
MULTI-FUNCTIONAL ROBOT USING ARDUINO FOR FARMING PURPOSE

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ABSTRACT

In our country agriculture plays an important role for development in food production. In order to this smart farming improves the quality and quantity of agricultural products and the smart agricultural technique is required to save manpower and increase the efficiency with the help of multi-tasking robot. Smart agriculture is very efficient because the IOT sensors are capable of providing information about agriculture field and then act upon that. Smart farming is a concept that increases the efficiency at low cost without compromising the quality of the crop. The main objective of this paper is to design and development of a multitasking robot which is capable of doing some agricultural activities like ploughing of field, sowing of seeds, watering the crop by measuring the soil moisturizing sensors and tracking the sun for solar energy for the night vision purpose. This Agri-bot gets energy from the solar plate mounted on the bot and this will also help in conservation of renewable energy resource on a large scale and is operated by Arduino IDE. In this review paper, we discuss the potential of embedded system and IOT, the Robotics and automation can play a significant role in agricultural production need and this mechanical vehicle will reduce the work cost, speed up and increase the exactness of the work.

Keywords: Smart Farming, Multi-Tasking, Agri-Bot, Embedded System & IOT.

I. INTRODUCTION

In India there are about 70% of population engaged in agriculture as a primary occupation. In today's world we do not have skilled manpower especially in agriculture sector so we required automation or a mechanical vehicle which is capable of doing some agricultural work. The traditional farming consumes more cost, takes more time and required a lot of man power. With increase in population of the world the concept of demand and supply also arises. For this the automation in agriculture field decreases the labor and decreases the human efforts. In order to enhance the productivity the concept of robotics is impacting in agricultural field and have a considerable impact on the farm products which plays important role in the Indian economy.

Farmers today are benefitted from the technological advancement, automation can help in boosting the efficiency of the various process involve right from sowing to harvesting the crops. This system developed is based on IOT which focuses on real time monitoring and controlling Agri-bot from field through wireless communication. This system uses basic component like DC motors, Arduino battery, soil moisturizing sensor. The energy required for this machine is less as compared with tractor or any other agricultural instrument. The solar panel is used to charge the battery and the battery is used to drive the motor for digging of soil and sowing of seeds. Soil moisturizer sensor is used to measure the moisturizer content of the soil and irrigate accordingly. The whole agriculture robot is commanded by Arduino IDE.

The main advantage of the Agri-bot is that it reduces the manpower, time, resources. Since it is solar powered multi-functioning robot so it does not required fuel to work. Pollution and agriculture waste is also big problem which is eliminated by using solar plate. It has many applications in the areas where rainfall is less and the areas where the reach of human is difficult. Its circuit is not complex so it is very simple to use and can be farmers friendly.

II. PROPOSED METHODOLOGY

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 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 signal to the microcontroller. 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).

In this project we decide to develop a structure like a robot and for the purpose of seed sowing and dig the soil in field and provide water according to the requirement and this requirement level of water is measured through soil moisture sensor. A 360 degree rotated Solar Panel also fixed on robot which works on sun tracking system though which we store charge in battery and utilize this power for night vision through led light.

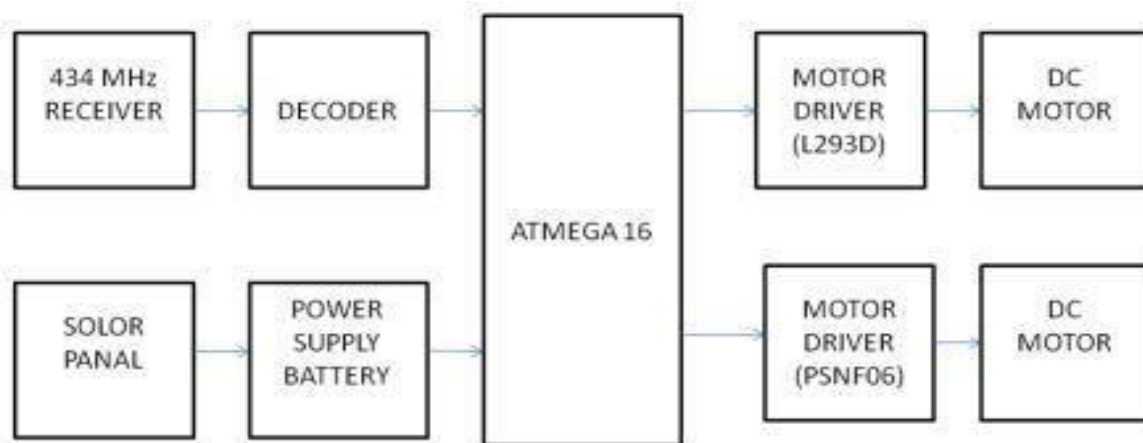


Fig.1- Block diagram of Agriculture Robot

III. RESULTS AND DISCUSSION

The Agribot is purely non convectional and reduces the human effort. It saves time of farmers and water for irrigation. The result shows accuracy in seed sowing and watering the crop. The estimated time for basic activites is observed is less as traditional farming.

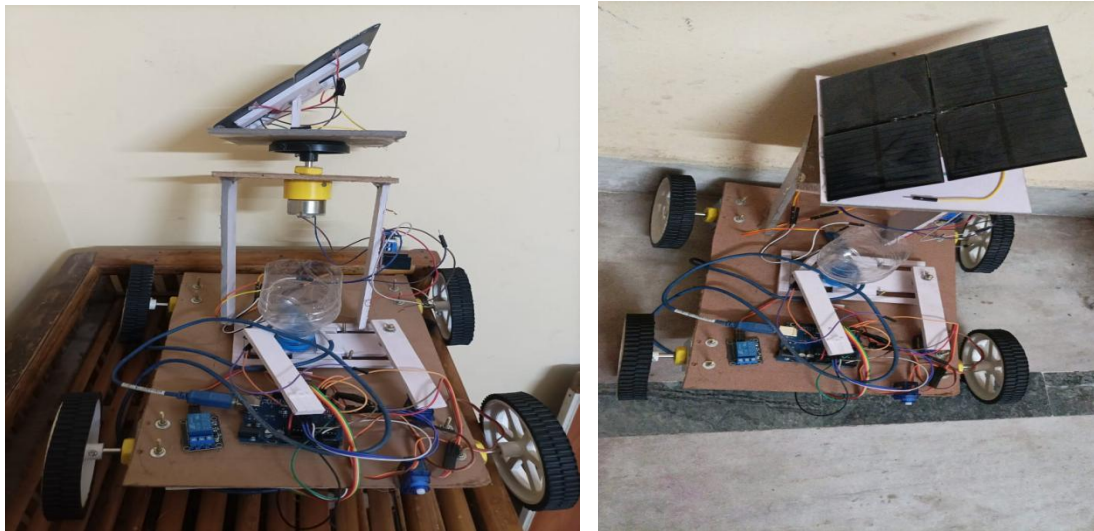


Fig.2 Agriculture Robot

IV. CONCLUSION

A prototype of multipurpose agriculture robot has been implemented successfully which is capable of sowing of seeds and watering crops accordingly. The greater part of this robot is that it is mostly self governing so that farmers can pay more time on other agricultural activities. The future work can include other incorporate the computer vision and can be utilising the ultrasonic sensors and camera for administration of similar activities and in improving efficiency of this robot.

V. REFERENCE

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