MULTIPURPOSE AGRO ROBOT USING ANDROID

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Abstract -*In India almost 70 percentages of people are depending on farming. Several operations are performed in the farming field like seed sowing, mud levelling, plugging etc. The present methods of seed sowing, pesticide spraying and mud levelling are problematic. The tools used for above movements are expensive and difficult to handle. So the farming system in India should be encouraged by developing a system which will decrease the man power and time. This paper aims to design, develop and design of the robot which can sow the seeds, levels the mud and spray the pesticides, which also detects the obstacles. This entire system is driven by solar energy. The designed robot gets energy from solar panel and it is operated using Bluetooth/Android App which sends the signals to the robot for required mechanisms and the movement of the robot. This increases the efficiency of seed sowing, pesticide spraying and mud levelling and also reduces the problem come across in manualplanting. For labor-intensive control, the robot uses the remote controller as android app.*

Keywords—Farming, mud levelling, pesticide spraying, obstacles, robot, seed sowing, solar powered.

1. INTRODUCTION

Agricultural science history dates back thousands of years, and its progress was driven and defined by very different climates, beliefs and technologies. So the farming system should be advanced to decrease the sweats of the farmers. The model developed is automatically sows the seeds, spray the pesticides, cut the grass and also detects the obstacles in the land. This prototype represents the progressive system for improving the agricultural processes such as seed sowing, mud levelling and pesticide spraying based on robotic assistance. Some of the most important problems in the Indian farming are increasing of input costs, availability of skilled labors, shortage of water resources and crop monitoring. To overcome these problems, the agro robot technologies were used infarming. This agro robot is used for multipurpose. Multiple functions are performed using a single robot. In this robot is developed to concentrate in an efficient manner and also it is expected to perform the functions autonomously.

2. RELATED WORK

As there are no resourceful equipment's to aid the farmers. There is a need for new systems to be implemented. Once the idea was framed, design options were finalized.

1. **Ranjith, NikithaMN, ArunaK, Afreen, BT Venkateshmurti,** The proposed work has the objective todesignanddevelopthesolarpower-drivenagro robot withBluetooth/androidappwhichcansowingtheseeds,cutt hegrasslandandspraythepesticides.

2. **Gokul, R.Diksith, M. Gopinath, S. AjithSundaresh,** Inthisthesystemiselaboratedtoremoveunwanted planting, the agricultural fields using movement of the robot to do the required actions and it is well-orderedbyusingBluetooth.

3. **YNikhilKumar, MKoteshwarrao, Khushwant, Rahulraj, Promaanonyachakrobarty, M.himakiran, Dr.GopiKiran saramekala, this** proposed workaccomplishestheactionsoffunctioningthediggingands eedsowingusingthecomponents such as dc shunt motor, Arduino and solar panel. The commands are given to cultivating robot with android applications.

4.**K DurgaSowjanya,R Sindhu, MParijatham,KSrikant, P. Bhargav**, The paper works towards at designing the a agricultural robotic vehicle which can be controlled through blue tooth for cultivating, sowing and sprinkling systems.

5. **Sourabhumarkar, AnilKarwankar,** This paper will finish off the installation of the agribot including hardware and software.

6. **BOZhao,Zhong-Xiang zhu, en-RongMao,Zheng-Hesong,**InthispaperaBPsemanticarrangementofthingswh ichcanshowanynonlinearrelationshipbetweeninputandou tput.Thissystemisappliedtostandardizethevisionsystemof anagriculturalwheeled-mobile robot.

3. MAJOR CHALLENGES

In Small villages the farmers will face the struggle on lack of internet conveniences, lack of power, lack of trained man power. In the absence of solar energy, the solar powered agro robots were not able to work.

Useof chemical batteriesleadtoadditionalcostanddamagetheenvironment duetothereleaseofchemicalsubstancesintotheenvironmen tanddeclinetheyield.

Bluetooth wireless communication technology allows the robots to reach shortrange communication.

Therobotmaygoinwrongdirectionwhilein the execution of seed dispensing operation.

4. PROPOSED SYSTEM

The main objective idea of this paper is to automate the procedure of planting, cultivating, pesticide spraying, mud levelling, obstacles findingandtunneling to decrease the humanoid effort and increase the harvest. The farming of seeds is robotically done by using DC motor. It is also possible to develop different kinds of seeds with dissimilar distance. The projected idea contains sprayer, which would be used for reducing the wastage offertilizers that is done by spraying appropriate amount of fertilizers required for the specific crop. The mode of process can be changed with the help of directions existing n the robot application. Anynonlinearconnection between inputs and outputs are controlled by using this method. The further stage is to develop further advancedGPSsystemthatincreasestheaccuracy also gives latitude and longitude direction of the field. Byusingrectangularconstructedgeometrytherobotdirectioncanbecontrolled.

5. ARCHITECTURE DAIGRAM

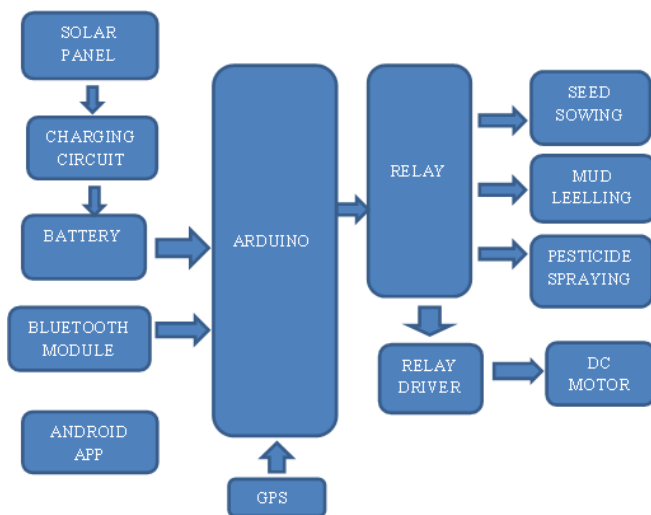Multipurpose agro robot using android is shown in below figure1.

Fig -1: System design of multipurpose agro robot using android

The above block diagram consists of Atmega48 microcontrollerwhichis controller for the entire system as shown in Fig.1 and solar panel is connected to the battery for storing energy and further it is giventopowersupplychargingcircuitrywhichisproviding+5Vforarduinoboardand+12VsupplyfordrivingDCmotorsusingrelaydrivermodule.Bluetooth HC05 is connected with the arduino and wirelessly with the android smartphone

tocontrollingthecomplete system. ThemainwheelsarepoweredbyDCmotorwhichisregulatedbyarelay switch and movement of wheels is controlled by a controller.

6. SYSTEM FLOW

Algorithm for the robot is as follows:

Step1: Start

Step 2: Switching on the robot

Step 3: Pairing the Bluetooth device with the android phone

Step 4: Robot should wait until it receives the signal from the app.

Step5: Ifitreceives the signal, robotworksaccordingly

Step 6: If the signal is not received go to the step 4

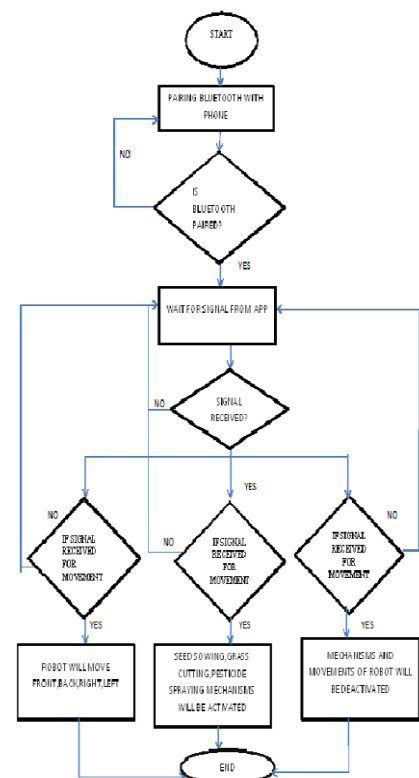Step 7:universalOFF signalisused to deactivate.

Fig- 2: Flow chart of designed robot.

7. EXPERIMENTAL ANALYSIS

The aimed robot will perform the seed sowing, pesticide spraying and mud levelling operations simultaneously. When the solar panel contracts heated it changes sunlight into electricity.Thiselectricalenergy is prearranged to the chargingcircuit.Thecharging circuit will work according to maximum power point tracking (MPPT) protocol to generate pulsed voltage and also to avoid reverse current.

The pulsed voltage is given to the battery in order to charge it. The charging of battery is controlled with the support of voltage sensors. In the meantime battery is bidirectional it will charge and supply voltage to ardunio at a time. The channel relay delivers voltage supply to all the different operations. The motor driver is usedtodrivethe DC motor whichruntherobot.Themodel consists of android app and bluetooth HC-05 to transmit and receive the signals correspondingly. The robot waits until it gets signals from the app. When the signal is received, the respective processes will be activated and the robot will work consequently.

The solar panel stores and converts the solar energy into electrical energy, which is given to the charging circuit in order to charge the battery to 12 V which will give the necessary power to the controller, DC motor and different operations. The android app which is used to control the robot is shown in below figure 3.It consists of keys.

Scan key are used for pairing of app with HC-05 module and set keys is used to add further keys if required. The stop, right, left, front and back keys are used to control the actions of the robot.Theremainingkeyslikemud levelling, pesticidespraying,seed sowing areusedtoactivate the devices. All OFF key is helpful in deactivating themechanismsandit willstoptheprogramofrobot.

In seed sowing operation, a funnel is used to store the seeds. A slider with hole is provided in order to sow the seeds into the ground at regular interval. The slider moves on the basis of to and fro sign with the help of DC motor which is fixed to the slider..
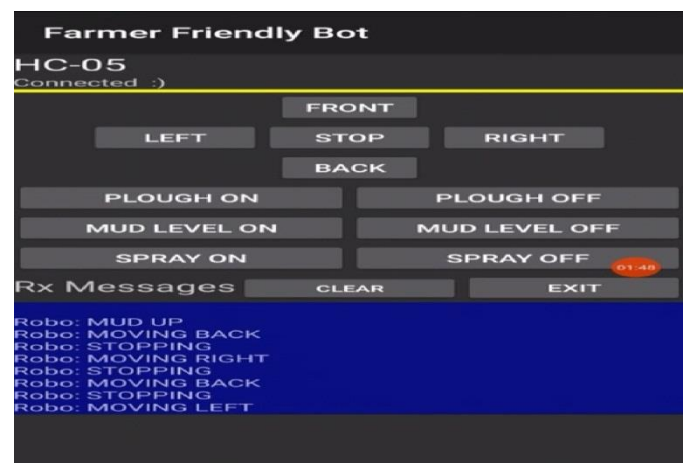
In pesticide spraying operation, a vessel is used for the storage of the pesticide solution. A small submersible pumpwhichisusedforpumpingthepesticidetothepesticide sprayerwhichiskeptinsidethevessel.
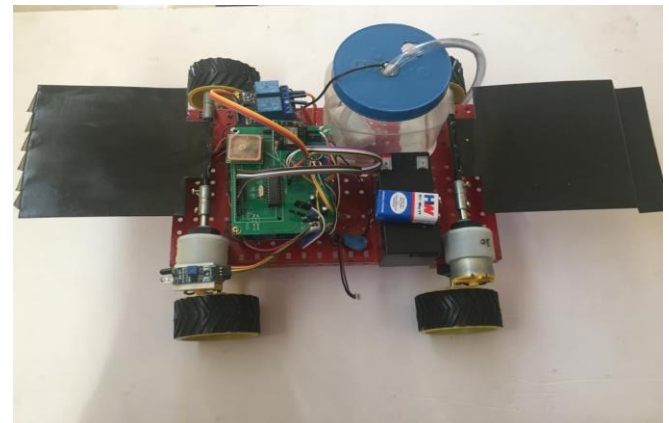
Fig-3: Snap shot of Prototype model

Fig-4: Snap shot of Prototype model with solar panel

Fig-5: Snap shot of Bluetooth android app

8. CONCLUSION

Multipurpose agro robot is designed to perform the complex farming tasks like seed sowing, mud levellingandpesticidespraying and obstacles detection. The benefits of the robot are to reduce the human effort

and efficient resources utilization. Instructions are passed to the system using Bluetooth which ensures no direct contact with human and thus safety of operator is safeguarded. The robot is solar power hence, it is renewable energy source. The operations are performed using the android app. Innovative seed sowing, mud leveling and pesticidespraye requipment has significant impact in agriculture. By using this advanced work, farmer can save more time and also reduce a lot of labour cost.

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