

Automation in Agriculture Using Agrobot

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Abstract

In India, nearly about 70% people are dependent upon agriculture. So the agricultural system in India should be advanced to reduce the efforts of the farmers. Various number of operations is performed in the agricultural field like seeding, weeding, weed cutting, ploughing etc. Very basic and significant operation is seeding, ploughing, weed removal. But the present methods of seeding, ploughing and plant cutting are problematic. The equipments used for seed sowing are very difficult and inconvenient to handle. So there is a need to develop equipment which will reduce the efforts of the farmers. This system introduces a control mechanism which aims to drop seeds at particular position with specified distance between two seeds and lines while sowing. The robotic arm helps in weed removal. Therefore, the drawbacks of the existing system will be removed successfully in this automatic machine.

Index Terms-Seed sowing, ploughing,weed removal.

I. INTRODUCTION

In the earlier days, there wasn't much of technological advancement. So the farmers performed seeding, ploughing and plant cutting by hand. But in recent times, technology has fairly advanced, so now it's not necessary to do seeding in sunlight. By using robot technology one can sit in a different location or a shaded place and can do seeding by monitoring the robot motion. Today's agricultural field demands to find new ways of agricultural operation to improve performance efficiency. In the field of agriculture various problems are faced by the farmers in the operations like seed sowing, ploughing, and waste planet cutting, weeding. Also the equipments used to perform the operations are very heavy. Due to migration of humans to the cities, there is very little labor available. Robotics technology plays a paramount role in all sections like medical field, industries and various organizations. In other countries robots are used to perform different operations in the agricultural field. We can make use of the available technologies and the robotics technology in the farming system to reduce the efforts of farmers and also to reduce time, energy and required cost.

II. LITERATURE SURVEY

1. Mahesh R Pundikar – A review: MultiseedSowing Machine, IJESS Volume 3, Issue 3.

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Mahesh R. Pundikar et al [1] studied the performance of seeding, ploughing and plant cutting devices by using image processing algorithm using flash magic. They also studied the effect of seed depth, seed spacing, miss seeding ratio and performance seed sowing device on germination of seed and efficiency of yield crop.

2. AdityaKawadaskar- Review method of seed soil and concept of multipurpose seed sowingmachine , IJPRET , 2013; Volume 1(8): 267-276

Adityakawadskar et al [2] redesigned and tested the seed sowing machine using CAD package like PROE. They concluded that multipurpose seed sowing machine maintain row spacing, control seed and fertilizer rate, control the seed and fertilizer depth.

3.B.Mursec – Testing of quality of sowing by pneumatic sowingmachines , JAMME, Volume 26 , Issue 1 , January 2008

B.Mursec et al [3] presented two sowing machines pneumatic vacuum sowing machine OLT and pneumatic pressure sowing machine Aeromat-Becker for interval sowing, differing in the mode of operation for cultivation of sugar beet. They concluded that on the pneumatic vacuum sowing machine OLT the optimum distance between seeds in the sowing row is reached with 4.5 - 8 km/h speed and on the pneumatic pressure sowing machine Aeromat - Becker with 4.5 - 10 km/h.

4. Joginder Singh – Study relating to formulating long term mechanization strategy for each agro climatic zone in India

Joginder Singh [4] studied the effect of farm mechanization on Indian economy. He concluded that Production and productivity cannot be enhanced with primitive and traditional methods. Thus, selective mechanization is the need of the future.

5. Shivaprasad B S , Ravishankara M N , B N Shoba – Design and implementation of seeding and fertilizing agriculture robot , Volume 3 , Issue 6 , 2014

The agricultural robot can be controlled by the Internet using Raspberry Pi. Live streaming can be seen in the computer by typing IP address and password, it measures the moisture of soil, temperature of soil and performing seeding in fertilizing in agricultural field.

6. Riya Desai – Removal of weeds using Image processing, IJACT, ISSN: 2319-7900

A leaf recognition system is proposed in which the use of leaf vein and shape can be used for plant classification; color machine system is specialized for making color measurements such as location of objects based on color, the extent of a color object, color textures.

7. Shohei Nakai, Yasuhiro Yamada – Development of weed suppression robot, IJMME, Volume 8 Issue 12, 2014.

This robot can remove weeds in inter row and intra row spacing because the robot can be freely controlled. Using the stereo camera image is processed.

III. DRAWBACKS

The robotic systems play an immense role in all sections of societies, organization and industrial units. The basic idea in this study is to develop a mechanized device that helps in on-farm operations like seeding/seed sowing at pre-designated distances and depths with all applicable sensors for controlling humidity, temperature. But many problems are faced by farmer during seed sowing operation, like proper adjustment of distance between two crops, distance between two rows. Seed sowing's very basic and paramount operation in the agricultural field. Nowadays seed sowing is done either manually or by tractors. Manual method includes broadcasting the seeds by hand. Sometimes method of dibbling that is making holes and dropping seeds by hand is used. Also a pair of bullocks is used to carry the heavy equipment of leveling and seed dropping. Another method of seed sowing is to use tractor in farms. The heavy equipments of seed storage and dropping mechanism are attached to the tractor to drop the seeds.

IV. OBJECTIVE

The proposed system as shown in Figure 1 has three main sections like seeding, ploughing and waste plant cutting, which are inter-communicated using communication technologies. The control station as well as robotic station possess the amenities viz., temperature sensor, humidity sensor, seed dispenser, seed storage, robotic system with motors, microcontroller.

The microcontroller is the brain of this system, which can dedicate the order of suggestion received to all the networks, and sensible factors processed by their corresponding embedded programs. We can use android and all the information sent through GSM to robot machine. The seeding and ploughing unit performs the respective operations. The robotic arm plucks the unwanted plant out with the help of digital image processing.

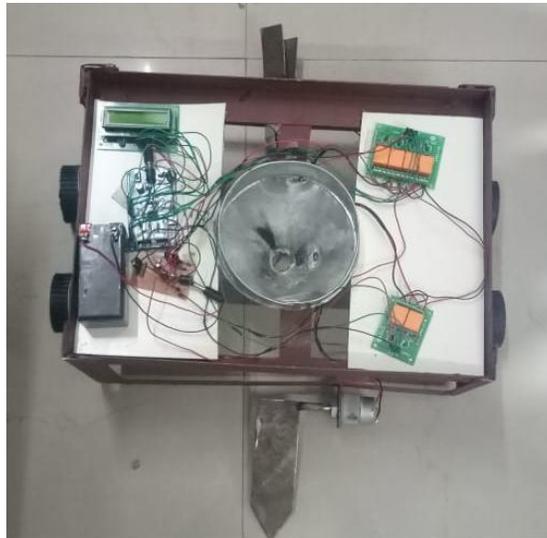


Fig. 1. The Proposed System - AGROBOT

V. EXPERIMENTAL RESULTS

When the robot is turned on, it checks the humidity and temperature and informs the farmer if it's normal or if it's high. It has two modes, ploughing & seed sowing mode and plant cutting mode. In the ploughing mode, the plough digs a hole through the land and the seed is dropped by a funnel at specified distances. In the plant cutting mode, the camera clicks the picture of the field and that picture is compared against the ones in the database and if a weed is found the robotic arm plucks it out. A GSM module SIM300A is used. The temperature and humidity details are sent to the SIM. The details of weed being removed are also sent to the SIM for the farmer's reference. The system with sensors is shown in Figure 2



Fig 2. The System with Sensors

VI. CONCLUSION

This project aims to reduce the workload of the farmer by its automated services. This robotic system plows, sows the seeds at required distance and removes the weeds and the infected leaves using IoT and Image Processing. By doing so, this system considerably reduces the time spent in the field in comparison to the traditional method.

VII. ACKNOWLEDGMENT

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