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EXPERIMENTAL INVESTIGATION ON AUTOMATIC SEED SOWING MACHINE USING IOT

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ABSTRACT

India is an agriculture based country in which, 70% of people depends on the outcome of farming. But if we observe that with increase in population the farm gets distributed among the family and because of this, farmer in India held averagely only two acre farm. Also economically, farmers are very poor due to which they are unable to purchase tractors and other costly equipment hence they use traditional method of farming. Basically, many farmers in India also use bullocks, horses and he-buffalo for farming operation. This will not satisfy need of energy requirement of the farming as compared to other countries in the world. So we are thinking that human and animal efforts can be replaced by some advance mechanization which will be suitable for small scale farmer from economical and effort point of view. So we are developing this equipment which will satisfy all this need and to solve labour problem. In this equipment we used ploughing rod, seed sower and land levelling attachment. This machine performs the operation (ploughing, sowing) which is used for small scale farming. As a added advantage this machine is operated with the help of electric drive which is controlled from an internet through internet of things (IOT) concept. By using above attachments one may perform various farming operations in less time and cost with reduced man power resource.

Keywords: ***Agriculture, Agro-Machinery, Internet of Things, Work-Efficiency***

INTRODUCTION

Agriculture has been the backbone of the Indian economy and it will continue to remain so for a long time. It has to support almost 17 percent of world population from 2.3 percent of world geographical area and 4.2 percent of world's water resources. The present cropping intensity of 137 percent has registered an increase of only 26 percent since 1950-51. The net sown area is 142 Million hectare. The basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agricultural and climatic conditions to achieve optimum yields and an efficient sowing machine should attempt to fulfil these

requirements. In addition, saving in cost of operation time, labour and energy are other advantages to be derived from use of improved machinery for such operations. A traditional method of seed sowing has many disadvantages. This paper is about performing different agricultural operations with the help of single vehicle setup which can perform simultaneous operations.

OBJECTIVES

To make the machine to help the farmers. To make the project cost efficient to the customers. To reduce the wastages of seeds during plantation.

LITERATURE SURVEY

Fabrication of automatic seed sowing using IOT [1] -Senthilnathan N, Shivangi Gupta, Keshav Pureha and Shreya Verma- Agro technology is the process of implementing the recent technologies to develop the crops that are being produced. The use of agro technology not only helps in improving the efficiency of the crop that are being produced but also helps in developing devices that are suitable for doing mechanical works in the fields.

Development of IOT Controlled Agri-Rover for Automatic Seeding [2] -Aditya Vishwas Kanade , Arockia Selvakumar A , Dnyanesh Jalamkar- Agri rover is the best solution to meet the rising demand on quantity and quality of agriculture products and declining labor availability in rural farming areas. The main aim of the designed system is efficient utilization of resources and to reduce a laborious work. Method: The seed sowing operation is performed by the system using servomotor mechanism controlled by ARDUINO controller and robot motion is controlled by Internet of Things (IoT).

Automation in Seed Sowing by using Smart Agri Robot [3] - V.Thirumaran , B.Vignesh ,V.Vanjinathan- The conventional seed sowing machine is considered to have less efficient and requires lots of human effort. Implementing automation in farming may provide feasible solutions. The purpose of automation is to eradicate the human clerical effort and to provide accuracy in the operations. This robot is capable of digging the soil at a certain depth and the seeds from the hopper is dropped into the field at a particular time interval in order to achieve the seeds spacing and proper compaction over the seeds.

Seed Sowing Robot [4] - Krunal Gandh ,Shubham Patil , Mahima Chaudhari , Hetal Patel , Bhushan Patil- Automation can proficiently moderate the amount of manual labour, and make farming easier and faster, leading to more agricultural growth. The idea of automation is prolonged to the farm houses and agricultural farms. Many features of the farm are automated, which consist farm products, auto-irrigation cycles, automatic seed sowing and controlled enclosures for livestock

Problem Identification

- By using seed sowing machine the wastage of seeds in the field can be decreased
- Pollution free handling which is also helpful for crops.
- Instead of water liquid fertilizers can be sprayed.
- Reduces labour charges and time consumption.

- The maintenance and fabrication cost is cheap.

Components of Machine

The following components are mainly used in automatic seed sowing machine using iot

Basic Components

A Seed sowing machine is constructed using the following components:

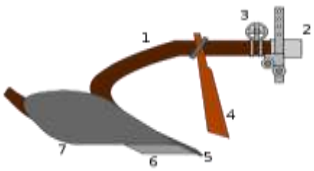
D.C. Motors

It is used in the model to drive the front wheels which further drives the distributer.

Seed Distributor

It consist of fluted rollers which are driven by rear wheel with the help of belt and pulley**.**

Cultivator



The work of the cultivator is to tilt the soil to the required depth so the distributer mechanism can sow the seed.

Chain and pulley drive

For transmission of power from motor to wheels belt and pulley drive is used in the machine and also to drive seed distributer.

The material used in fabrication of the machine is mild steel grade (MS).

Electrical Components

For automating the seed sowing operation the following electrical components are used:

- Single channel relay
- Step Down module
- Wi-Fi-ESP8266 microcontroller

- Jumper wires
- Battery (12 V)

DESIGN OF THE EQUIPMENT

The seed sowing vehicle is designed based on two criterion. One is to keep the design in such a way that the working is as simple as possible and the other is to maintain low weight of the frame and reducing the number of pulleys used. The figure 2 shows the model of the seed sowing machine developed using Solid works software. The optimum position of the components is decided through the help of the software model.

Fig.1.View of the equipment

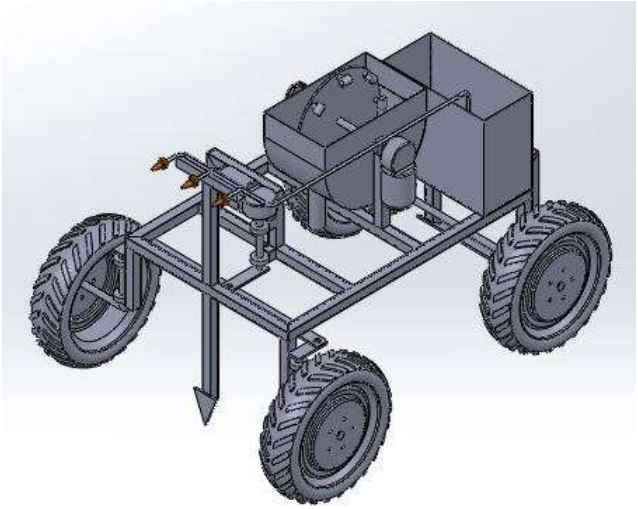


Fig.2.3D view of equipment

WORKING PRINCIPLE

When the operator logged in the web page of seed sowing setup with respective web link and the power supply for activating entire module is turned on through manual interaction. Once the operator activates the key to rotate the drive, it causes the vehicle to move on the field through the rotation experienced by the drive. By activating the steering drive, turning operation is performed. Initially the ploughing rods get contacted with the

ground surface according to the ploughing depth, soil ploughing operation is performed. The rotation of DC motor also makes the metering plate to rotate about its fixed axis and causes the seeds loaded inside the hopper to discharge on the fields. The water spraying operation is performed by the activation of DC pump which sucks the water from the reservoir and discharge with high pressure on to the field. At last with the help of levelling lever ploughed land gets leveled.

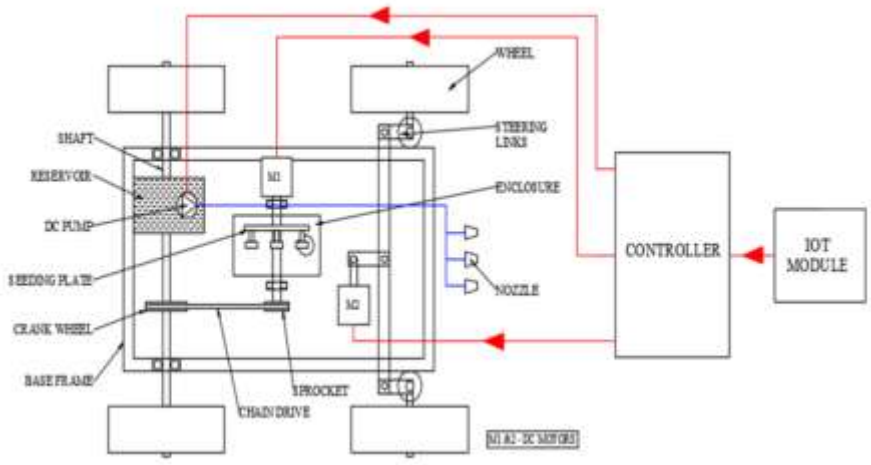


Fig.3.Block diagram of equipment

RESULTS AND DISCUSSION

The seed sowing machine has been designed and fabricated and the process of seed sowing is automated using Iot in order to minimize the human effort. The modification in the selection of the micro-processor is done to achieve wireless connectivity between machine and the controller. ESP8266 has been used in order to host an application from another application processor. Relay is used to control a high- voltage circuit using a safe low-voltage circuit. The cultivators tilts the soil as machine moves forward and the seeds are dropped at regular intervals into the soil through distributer mechanism which consist of hopper and seed flow system. Thus, the model fabrication and its automation have been done to overcome the difficulties of farmers by achieving regular distance between rows and consecutive seeds.

CONCLUSION

This seed plantation machine has great potential for increasing the productivity of the planting. Till now tractor was the main traction unit for nourishment in farming. With the adaptation of this seed planting machine its purpose will be done. Hence there is need to promote this technology and made available to even small scale farmers with affordable prices. This machine can be made by raw materials also which saves the cost of whole project and is easily manufactured in available workshops. The only cost is of metering device and sensors. Hence by using this machine we can achieve flexibility of distance and control depth variation for different seeds, hence usable to all seeds.

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