Review On: Automatic Seed Plantation Robot With e-Yantra by using IoT

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***Abstract*- This paper strives making a robot capable to perform operations such as, to dig the soil as well as to the sow seed. The same paper provides the opinion of E-yantra robot which digs that soil and sows those seeds. E-Yantra is that robotic platform, which has been designed and developed by the IIT, Bombay for learning as well as, for the purpose of education. The main component used by means of the e-yantra robot is AVR Atmega 2560 micro controller that supervises and controls the entire process. Initially the soil is dug by means of a robot. After that, the seeds are dispensed. It can be applied through the process of internet of things (IOT). As of now, most countries of the world are deprived of the literate human power within agriculture sector. So, farmers must improve their techniques used for digging the soil as well as sowing the seeds. This process also reduces the requirement of labor in the farm. By means of the mentioned process, seeds are protected from damage and also high sowing rate is rendered.**

***Index Terms*- E-yantra, IOT, Atmega 2560, digging and sowing seed**

I. INTRODUCTION

Today India's record in the progress of agriculture over past few decades is quite impressive. In these days there are various seed sowing machines developed but there is no smartness of work done. Manual method includes dispensing the seeds by hand.

In ancient days digging the hole in the soil and dropping the seeds by using bullock carts, tractors, etc. are done, which take various time. Since these process requires longer time and hence numbers of human powers are required for agriculture process. If skilled persons are not available then also it may causes several problems during seed plantation. India is one of the agrarian nation and haves agrarian economies. A large amount of residents in the village depends on cultivation to earn their livelihood.

No occupation in India is as top as agriculture. Farmers are in need of seeds for cultivation. The seeds are obtained in packets and many organization deals with manufacture of seed packets. The robotic systems play an immense role in all sections of societies, organization and manufacturing units.

The innovative idea of this paper is that soil is dig and seeds are sown automatically by using e-yantra robot so human efforts are reduces. The e-yantra robot is the robotic platform developed by IIT Bombay such that various applications are performed in the e-yantra module. E-yantra module consists of three flavours:

Configuration-1:
Master: P89v51RD2 Slave: ATmega 2560
Configuration-2:
Master: ATmega 2560 Slave: ATmega 8
Configuration-3:
Master: LPC 2148 Slave: 2 x ATmega 8

Among which this paper works on ATmega 2560 as a master configuration. Also, this paper uses the concept based on internet of things (IOT). This process is totally automated so that the farmers not need to visit the farm for work. The one may do the work from any place in the world.

This process is automated as well as it does not cause any greenhouse gases on earth. This technology is safety for all the living beings and do not causes any harm. The system is efficient and accurate to use.

- E-yantra Module

E -Yantra is the robot which is developed by the IIT, Bombay for education reason. It is the advanced robotic platform having number of functions already built in it. In addition there is provision in the structure so that one can interface the external hardware on it for different application.

➢ Major Building Blocks Of Robot

The Major Components needed for designing a Robot

a. Sensors: For Sensing the environments.
b. Actuators: For Movement of robots and its parts.
c. Control: Controller/Processor as brain of Robot.
d. Intelligence: User Written Command to perform desired set of action.
e. Power: A necessity for making a system work.
f. Communication: Robot can talk to another robot/PC.

Fire Bird V ATMEGA2560 technical specification

❑ Microcontroller:
- Atmel ATMEGA2560 as Master microcontroller (AVR architecture based Microcontroller)
- Atmel ATMEGA8 as Slave microcontroller (AVR architecture based Microcontroller)

❑ Sensors:
- Three white line sensors (extendable to 7)
- Five Sharp IR range sensor
- Eight analog IR proximity sensors
- Two position encoders (extendable to four)
- Battery voltage sensing
- Current Sensing (Optional)
- Five Ultrasonic Range Sensors (Optional)

❑ Indicators:
- 2 x 16 Characters LCD
- Buzzer and Indicator LEDs

❑ Control:
- Autonomous Control
- PC as Master and Robot as Slave in wired or wireless mode

❑ Communication:
- USB Communication
- Wired RS232 (serial) communication
- Wireless ZigBee Communication (2.4GHZ)
- Wi-Fi communication (if Wi-Fi module is installed)
- Bluetooth communication (if Bluetooth wireless module is installed)
- Simplex infrared communication (From infrared remote to robot)

❑ Dimensions:
- Diameter: 16cm
- Height: 8.5cm
- Weight: 1100gms

❑ Power:
- 9.6V Nickel Metal Hydride (NiMH) battery pack and external Auxiliary power from battery charger.
- On Board Battery monitoring and intelligent battery charger.

II. LITERATURE REVIEW

In paper [1], This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing, fruit picking and pesticide spraying. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors .The main component here is the AVR At mega microcontroller that supervises the entire process. Initially the robot tills the entire field and proceeds to ploughing, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode. For manual control the robot uses the Bluetooth pairing app as control device and helps in the navigation of the robot outside the field.

In paper [2], In this paper, solar panel is used to capture solar energy and then it is converted into electrical energy which is used to charge battery, which then gives the necessary power to a shunt wound DC motor. Ultrasonic Sensor and Digital Compass Sensor are used with the help of Wi-Fi interface operated on Android Application robot in the field. This brings down labour dependency. Seed sowing and digging robot will move on various ground contours and performs digging, sowing the seed and covers the ground by closing it.

In paper [3], In this paper, autonomous robot for agriculture (AgriBot) is a prototype and implemented for performing various agricultural activities like seeding, weeding, spraying of fertilizers, insecticides. AgriBot is controlled with a Arduino Mega board having Atmega 2560 microcontroller. The powerful Raspberry Pi a mini computer is used to control and monitor the working of the robot. The Arduino Mega is mounted on a robot allowing for access to all of the pins for rapid prototyping. Its hexapod body can autonomously walk in any direction, avoiding objects with its ultrasonic proximity sensor. Its walking algorithms allow it to instantly change direction and

walk in any new direction without turning its body. An underbody sensory array allows the robot to know if a seed has been planted in the area at the optimal spacing and depth. AgriBot can then dig a hole, plant a seed in the hole, cover the seed with soil, and apply any pre-emergence fertilizers and/or herbicides along with the marking agent. AgriBot can then signal to other robots in the immediate proximity that it needs help planting in that area or that this area has been planted and to move on by communication through Wi-Fi.

In paper [4], In this paper, an autonomous Agriculture Robot is presented which is specifically designed for seed sowing task only. It is a four wheeled vehicle which is controlled by LPC2148 microcontroller. Its working is based on the precision agriculture which enables efficient seed sowing at optimal depth and at optimal distances between crops and their rows, specific for each crop type.

III. APPLICATION

- At Farm
- At Garden
- At Agri Universities

IV. CONCLUSION

The main focus of the paper is its automatic way of seed dropping in the soil. Here, soil is dig as well as seeds are dropped in proper sequence which results in proper germination of seeds. This method reduces the labor requirement. By using this process wastage of seeds are reduce to a greater extent. This system is made for soil digging the soil and seed dropping in automatic way. The endeavors of this project on the way to reduce the man power, time and enhance the sowing rate.

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