

Remote Controlled Multi Purpose Mower

Vanisr K¹, Kalaimamani K², Santhiya N³, Swathi S⁴, Dr. K. Pooranapriya⁵

^{1 2 3 4} Student, ⁵Professor

^{1 2 3 4 5}Department of ECE,

^{1 2 3 4 5}Vidyaa Vikas College of Engineering and Technology

^{1 2 3 4 5}Namakkal, India.

Abstract — Agriculture is the backbone of Indian economy. India has many factors which affects the productivity mainly includes inadequate irrigation tools, labour shortage and inefficient farming practice. In order to raise the productivity, this project strives to develop a robot capable of performing operation like automatic ploughing, pesticides spraying, weed removal and lawn clearance. The main component here is the Arduino that control the entire process. For the movement of wheels, ultrasonic sensor senses the length of the field or lawn. Once, this length is reached, the controller changes the direction of the wheel motor. In ploughing, when signal to plough is passed through the RF module the Arduino enables the ploughing motor through the relay which causes the pneumatic piston to perform the operation. In spraying process, a DC motor is used to pump the pesticides from the tank. The farmer can aware of the work status in the field through his mobile. A timer is used to set the time to activate the process. In lawn clearance, the ultrasonic sensor is used to detect the obstacle like animals, humans exist in its path, a buzzer is activated.

Keywords—GSM, DC motor, RF, Arduino

I. INTRODUCTION

Agriculture is the fundamental thing for survival in this world. But it is not a easy process. The farmer has to put huge effort in the irrigation process. In this project, the model developed can automatically perform ploughing, weeding, lawn mowing and spraying processes. The organization of this process is as follows in next section. The model of multi- purpose mowing machine is discussed in section III.

II. RELATED WORKS

In [1] Monalisha sahu, Dr A.K. Goel, the mechanical weeding is implemented. The machine can be used in any type of soil. The blades of the weeder can be changed based on the soil.

In [2] Pandit Shamuvel V, Patil Kedar K, et.al discussed that, the weeding can be done mechanically to change the current existing chemical methods. So that the plants do not get affected from the chemicals. In [3], Dr.C.Sakhale, Prof.S.N.Waghmare, Rashmi S.Chimote focused that, the farmers could not afford individual machines for the processes like cultivation, spraying and weeding. So this paper focused on designing a machine that could be used for various farming operations.

III. PROPOSED SYSTEM OF MULTIPURPOSE MOWER

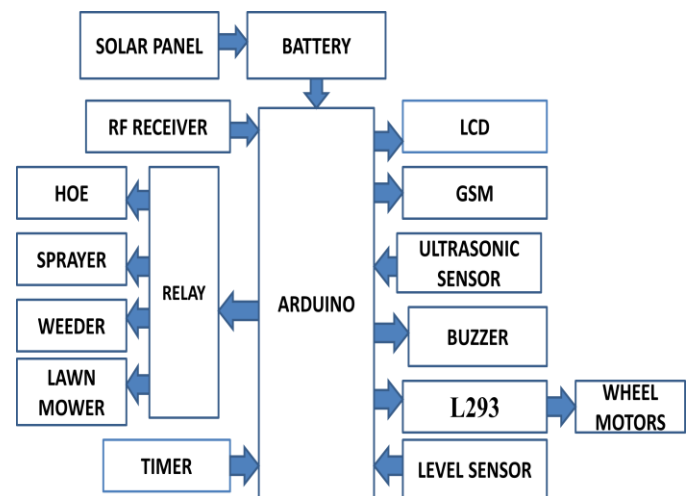


Fig 1. Architecture of multi purpose mower

The block diagram consists of Arduino microcontroller which is controller for the whole system as shown in Fig.1 and solar panel is connected to the battery for storing energy and further it is given to power supply charging circuitry which is providing +5 V for Arduino board and +12 V supply for driving DC motors using L293 motor driver module. RF module is used to send commands through the remote.

A. POWER SUPPLY

Solar panels are a great way to cut your electricity that everyone wants to live on their own or at least reduce our home's carbon footprint, and solar panels make this dream possible. Solar panels are made of photovoltaic (PV) cell, which converts sunlight into electricity.

B. Arduino controller

Arduino Atmega328 microcontroller as shown in Fig. 2 is used to command the various components. The Arduino atmega328 microcontroller and its architecture is shown in Fig. 2. The Atmega328 microcontroller has 28 pins. It has 13 I/O digital pins, of which 5 can be used as PWM outputs and 5 as analog input pins.

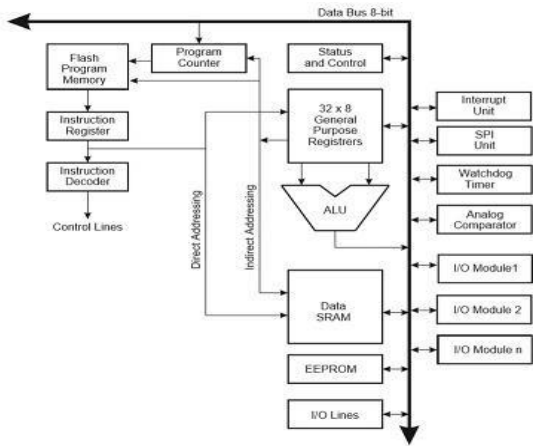


Fig 2. Arduino Architecture



Fig 4. Ultrasonic sensor

C. Motor Driver IC L293D

The motor driver is a module for motors that allows to control the working speed and direction of two motors simultaneously. The motor driver is designed and developed on the basis of L293D IC. L293D is a 16 pin motor driver IC as shown in Fig.5. It provides bidirectional drive currents at voltages ranging from 5 V to 36 V. The L293D is an IC with eight pins on each side to control two DC motors simultaneously. It consists of 4 input pins, 4 output pins and 2 enable pins for each motor[9-10].

D. Relay

Relay act as a switch that is interfaced between the Arduino and the equipments used for farming. It is used to enable or disable the operations based on the commands from the Arduino.

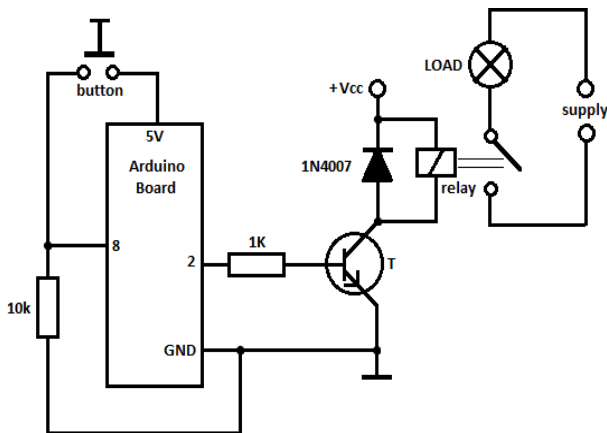


Fig 3. Interfacing Arduino with Relay

E. ULTRASONIC SENSOR

It is used to measure the distance of the field. The range of the sensor is minimum of 2cm to a maximum value based on the design of the machine.

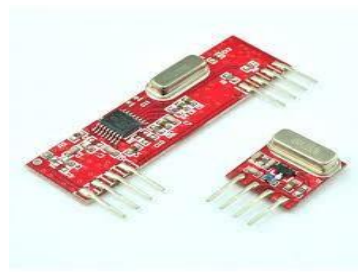


Fig 5. RF transmitter and receiver

G. REMOTE

A remote is used to send command to the Arduino to perform various operations. The remote consists of 5 buttons for initiating the operations.



Fig 6. Keypad structure

H. BUZZER

The buzzer is used to indicate when the condition in the code is met. The buzzer is activated when there is an obstacle in the path of the machine which is detected by the ultrasonic sensor.

III. IMPLEMENTATION

A. METHOD OF IMPLEMENTATION

The mower machine is designed to perform operations like ploughing, spraying, weeding and lawn cleaning. In ploughing and mowing, the ultrasonic sensor is used to detect the length of the field. This sensor also play a role in obstacle detection. The L293 motor driver can control

two DC motors. It is used to control the speed and direction of the wheels. When the sensor indicate the end of the field the wheels are rotated to right or left based on the commands from the Arduino.

In spraying , the pesticides are filled in the tank. It is then pumped using DC motor to the sprayer. When the farmer presses the button for spraying in the remote or if he set the timer for spraying the process is started. The status of the process is sent to the farmer's mobile using GSM module.

In weeding, a blade is fitted in the front of the machine which clears the weeds in the farm between plants. It is based on certain time delay fixed initially for particular plant in the field based on the crop distance.

B. FUTURE WORKS

- The spraying process can be done automatically based on the soil moisture and humidity.
- In weeding, image processing is made to adjust the height of the machine based on the plant growth.
- Timer can be used to automatically on and off when the time is reached.

IV. CONCLUSION

Thus, the multipurpose mower machine is cost effective and affordable equipment for the farmers. It helps in increasing productivity with less effort and saves time.

REFERENCES

- [1] Monalisha sahu,Dr A.K. Goel,"Development of multipurpose power weeder", in *Indian Journal of Social Sciences and Humanities Invention*, vol 4,Issue6 , June 2017.
- [2] Pandit Shamuvel V,Patil Kedar K, et.al,"Mechanical portable power weeder machine", in *International Journal of Research in Advanced Engineering and Technology*,Volume 2,Issue 5,September 2016.
- [3] Dr.C.Sakhale ,Prof,S.N.Waghmare,Rashmi S.Chimote,"Multipurpose farm machine", in *International Research Journal of Engineering and Technology*,Volume 3,Issue 9,September 2017.