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ADVANCED SOLAR POWERED ANDROID CONTROLLED AGRICULTURE ROBOT FOR CULTIVATION, SEEDING & IRRIGATION

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ABSTRACT

Agriculture robot is designed for agricultural purposes. It is designed to minimize the labour of farmers in addition to increasing the speed and accuracy of the work. The project aims on the design, development and the fabrication of the robot which can cultivate, seed and spray water, this whole system of the robot works with the battery and the 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. All the equipment of the vehicles is controlled by wireless communication using Bluetooth module. The advantages of these robots are hands-free and fast data input operations. We are designing the Robot and Bluetooth App to control the basic movements like forward, backward, left and right directions. In addition to these, Cultivator up and down operations, Water sprayer on and off, seeding on and off operations is also operated. All these operations can be controlled using an android mobile app.

INTRODUCTION

Agriculture's history dates back thousands of years, and its development was driven and defined by very different climates, cultures and technologies. So the agriculture system should be advanced to reduce the efforts of the farmers. The model developed automatically sows the seeds, spray the pesticides and also cut the grass. The prototype represents the advanced system for improving the agricultural processes such as seed sowing, grass cutting and pesticide spraying based on robotic assistance.

As there are no efficient equipment's to aid the farmers. There is a need for new

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techniques to be implemented. Once the idea was formulated, design options were finalized. In [1], SaurabhUmarkar and Anil Karwankar, discussed that the process of seed sowing is a key component of agriculture field. For many crop varieties, high-precision pneumatic planting has been developed for a wide range of seed sizes, resulting to uniform seed distribution in seed spacing along the travel path. Wifi is used as receiver. Main disadvantage of the system is robot moves in only one direction. Whenever there is obstacle power supply is automatically turned OFF. In [2], M.D. I. Sujon, R. Nasir and Jayasree Baidya, agricultural researcher determined the effects of various seeding techniques and machines and also different rates of oil seed rape application on establishment of seed emergence plant and final yield of grain. The robot will perform farming using analogy of ultrasonic detection in order to change its position. The main disadvantage of this system is, it does not work well on all types of soil. In [3], H. Pota R Eaton, J Katupitiya and S D Pathirana, concludes that bullock drawn planting becomes a necessity to sow as skilled sowing workers are almost decreasing. Planting distance and plant population are acute factors in maximizing the yield of crops. In this Microcontroller 8051 is used for communication between the input and output devices. The main drawback of this model is, it consists of only one mechanism. In [4], S. Kareemulla, K Shaik, E Prajwal, B Mahesh, V Reddy, the system benefits farmers in the basic operation of seed sowing. This machine's operating mode is simple. It is possible to increase the total yield percentage effectively. Labour problem can be reduced. As compared to the manual and tractor based sowing time and energy required for this robot machine is less. Also wastage of seed is less. The disadvantage of model is, it consists of only one mechanism. The above research papers helped to understand the different aspects posed by the research on the agricultural robot. The robots designed in the above literature surveys have many issues with movement of the robot and grass cutting. These problems are effectively addressed in this work.

The main motive for developing Advanced Solar Powered Android controlled Agriculture robot is to decrease labour force and increase the processes of digging and seed sowing of crops and covering the land

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so that human efforts will get reduced up to 90 percent. Especially when the duties, that needs to be performed, are potentially harmful for the safety or the health of the workers or when more conservative issues the applications of instrumental robotics cover further domains, as the opportunity of replacing human operators.

PROPOSED SYSTEM

The proposed model uses basic components like DC motors, relay, relay driver ULN2003, Bluetooth module and Arduino Uno R3 as the main controller. The mechanical design of the robot is also simple. It is programmed to carry out the above functions simultaneously.

To perform the function of ploughing it is equipped with rotor wheel which is fixed in the anterior end of the robot, to sow seeds it has a container with seeds, funnel and its bottom contains a perforation to sow the seeds and finally the posterior end of the robot has a sloping metal sheet touching the ground to cover the sown seeds with soil and level as it moves forward. It is also mounted with sprinklers and dc spraying motor with a water bag to spray fertilizers and insecticides.

Fig.1: TX

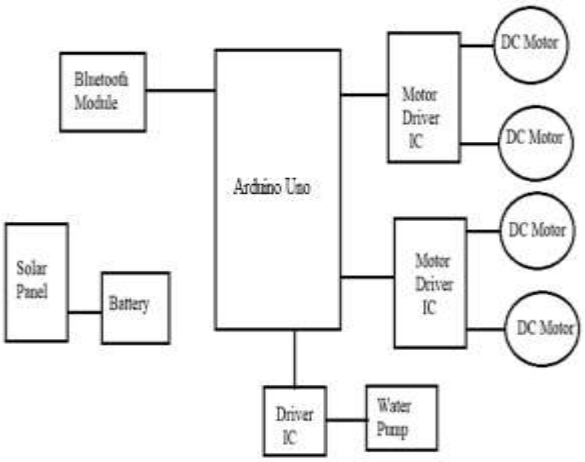

Fig.2: Block Diagram

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial

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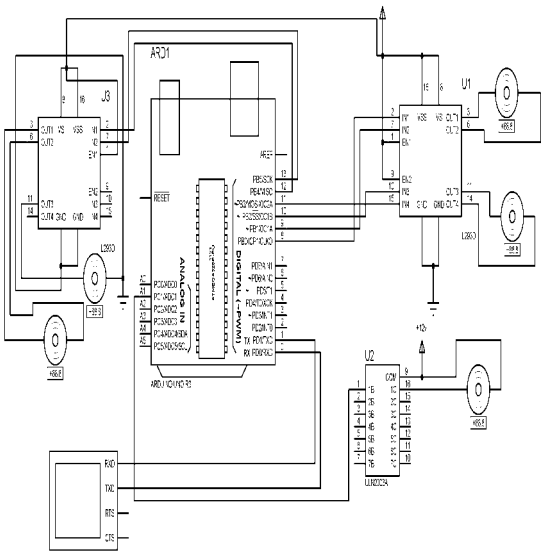
driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means "One" in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions, see the index of Arduino boards.

SCHEMATIC DIAGRAM



The Arduino Uno has several facilities for communicating with a computer, another Arduino, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega8U2on the board channels this serial communication over USB and appears as a virtual com port to software on the computer. The '8U2 firmware uses the standard USBCOM drivers, and no external driver is needed. However, on Windows, an *.inf file is required. The Arduino software includes a serial monitor which allows simple textual data to be sent to and from the Arduino board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1). A Software Serial library allows for serial communication on any of the Uno's digital pins. The ATmega328 also support I2C (TWI) and SPI communication. The Arduino software includes a Wire library to simplify use of the I2C bus.

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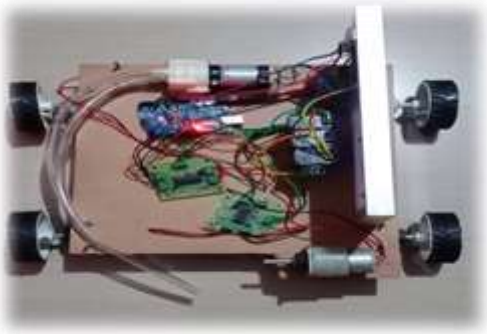

Fig.3: Snapshot of Project

Intercultural operation Weed competes with the crop for sunlight, space, and nutrients. To control weed species, many herbicides and chemicals are used in agricultural fields, which results in drinking water contaminated and environmental pollution. Currently, the excessive use of herbicides damages the health of people, animal etc. According to the weed science research, about 33% of the total losses by agricultural pests are caused by weeds only[2]. Therefore, it is important to identify the weeds from the crop and selectively spray herbicides to optimize the chemical application. There are various techniques developed all over the word for distinguishing weed from the crop. In the conventional weed control system, the herbicide is sprayed uniformly over the field which may damage crop condition. Machine vision systems present a great potential to be used on data collection for precision agriculture, where images would be used to extract information. The autonomous agricultural robot can accomplish intercultural operation using the machine vision-based technique. It can be achieved by mapping the weeds in selectively or in patches by image processing method, in row crop, the patch identification in between the row can help to distinguish the weed. There is specific shape reorganization method are applicable for classifying the weeds by its shape this method is more accurate in weed identification method. Another method is color segmentation for identifying weeds. Based on all these techniques weed maps is generated. Detecting weeds selectively from a field with the application of proper methods of image segmentation technique and post processing the segmented data finally, optimize the application part of chemicals in the field. Based on the map generated appropriate weeding technique is considered for weeding. There are different operational methods for removing the weeds like mechanical chemical application. Identifying the actual position of the weeds mechanical weeder can be incorporated in removing weeds by partial tillage operation

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at 2 to 4 cm depth. Removing of weeds from between the row is easy as compared to removing weeds from intra-row which required high- speed sensing device and high- speed mechanisms to push rotary blades or chemical spray for intra row application.

CONCLUSION

In agricultural filed, the contingency for robots, augmented yield is colossal. Hence robots are emerging on farms in various guises and are increasing in numbers. The alternative dilemmas combined with autonomous farm equipment can apparently be overcome with automation. This project is mainly based on curtailing human power as well as expenditure on equipment. The robot can be with accessible source system rather than a normal robotic car. Affability of automation system is higher than traditional system. The advantage of this system is, it diminishes the labour cost, and time. In this design a robot is assembled to entrench automatic digging, seeding, leveling and fertilization in a field.

The working of the robot is executed by renewable energy as solar energy. It is presumed that robot will support farmers in bettering the efficiency of operations in their farms. It can aid the farmers in initial stage of farming. One of the advantages of the smaller machines is that they are more acceptable to the non-farm community. The jobs in agriculture field are a drag and require intelligence and speed hence robots can be rightly substituted with human operator. Robots can improve the quality of our lives but there are downsides. At present in our country all agricultural machines are working manually or by petrol engine or tractor. Humans cannot work for long time manually. To avert this condition, we need some kind of power source system to operate the digging, sowing, leveling, and sprinkling. This can be achieved by our solar powered multifunctional agricultural robot.

REFERNCES

1. Ms. SaurabhUmarkar, Ms. Anil Karwankar, “Automated Seed Sawing Agribot using Arduino” International Conference on Communication and Signal Processing, April 6-8-2018.
2. Prof. Manoj. Kr. Pandey, TejendersinghRawat, “AgroBot: An Autonomous Robot” International Journal of Advanced Research in

Computer Science, Volume 8, No.5, May- June 2017.

3. Prof. Adhapure D. U, "A Review on Solar Operated Multipurpose Agriculture Robot" International Journal Research of Engineering and Technology Volume 4, Oct2017.
4. Prof. Priyanka D. Yadav, Ms. Aditi D. Kokate, "Multipurpose Agricultural Robot" International Advanced Research Journal in Science, Engineering and Technology, Volume 4,2 Jan 2017.
5. khanna, A;Ranjan,"Solar-powred Android based Speed Control of DC motors through Secure Bluetooth," Communication systems and network technologies CSNT 2015 international conference (IEEE Publication), pp 1244-1249.
6. Ms.AshishLalwani, Ms.MrunmaiBhide, MS.S. K. Shah, "A Review: Autonomous Agribot for Smart Farming", 46th IRF International Conference, 2015.