MULTIPURPOSE ROBOT TOWARDS SMART FARMING

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Abstract:--- In India, 70 percent of individuals and 82 percent of farmers betting on agriculture. India is the largest country for 25 percent of world production and 27 percent of world consumption of agriculture products. Now daily farmer spends extra money to provide agriculture product by investing high wages for labors and manpower. During this agriculture sector, while we use the supporting machines that need manpower to perform sowing and farming. But the supporting machines consume more cost, time and fuel. So, we commit to introducing automation robots within the agriculture field to scale back up revealed shortcoming problems. This paper cracks to progress a robot that executing operations like automatic excavation, seeds dispensing and irrigate. The robot travels onward for excavation and seed dispensing. After completion of the whole process, the robot automatically goes to the OFF stage. Farmer spends extra money on machines it helps them to decrease labor and increase yield but profit and efficiency are very less. Hence the automation is the ideal solution to beat all shortcomings by creating a machine that performs multiple operations and automates it to extend the yield on an outsized scale and reduce the manpower cost.

Keywords--- Agriculture Robot, Sowing robot, Farming, Excavation robot, Irrigation, Seeds dispensing robot.

I. INTRODUCTION

In India generally, the normal seed sowing methods may include the utilization of animal-drawn funnel and drilling using the tractor. The most reason for developing Agriculture Automation Technology is lessening the time and price of food production. Today, Internet application development demand is extremely high within the agriculture field. So, the Internet of Things may be a major technology by which we are able to produce various useful internet applications to attach with the farmer for performing and monitoring the Agriculture ground.

The Internet of Things (IoT) is a system. It's interconnected to the computing devices, digital machines, animals or people, the flexibility to transmit data over a network with no need human-to-computer interaction.

IoT may be a network therein all physical substances are connected to the net over network devices and sharing data. These IoT devices gather useful data with the assistance of assorted current pieces of knowledge and share that data between other devices.

Robotics may be a division of engineering that involves conception, design, creation, and operation of robots. The Robotics field overlaps with electronics, engineering, and computing. The term robotic automation sits down with the automation of business and business methods using robots of several presences.

Agribot is one of the Automation processes for

performing seed sowing and irrigate. The mixture of Robotics and IoT is that the main source offeat offer solutions in precision agriculture to processes associated with excavation, seeds dispensing and irrigate. The robot twitches its role through plowing the sector, then sows the seeds within the plowed area and ends the method by covering the seeds sown with soil. It's an ultrasonic proximity sensor to avoid the obstacles within the path. The most components are the Arduino Uno microcontroller that supervised the whole process within the system.

The ultrasonic sensor continuously sends the information to the microcontroller which is the place to excavation. As per the condition when the robot reaches the ridge it'll move right or left for performing the identical excavation process within the field. The completion of the whole process robot automatically sends the message to the farmer. The method of soil down, to shut the seeds and level the bottom by sending a message using Bluetooth. The robotic system plays an immense role in altogether sections of societies, organizations, and industrial units. The target of the project is to develop an automatic system that helps in on-farm operations.

II. LITERATURE SURVEY

The author [1] discussed two main issues in modern agriculture that are high times and high labor costs. This project developed with a far off controlling automatic seed planting system. IoT methodology is accustomed to develop the robot for seed dispensing. the whole system controlled by the AVR microcontroller. This robot system decreases high cost and also decreases the time by utilizing solar power supply to run the robot.

The author said about the proposed system [2] objectives at design automatic sowing robots within agriculture farming. The whole process supervised by the AVR Atmega microcontroller. The robot proceeds to plow the whole land and concurrently dispensing the seeds. Bluetooth pairing app as an effective device and supports within the direction-finding of the robot outside the land. The GSM unit sends a typescript message to the agriculturalist updating him about the break within the point. The farmer then responses via SMS to either change on the water sprayers or disrespects the alert.

The aim of the designed system [3] is to seeding, fertilizing and soil PH, temperature, moisture, and humidity checking. The

robot is controlled by remote. The designed robot system includes map reading to the destination successfully. The robot's direction is controlled via remote. The robot and therefore the remote system is connected through the net system. 4 DC motors are used for navigation of the robot. The speed of the DC motors is controlled using the micro-controller. The solenoid device is employed to regulate seeding and fertilizing.

This paper [4] developed a robot performing independence operations like plowing, seeding, fruit picking and pesticide spraying within the agriculture field. The AVR Atmega microcontroller that supervises the whole process. The robot proceeds to plow the whole field and simultaneously dispensing the seeds. The robot operates on automated mode for plowing only within the agriculture land, outside of the sector it's strictly operated in guide mode. For manual control, the robot uses the Bluetooth pairing app as an effective trick and helps within the navigation of the robot. The alerting device may be a GSM module that sends a typescript message to the agriculturalist informing him about the breach within the point.

In this Agribot [5] designed to reduce the labor additionally to growing the speed and accurateness of the work. It performs the first functions involved in farming that are plowing the sector, spreading seeds and covering the seeds with soil. The robot is self-directed and offers the power for optional switching of the plowing system when essential.

Agribot during this project [6] is meant to perform the sowing process only. The robot successfully covers distances between crops and their rows. The direction-finding technique using IR sensors is less complicated and fewer immense over other existing agriculture robotic systems. The exposure area by the robot is controlled thanks to its requirement on DC battery.

The Author's proposed system [7] purposes at designing multiuse agricultural robotic for plowing, seeding and irrigation systems. The drives of the proposed system are to excavation the soil counting on wetness level within the soil, to plow the seeds with projection's like structure at the top to show the highest layer of soil down, to shut the seeds and level the bottom mechanically and to deliver irrigation system by spraying water with a pump within the field.

In this existing paper [8], design for a mobile robot for sowing seeds autonomously on prepared land. The drive is provided by caterpillar treads for traversal on the rolling field. The robot navigates the land using the inputs from a magnetometer and therefore the accuracy of direction is enhanced by breastfeeding this input to a Proportional Integral (PI) Controller. It further employs an ultrasonic sensor for noticing the top of the sector. The seeds are sown by the robot in evenly spaced rows with each point where a seed has been dropped intermediate from the successive point. The device consists of a modular structure providing satisfaction for maintenance. Overall, the proposed device displays considerable efficiency in power consumption, making it

appropriate for the sector of agriculture.

In the field of agriculture [9], plantation begins with plowing the land and sowing seeds. For plowing, this robot is given tentacles attached with saw blades. The sowing mechanism initiates with long-toothed gears actuated with motors. the whole body is split into two portions the tail part acts as a container for seeds. The successor holds on all the microchip technology used for automation and actuation. The movement is given wheels covered under conveyor belts. Gears at the rear of the robot rotate at equal speed concerning one another with the saw blades. for every rotation, every tooth on gear will take seeds and can drop them on the sector. Camera at the frontend trail for each fixed distance monitoring and perform seed dispensing.

The authors proposed [10] a system that aims at designing multipurpose autonomous agricultural robotic vehicles that are controlled by GPS and magnetometer for plowing, seeding, leveling, and message indication to begin irrigation. Bluetooth module and GSM are accustomed to communicate with Arduino about utilizing the robot for a specific operation. The targets of the proposed framework are to tunnel the grime relying upon wetness level within the dirt, to furrow the seeds with teeth resembles structure toward the conclusion to show the most effective layer of soil down, to shut the seeds and level the bottom consequently and to relinquish water system framework by sending a message using GSM module.

III. PROBLEM STATEMENT

In the existing paper, the author used remote controlling technology to work the robot for seeding function. During this proposed paper will help to develop a robot for automatic seeding function. The robot handles the multiple processes within the agricultural field like plowing, seed dispensing and irrigation in a very single system. The robot analysis the sphere distance using an ultrasonic sensor when it reaches the top of the ridge it'll change its direction using DC motors and again it'll perform its seeding process. At the identical time, it'll perform a plowing and irrigation process also within the land. Continuously the robot performs the seeding function at the top of the session it'll automatically attend the OFF stage.

IV. METHODOLOGY

A. Block diagram

The diagram consists of an ultrasonic sensor, servo motor and Arduino Uno which are serially connected. Arduino receives an input when the ultrasonic sensor denotes the top of the sphere. Arduino Uno is employed in controlling the general operation of farming operations through the relay. From the Arduino, the signal is transmitted to the robot. There are four steps to work. During this way, the robot performs a dispensed agricultural task on getting instructions or signals through sensors.

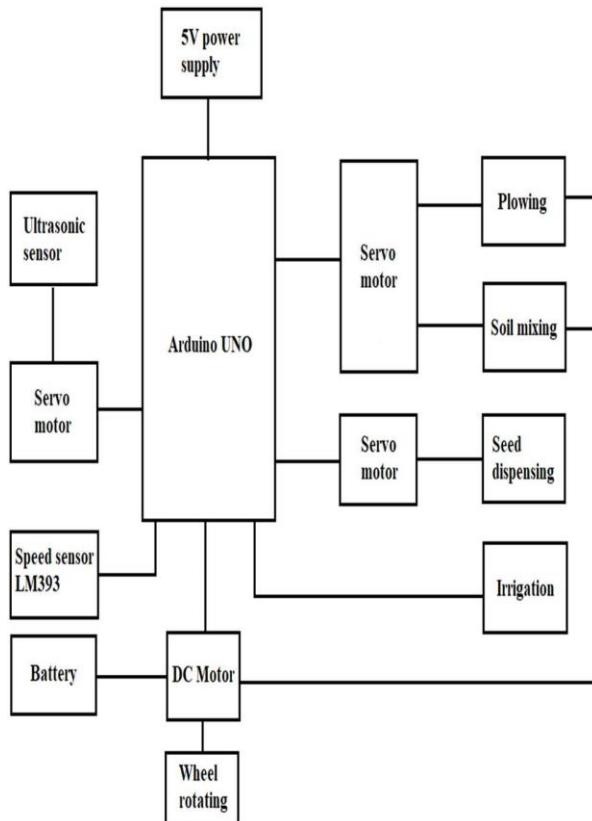


Fig.1. Block diagram of the proposed system.

B. Working

In the robot push the beginning button it'll be connected with the ability supply of the Arduino board. When the system gets the ability source it'll perform the automated seeding function. The Arduino Uno is the controller of everywhere the system. it'll manage all functions within the robotic system. The ultrasonic sensor sends the message to the controller if there any obstacles are found within the Infront of the robot within the field. When the controller gets any input from the ultrasonic sensor it'll perform that obstacle avoidance action within the field. The robot moves within the field it'll stop every 15CM for the seeding process. The robot continuously performs the plowing and mixture of the soil process.

Two relays are used for grass cutting a whose opening and shutting terminals are shorted so connected to 12v battery and also the other terminal is connected to the motor. Here dc motors are interfaced with blades. A relay is an electrically functioned shift accustomed to controlling a circuit. In a relay, two pins out of 4 pins are connected to Vcc and ground. the opposite two pins are connected to Arduino as assigned within the program which is meant for the look model. Water tanks and pumps are used for water spraying operations. When the switch is pressed, the water spraying operation will happen. Here pump is connected to the dc motor to perform the water spraying operation smoothly, which successively connected to relays. In relay two of the pin, terminals are shorted so connected to 12V battery et al. are connected to Arduino. Thin iron rod-shaped nails are bunched together to perform the plowing operation.

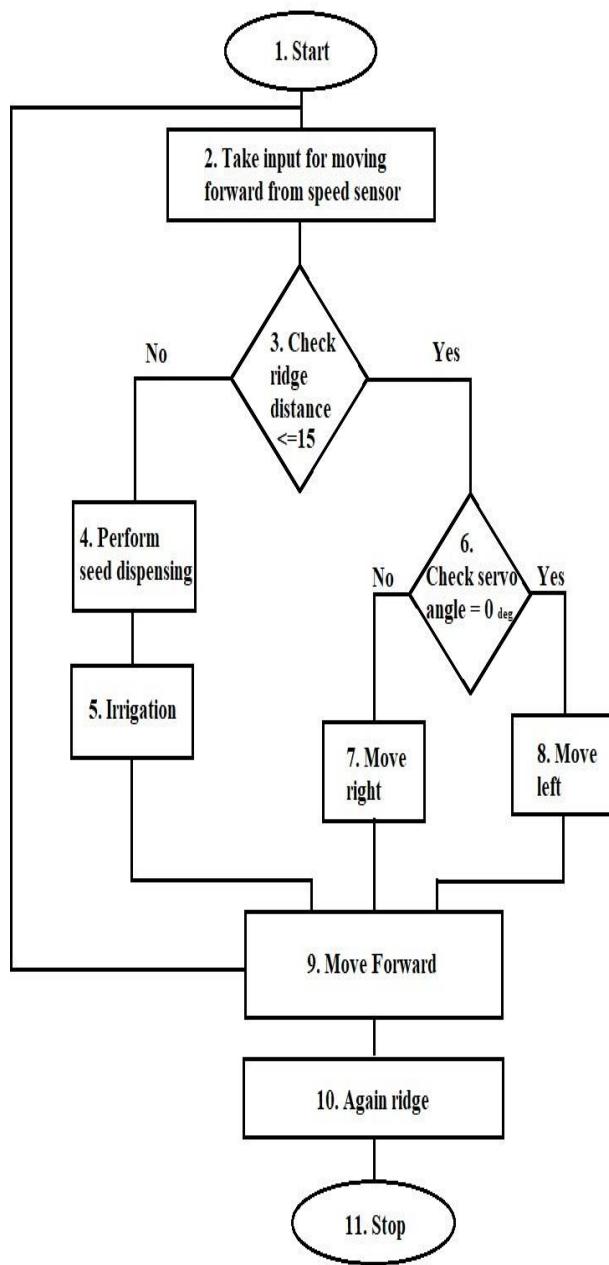


Fig.2. Flowchart of the proposed system

C. Hardware Requirements

- ❖ Arduino Uno
- ❖ DC Motors
- ❖ Servo Motors
- ❖ Photo Interrupter Speed Sensor Module LM393
- ❖ Ultrasonic Module HC-SR04
- ❖ Water sprinkler

V. CONCLUSION AND FUTURE DISCUSSION

In this paper, the automated agricultural robot needs to increase productivity with high performance. The chassis handles the hardware across on Agribot which may perform each operation dexterously and effectively. All the information

collected from the Agribot sent to the Arduino receiver to controlled the system successfully. As we are able to perform multiple operations in a very single system it gives cast an efficient system. The Agribot gives compacts are low power and low-cost system with effective output. during this Agribot perform multiple operations in a very single system. the method of Seed sowing, plowing, rotating, irrigation is performed by the robot. In future system will performs with the grass cutting, fertilizing and picking agriculture products. The longer-term system may include image processing to identifies the obstacles, the ridge of the sphere and agriculture product. the complete process of seed sowing and farming is performed by one Agribot.

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