

SOLAR POWERED AUTOMATED MULTI-TASKING AGRICULTURAL ROBOT

**K. Vinay Kumar^{*1}, R. Pavan Kumar^{*2}, P. Madhusudhan^{*3},
S. Nikhil Varma^{*4}, K. Sagar^{*5}, Y. Shivananda^{*6}**

^{*1}Assistant Professor, Mechanical Engineering, Annamcharya Institute Of Technology & Sciences (Autonomous), Tirupati, A.P, India.

^{*2,3,4,5,6}Students, Mechanical Engineering, Annamcharya Institute Of Technology & Sciences (Autonomous), Tirupati, A.P, India.

ABSTRACT

Solar-powered automated multitasking agriculture robots are an innovative solution to improve agricultural efficiency while reducing the need for human labor. In India nearly about 70 percentages of people are depending on agriculture. Numerous operations are performed in the agricultural field like seed sowing, water spraying and pesticide spraying etc. The present methods of seed sowing, water spraying and pesticide spraying are difficult. The equipment's used for above actions are expensive and inconvenient to handle. So the agricultural system in India should be encouraged by developing a system which will reduce the man power and time. In conclusion, solar-powered automated multitasking agriculture robots are a cost-effective and sustainable solution for farmers, providing them with a way to improve their productivity and reduce their environmental footprint.

Keywords: Agriculture, Robot, Seed Sowing, Water Sprinkling, Pesticide Spraying.

I. INTRODUCTION

Agriculture is the backbone of rural India. Farmers face problems such as lack of timely availability of efficient workforce, as many have migrated from country side. Hence, to reduce the burden of farmers, automation in the field of farming is necessary. The main reason behind automation of farming processes is saving the time and energy required for performing repetitive farming tasks and increasing the productivity of yield by treating every crop individually using precision farming concept. The robot is able to automatically seed and water, spray pesticides according the path set by the user using the GUI that was developed.

II. LITERATURE SURVEY

[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 explains on building a robot equipped for performing tasks like sowing, seed apportioning. It likewise gives manual control when required and watches the moisturity with the assistance of dampness sensors .The fundamental segment here is the AVR At mega microcontroller that regulates the whole cycle. At first the robot works the whole field and continues to sowing, all the while apportioning seeds next to each other. On the field the robot works in an automated mode, however outside the field is carefully worked in manual mode.

[2] "Design and Implementation of Seeding Agricultural Robot" (JIRAS) (P.Usha, V. Maheswari, Dr. V. Nandagopal)

This paper describes how can a robot be utilized to build up the way toward developing farming area without the utilization of labor. The point of the paper is to reduce the labor, time and increment the profitability rate.

III. EXISTING METHOD

In existing system seed sowing robots are not available. In this a person should manually sow or plough the land for seeds. It takes so much time and need labor. So, we moved to proposed this system.

Disadvantages :

- It can lose connection in certain conditions.
- Not accurate method
- No seeding is done in this method.

IV. PROPOSED METHOD

We propose this “an agri-bot for” to overcome all the drawbacks in existing system. It reduces the burden of farmers, automation in the field of farming is necessary. automation of farming processes which saving the time and energy required for performing repetitive farming tasks and increases the productivity of yield.

BLOCK DIAGRAM :

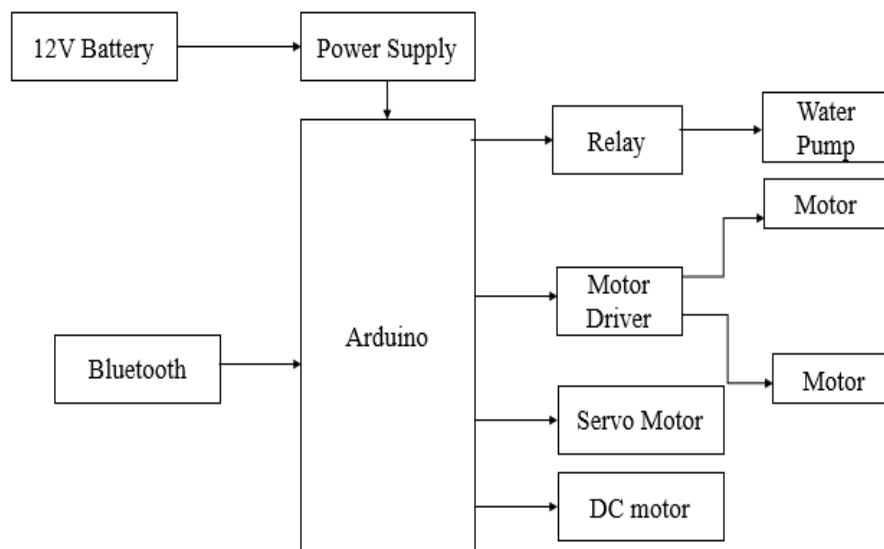


Fig 1: Block Diagram

V. COMPONENTS

A. ARDUINO

Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins. There are many versions of Arduino boards introduced in the market like Arduino Uno, Arduino Due, Arduino Leonardo, Arduino Mega, however, most common versions are Arduino Uno and Arduino Mega.

B. BATTERY

Battery Collected Charge from the solar panel is used to charge the battery. Supply is passed from the battery to framework.

C. SERVO MOTOR

Servo motor can be rotated for any angle using Controller. In this framework servo motor is used below the hopper, for seeding purpose. It can act as on-off valve.

D. SOLAR PANEL (POWER SUPPLY)

Solar panel is a get together of photo-voltaic cells mounted in a structure for establishment. It utilizes sun light to produce DC. An assortment of Solar modules is known to be solar Panel and an arrangement of Panels is an Array. Varieties of a photovoltaic framework gracefully sun oriented power to electrical hardware.

E. DC WATER PUMP

DC water pumps utilizes direct current from battery to move fluid in a different way.

F. BLUETOOTH

It is used for many applications like wireless headset, game controllers, wireless mouse, wireless keyboard and many more consumer applications. It has range up to <100m which depends upon transmitter and receiver, atmosphere, geographic & urban conditions. It is IEEE 802.15.1 standardized protocol, through which one can build wireless Personal Area Network (PAN). It uses frequency-hopping spread spectrum (FHSS) radio technology to send data over air.

G. RELAY

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, or where several circuits must be controlled by one signal. Most of the high end industrial application devices have

relays for their effective working. Relays are simple switches which are operated both electrically and mechanically. Relays consist of an electromagnet and also a set of contacts. The switching mechanism is carried out with the help of the electromagnet. There are also other operating principles for its working. But they differ according to their applications. Most of the devices have the application of relays.

H. MOTOR DRIVER

This engine driver board is perfect for mechanical applications and appropriate for association with a Micro controller requiring only a few control lines for every engine. It can likewise be interfaced with basic manual switches, TTL rationale Gates, Relays and so on. This double bidirectional engine driver depends on the extremely used Motor Driver Integrated Circuit i.e. L293D. The circuit will enable effectively and autonomously control two engines each in the two headings.

VI. SOFTWARE REQUIREMENTS

ARDUINO IDE

Arduino IDE where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module. It is easily available for operating systems like MAC, Windows, and Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.

The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board. The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module. This environment supports both C and C++ languages.

VII. RESULTS AND DISCUSSIONS

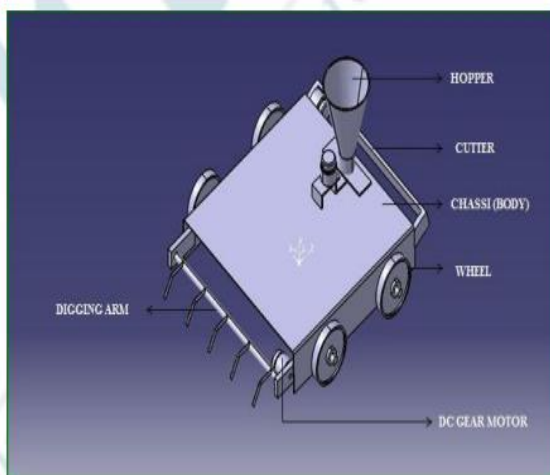


Fig 2: 3D model view of basic model



Fig 3: Basic testing prototype

The framework can run on two modes. In manual mode user can turn on pump and turn off the pump. In auto mode the framework itself automate the process depending upon soil condition. Soil moisture sensor value varies from 0 to 1023. If value is greater than 900 then it's dry. If it's less then it is wet. If user press and holds ploughing operation, motor will rotate in clockwise direction which results in downward movement of digging arm and when user releases motor will stop. Similarly, when user press and holds harvesting operation, motor will rotate in anti-clock wise direction which results in upward movement of digging arm. Here digging arm as well as collecting arm both are same.

VIII. ADVANTAGES, LIMITATIONS AND APPLICATIONS

A. ADVANTAGES

- By the improvement of these framework physical work diminished.
- Reduce the task of rancher and it is simpler to operate by using a smartphone.
- The robot does not get worn-out or wiped out.
- Fully smart phone controlled through Arduino.
- Easy to actualize.

B. LIMITATIONS

- Framework should be inside the specific range.
- Robots could change the way of life/enthusiastic intrigue of horticulture.
- Experts are required to examine framework failure.

C. APPLICATIONS

- Agriculture.
- Industrial.
- Commercial.

IX. CONCLUSION

This project introduces wireless technology in the field of agriculture. Exploits features of Android platform to help Farmers Significantly. Provides a flexible user interface to farmer to control the machine effectively. It reduces manual labor requirement which is a boon to the farmers as finding laborers is a very difficult job today. The Agribot can work in any sort of climatic condition as well as can work nonstop unlike humans. The time required to carry out the five functionalities reduces considerably in comparison with carrying out the same activities manually. It is a onetime investment which reduces the overall farming cost considerably. This Agribot acts as a gateway to automated smart farming.

X. FUTURE SCOPE

The framework can additionally be changed for estimating various boundaries in ranching like yield development, weed commonness, its sort and so forth. One or numerous frameworks can be observed through GSM framework. Attaching GPS and GPRS. Flying small scale robot. Adding camcorder for live spilling.

XI. REFERENCES

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