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IMPLEMENTATION OF MULTIPURPOSE AGRICULUTURAL ROBOT

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ABSTRACT

The main aim of the paper is to bring electronics and modernize the age old traditional works followed in the world. One of the such work is agriculture and it is the most influencing thing. The development of agriculture by modernizing can be achieved by introducing the automation in it.The automation can be done by the agricultural robot controlled by the mankind.This multipurpose robot performs the task such as Digging the soil(ploughing),seeding,mud leveler,water sprayer and pesticide sprayer.This robot works with the help of battery as well as solar device.There are millions of people all over the world whose primary work or occupation is agriculture. The use of automated vehicles has peaked interest among many farmers. We make of relay switch to control the task assigned to the robot so that the necessary work is done in time.The main advantage of these robots are it reduces human labor,The task assigned is completed quickly and efficiently. The following features are designed to reach specifications as mentioned above: Digging the soil is one of the major step in farming. In this process we dig the soil and we use this for seeding. We dig the soil by making use of propeller which is made up of sharp edges. The sharp edges of the propellerdigs the top most layer of the soil.Seeding is the next step followed after digging. Here seeds are sowed in the soil at discrete time interval. The flow of seeds is limited by the seed container automatically by making use of servomotor.Mud leveler is used to level the mud to ground level after sowing seed by making use of leveler.Water sprayer is used to spray the water over the seeds sowed after leveling the soil to ground level.Pesticide sprayer is used to spray pesticides over the crops to prevent from getting affected by the pesticides.

KeyWords: ArduinoUno,Bluetooth Module ,Mud leveler,Relay Switch, ZigBeeCommunication.

I. INTRODUCTION

Automation of agricultural operation is novel thing and it has got demand of time to improve the productivity with the help oflatest technological tools. In recent time, robots are appearing in various forms in farms and are increasing in number. Many adaptable vehicles for agricultural operations is being developed by the researchers. A concept was adapted to use small efficient autonomous machines in place of large tractors . Moreover such a system may have a less environment impact as it can reduce the use of chemicals and high usage of energy. There are number of field operations which gets more benefits than the conventional methods that can be executed by autonomous vehicles.The robotic applications are spreading day to day in different domains in order to replace the mankind to return the investment effectively. This is used for safety purpose of the human from harmful things .Robots can perform many conservative issues which creates the ambiguity in the safety and harms the mankind such as chemicals or fertilizers etc.

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II. RELATED WORK

2.1.MF-Scamp Robots

These robots are designed for scouting, weeding and harvesting. It is either four-wheel or six-wheel drive weed seeking robot, where it removes and destroys the weed. It uses color sensor to identify weeds between crops by producing weed maps, identifying plants as a result it reduces the usage of herbicides to large extent.

2.2.AgBot II

AgBot II is a robot designed to help farmers to take decisions on the use of herbicides, fertilizers and watering. It enables farmers to take the required decisions for the crops based on pests, weather and other factors. It reduces the usage of water and increases productivity with minimal effort.

2.3.AgriBot

AgriBot is designed to increase the speed, application accuracy of the work and minimizing the labor of farmers. It is used for harvesting, spraying, seeding and removing of weeds. It works based on GPS based module. For harvesting, it pick up the crop and places it in a vessel. The main obstacle is the farms are a part of nature and nature is not uniform.

III. PROPOSED WORK

In this project we make use of Bluetooth and ZigBee communication to control the various operations of robot. The bluetooth module has a working frequency of 2.4GHz, Sensitivity of -80dBm, RF transmitting power of +4dBm and working range of 05-10m.

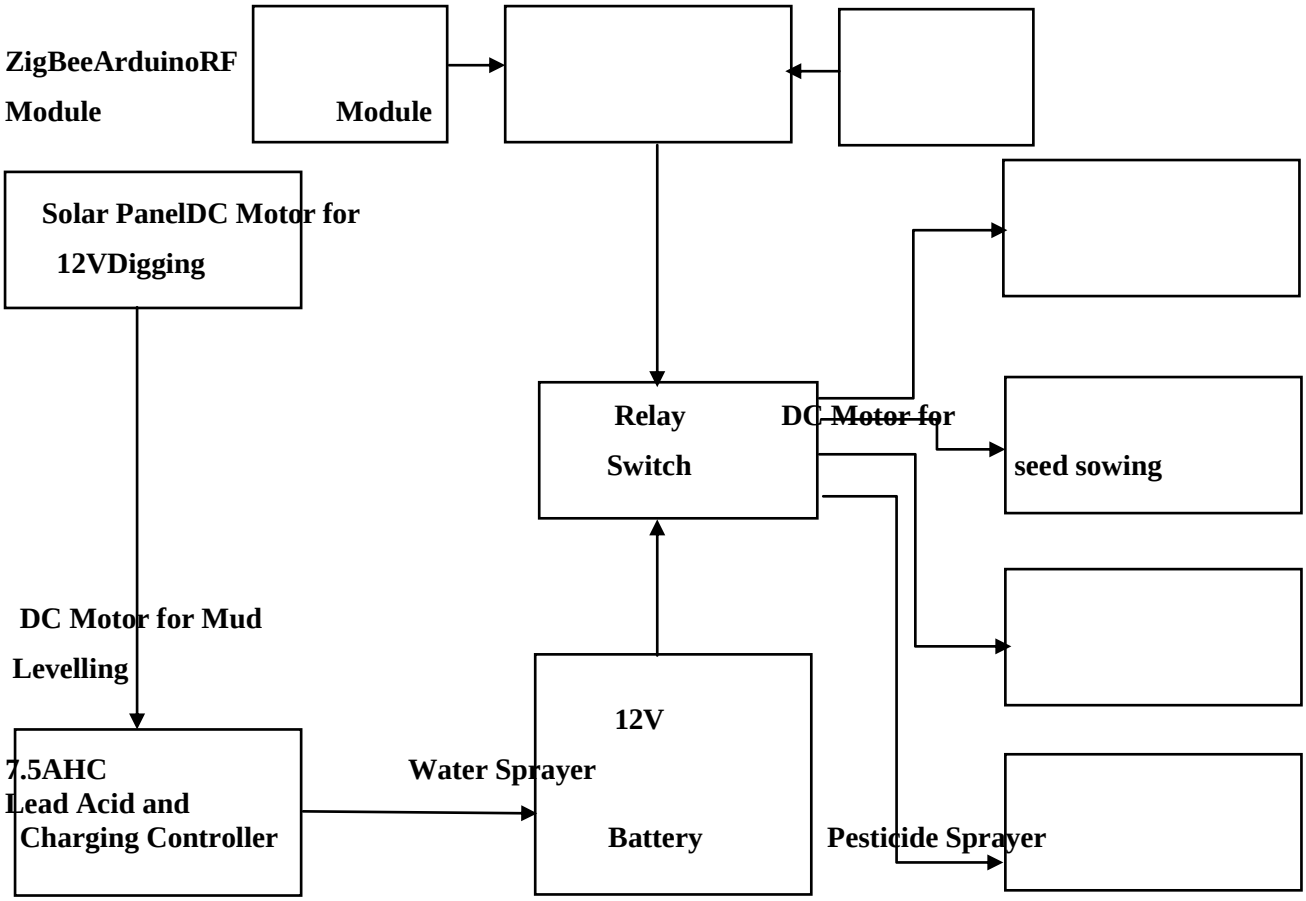

Fig 3.1: Block diagram for Multipurpose Agricultural Robot

When the person is unable to work in field due to climatic conditions or any other factor, he can make use of ZigBee communication system to control the robot , as it is capable of transmitting and receiving signal over a longer distance compared to bluetooth. It's working frequency is 2.4GHz and the range is 10-100m.

3.1 OPERATIONS

- **Digging soil**
  - Propeller with sharp edges of length 1.5 inches is used. As the dc motor starts to run propeller lowered to ground level sand starts digging the soil.
  - The operation of dc motor is controlled using Bluetooth or remote controller or through ZigBee communication.
  - Relay switch is used to control the power of dc motor.

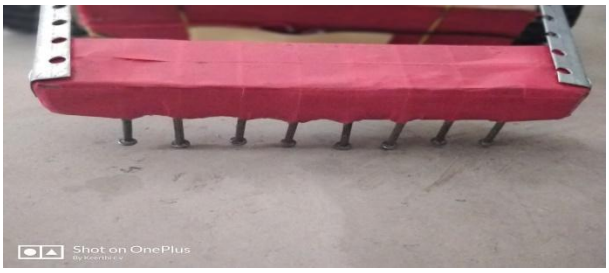

Fig:3.1.1 Propeller to dig the soil

- **Seeding**
  - Seed container is used to carry the seeds. Seed container has holes in order to sow the seeds.
  - Servo motor is used to drop the seeds in discrete manner.
  - As the dc motor is on and starts to move the shaft in to and fro which is controlled by servo motor.

Fig:3.1.2 Seed container to sow seeds

- **Mud Leveler**
  - Metal sheet connected to dc motor is used for the leveling of the soil.

- When dc motor is on the shaft comes down to ground level and robot starts tends to move in order to level the soil after sowing the seeds.

Fig:3.1.3 Mud Leveler

- **Water Sprayer**
  - Water container is used to store the water and water pump is connected to pipe to spray the water on the sowed seeds.
  - Relay switch is used to control the power of dc motor.

Fig:3.1.4 Water container to store water

- **Pesticide Sprayer**
  - Same as we store water in the water container we are going to use pesticide container. In which pesticides is stored.
  - When the dc motor starts to rotate the robot moves and the water pump used in it pumps the pesticide through pipe connected to it.

Fig:3.1.5 Pesticide container

Fig:3.1.6 Multipurpose Agricultural Robot

IV. CONCLUSION

The real time autonomous machine is one of the immense and novel enhanced techniques in the field of agriculture. We can increase productivity within no time with less work. We can perform the operations by being in different place with the use of ZigBee communication technique. The heavy machines used in conventional method is harder to use compared to robots.As the coin got two faces it has also got some pro's and con's.

Some of the pro's are we are more attracted to modernized things than the conventional things so it attracts the non-farming people. The agriculture convention method is mixed up with drag, intelligence, patience and risk of life so the use of advanced robotic techniques reduces such type of ambiguities.

The other face of the robots are they to some con's such as most of the agriculturalist still depend on conventional methods such as manual or using the machines which run on fuel which is more expensive to bear and it requires more time to work manually.To avoid this it requires few power system for cultivating the crops.We can implement the prototype which is more effective and less expensive.It can further be implemented using the latest advanced technology.

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