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AGRI ROBOT FOR MULTI PURPOSE APPLICATIONS

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ABSTRACT:

The project presents about the multiple agricultural tasks done by the single robot. To develop the efficiency of the agricultural tasks we have to find the new ways. This project deals with a novel approach for cultivating lands in very efficient way. The distinctiveness of this agriculture robot system is it is multitasking abilities which can drill, pick and place, seeding, pumping water & fertilizers, weather monitoring to work in both agriculture, forestation and gardening platform. The project aim is design, development and the fabrication of the robot which can dig soil, put seeds, roller to close the mud and sprayer to spray water, this whole system of robot works with the help of battery and solar power. More than 40% of the population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest.

Keywords: Soil moisture level, iot server, TELNET.

1. INTRODUCTION:

The idea of applying robotic technology in agriculture is very new, the opportunities for robot enhanced productivity immense. The robots performing agriculture operations such as ploughing , seed sowing and water spraying. Allowing farmers to reduce the environmental impact, increase precision and efficiency, and manage individual plants in novel ways. The Principle- The main impact for our project has been to develop a solar operated digging machine, which is solar powered. In this machine, we used a solar panel to capture and convert solar energy into electrical energy which is used to charge a 5v battery. This gives the necessary power to a DC motor. With the help of Bluetooth, we connect all the commands through our mobile phone. This power is transmitted to the rear wheel through gears. In

this project it makes the electric and mechanical systems share their power in efficient way. It reduces the running cost of digging machine. Purpose- Multipurpose agriculture robot can perform the following functions. v Robot vehicle can dig the soil, put the seeds and spray water. v To reduce human effort in agricultural field. v To perform all 3 operations at single time, hence increases production and saves time. v Farmers can operate this robot through smartphone by sitting at a place and can easily operate. v The usage to solar can be utilized for battery charging. As robot works in field, the rays of sun can be used for solar power generation. v To increase the efficiency , the solar power is used and the power output can be increased. v It can be used for small fields. v It can see the view of ground with camera. v Robot can move automatically in field. About Machine- The robot can dig the soil, put the seeds and spray water, these whole system of the robot works with the battery and the solar power. More than 40% of population in the world chooses agriculture as the primary occupation, in recent years the development of the autonomous vehicles in the agriculture has experienced increased interest. The vehicle is controlled by Bluetooth controller (Through mobile phone) and camera is used for seeing the view of ground. The advantage of this robot :- It is hands-free & controlled with radio waves. In the field of agriculture, a concept been developed to use multiple small machines which could be more efficient than traditional large tractors & human forces. *Features- v Automatic grass cutter v Automatic seedling v Sprinkling Fertilizer v Sprinkling Irrigation v Solar power operated v Automated with mobile phone v Hydraulic Cultivator v Live view of ground through camera How it works- The basic aim of our project is to develop a multipurpose agriculture robot, which is used to digging the soil, sowing the seeds and spraying the water with least changes in accessories with minimum cost. This whole system of robot works with battery and the solar power. v The basic frame is made for the robot with 4 wheels connected and the rear wheels are connected with motor. v At one end of the frame, cultivator is fitted which is also driven by DC motor and design is made to dig the soil. v Funnel is used to store the seeds and fertilizers, it flows through the funnel by drilled hole on the shaft to the digged soil. v On the end sprayer is fitted to spray water. v Solar is placed on the top of the robot and is connected to a battery for charging the battery. v Front side of the frame Camera is fitted to see the view of ground. v Firstly, we can send data through our own app that is developed by us, with the help of Bluetooth connectivity. v Bluetooth module receives the data according to our program that is in arduino. v Then Arduion sends data to relay module and then switch is put to on/off. Conclusion- In agriculture, the opportunities for robot enhanced productivity are immense and robots are appearing on farms. The other problems associated with autonomous farm equipment can probably

be overcome with technology. This equipment may be in our future but there are important reasons for thinking that it may not be just replaced by human driver with computer.it may mean a rethinking of how crop production is done. Crop production may be done better and cheaper with a swarm of small machines that with a few large ones. One of the advantages of the smaller machines is that they may be more acceptable to the non-farm community. The jobs in agriculture are drag, dangerous, require intelligence and quick, thought highly repetitive decision hence robots can be rightly substituted with human operator. The higher quality products can be sensed by machines (color, weight, density, ripeness, size, shape) accurately. Robots can improve the quality of our lives but there are down sides. The present situation in our country all the agricultural machine is working on manual operation otherwise by petrol engine or tractor is expensive, farmer can't work for long time manually to avoid this problem, we need to have some kind of power source system to operate the digging machine. Advantages- v To implement a prototype model of drilling and seed sowing machine system within the limited available source and economy. v The system can be subjected to further development using advanced techniques. v It may become a success if our project can be implemented throughout our country.

2. LITERATURE SURVEY

In modern era, the main problem in agriculture field include lack of farm labor availability, lack of knowledge regarding soil testing, increase in labor wages, wastage of seeds and more wastage in water. To overcome all these disadvantages the robot for agriculture has been proposed. The main aim of agricultural robot is applying robotic technology in agricultural field. The agriculture robot efficiently performs ploughing, seeding and mud leveling automatically. The robot is a mechanical device which is capable of performing various tasks without human intervention. The robot works based on command given by the controller. Various sensors are used for sensing various parameters along the robotic path. The microcontroller being the heart of the robotic system manipulates entire the action of the robotic system. It also controls a wheel motion by controlling the DC motors. Motor driving circuit is used to drive the DC motors which in turn control the wheel motion. The seeding

robot for agricultural purpose is an autonomous robot which is controlled remotely through a wireless Bluetooth connectivity between the Smartphone and the robot. The Bluetooth electronics app is used to operate the robot. It is used to control each and every operation of the robot.

2.1. "Agricultural Robot for Automatic Ploughing and Seeding" 2015 IEEE International Conference on Technological Innovations in ICT (TIAR 2015) (Amrita Sneha.A, Abirami.E, Ankita.A, Mrs. R. Praveen, Mrs. R. Srimeena). This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing. 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. On the field the robot operates on automated mode, but outside the field is strictly operated in manual mode.

2.2. "Design and Implementation of Seeding Agricultural Robot" (JIRAS) (P.Usha, V. Maheswari, Dr. V. Nandagopal) In this paper, the robot system is used to developthe process of cultivating agricultural land without the use of man power. The aim of the paper is to reduce the man power, time and increase the productivity rate.

2.3. "Automated Farming Using Microcontroller and Sensors" (IJSRMS) ISSN: 23493371 (Abdullah Tanveer, Abhishek Choudhary, Divya Pal, Rajani Gupta, Farooq Husain) Farming can be done using new technologies to yield higher growth of the crops. In this project we are going to check temperature, light, humidity and soil moisture. The paper here is all about automatic control features with latest electronics technology using microcontroller and GSM phone line. The project works automatically and hence reduces the manpower.

2.4. "IOT Based Smart Agriculture" IJARCCE June 2016 (Nikesh Gondchawar1, Prof. Dr. R. S. Kawitkar2) In this paper a project model for agriculture robot is describe the newer scenario of decreasing water tables, drying up of rivers and tanks, unpredictable environment present an urgent need of proper utilization of water.

3. METHODOLOGY

In modern era, the main problem in agriculture field include lack of farm labor availability, lack of knowledge regarding soil testing, increase in labor wages, wastage of seeds and more wastage in water. To overcome all these disadvantages the robot for agriculture has been proposed. The main aim of agricultural robot is applying robotic technology in agricultural field. The agriculture robot efficiently performs ploughing, seeding and mud leveling automatically. The robot is a mechanical device which is capable of performing various tasks without human intervention. The robot works based on command given by the controller. Various sensors are used for sensing various parameters along the robotic path. The microcontroller being the heart of the robotic system manipulates entire the action of the robotic system. It also controls a wheel motion by controlling the DC motors. Motor driving circuit is used to drive the DC motors which in turn control the wheel motion. The seeding robot for agricultural purpose is an autonomous robot which is controlled remotely through a wireless Bluetooth connectivity between the Smartphone and the robot. The Bluetooth electronics app is used to operate the robot. It is used to control each and every operation of the robot.

OBJECTIVES

• To build a battery operated smart agricultural robot for multipurpose farm activities.

• It should check the moisture content in soil, humidity of surroundings and temperature of seed.

• The ground should be dug to the specified depth and the adequate amount of seeds has to be dispensed then it should level the mud after seeding operation.

• It should be easy to operate andsafe handling.

OPERATION

The methodological procedure, circuit diagram and the block diagram are included in this section. The development of the agricultural robot consists of the integration of hardware techniques and software tools. Fig. 4 shows the block diagram of agricultural robot. Arduino Uno microcontroller is the master controller of the developed robot. All the operations of the robot are controlled through

Bluetooth connectivity. The robot for agricultural purpose is an autonomous robot which is controlled remotely through a wireless Bluetooth connectivity between the Smartphone and the robot. The Bluetooth electronics app is used to control each and every operation of the robot. The Bluetooth HC-05 module is fixed on to the robot which receives signals from the Bluetooth electronics app and sends these signals to the microcontroller for processing of operations. The microcontroller is powered by a 12V DC battery and it consists of a voltage regulator, which is used to regulate the voltage input for the controller. The microcontroller gives a 5V supply to the driver circuit. This supply is insufficient to actuate DC motors. Thus driver circuit amplifies 5V current into 12V current and drives the motors connected to it. The L293D motor driver 1 circuit is used to control the bidirectional motion and receives signals from the microcontroller. The DC motors control wheel motion and other activities of the robot. The microcontroller sends signals like 00,01,10,11. When signals are like 00 or 11 then the motor is in off condition so there is no movement of robot occur, if else the signal like 01 then the motor will rotate on backward direction else the motor rotate on forward direction(when signal is 10).

Fig.1. Hardware kit.

CONCLUSION

An attempt has been made to develop a Bluetooth operated agricultural robot which performs ploughing, seed sowing and mud levelling operations. The proposed system is battery operated and controlled by Bluetooth device. Using this robot, farmer can carry out other secondary activity along

with operating the robot. By carrying out multiple activities at the same time, farmer can increase his income which results in development of Indian economy.

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