

AGROBOTS

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ABSTRACT

Compared to spraying pesticides manually outdoors, the environment has a high temperature, humidity for operating the spray work in green-house or in farms. In order to protect labourer and reduce labour intensity, we have developed a prototype of pesticide spraying robot specially used in the greenhouse and farms. ROBOT is controlled with a ARM7 controller. Designing of latest inverted ROBOT which will be controlled using an REMOTE. We are developing the remote buttons and commands in the hardware by which we can control robot motion using RF communication to interface controller and remote. Controller can be interfaced to the RF module through UART protocol. According to commands received from remote the motions can be controlled. The consistent output of robotic system along with quality and repeatability are unmatched. Although the productivity of prototype is not quite efficient, the robot still meets the requirements of pesticide spraying in farms without human operators. The robot is equipped with RF receivers, which decodes and control it. The transmitting and receiving modules are constructed using microcontroller. This project is divided into two modules. One is transmitting (Remote) and other is receiving module (Robo). The transmitter is built by 89C2051 Controller. The data is modulated and transmitted by RF module. The movement of Agrobot is designed by DC motor. The data of sprayed pesticide is stored in memory using RTC and it is displayed on LCD. The required power supply is derived from battery.

Keyword : - Robot, ARM7, RF Module, DC Motor .

1. INTRODUCTION

The population of the world is urbanizing rapidly. In order to fulfill their diet the production of food must be increased, but this must be a cost affordable to everyone. Mechanism of agriculture enables conservation of input precision in ensuring better distribution, prevention of losses or waste of input applied. Mechanism reduces unit costs of production through higher productivity levels and the input conservation. The all agriculture equipment's often are hardly modernized due to its low productivity. In India farming is done by traditional ways, besides that there has been large development of industrial and service sector as compared to that of agriculture sector. The spraying of pesticides and insecticides is traditionally done by farm worker carrying backpack type sprayer which requires more human efforts. Giving attention to these important problems an attempt is made to develop equipment which will be beneficial to the farmer for spraying operations. This equipment is easy to use and operate.

In this regard here is a demo model of such equipment, which performs the operation very effectively. Such types of robots used in agriculture fields are called as AGROBOTS. In this project a remote is designed with the help of RF transmitter, which encodes the data to the robot for controlling the movement as well as spraying of pesticide. The robot is equipped with RF receivers, which decodes and control it. The transmitting and receiving modules are constructed using microcontroller. This project is divided into two modules. One is transmitting (Remote) and other is receiving module (Robo). The transmitter is built by 89C2051 Controller. The data is modulated and transmitted by RF module. The movement of Agrobot is designed by DC motor. The data of sprayed pesticide is stored in memory using RTC and it is displayed on LCD. The required power supply is derived from battery.

1.1 OBJECTIVE

The primary Goal of this project is to create a robo providing solutions to current human health hazardas involved in pesticide spraying. By development of this Agrobot lot of manual labour will reduced. The spraying of pesticide can be made precised and record of it is possible to maintain for reference.

2. SPRAYING METHODS:

One of the more common forms of pesticide application, especially in conventional agriculture, is the use of mechanical sprayers & Backpack (knapsnap) sprayer:

One type of backpack sprayer is a compress air sprayer with a harness that allows it to be carried on the operators back. Another type of backpack sprayer has a hand operated hydraulic pump that forces liquid pesticide through a hose and one or more nozzles. The pump is usually activated by moving a lever. A mechanical agitator plate may be attached to the pump plunger. Some of these sprayers can generate pressures of 100 pounds per square inch (psi) or more. Capacity of both these types of backpack sprayers is usually 5 gallons or less. Hydraulic sprayers consist of a tank, a pump, a lance (for single nozzles) or boom, and a nozzle (multiple nozzles). Sprayers convert a pesticide formulation, often containing a mixture of water (or another liquid chemical carrier, such as fertilizer) and chemical, into droplets which can be large rain type drops or tiny almost invisible particles. This conversion is accomplished by forcing the spray mixture through a spray nozzle under pressure. The size of droplets can be altered through the use of different nozzle sizes, or by altering the pressure under which it is forced, or a combination of both. Large droplets have the advantage of being less susceptible to spray drift, but require more water per unit of land covered. Due to static electricity, small droplets are able to maximize contact with a target organism, but very still wind conditions are required. But, in this type of spraying, the labor has to carry all the weight of the pesticides filled tank which causes fatigue to labor and hence reduces the human capacity.



Fig -1 Backpack pesticide sprayer

2.1 EFFECT OF BACKPACK SPRAYER

- Increases labour work.
- It is hazards for the person.
- Can affect the health of the person.

- Pesticide spraying is injurious to health.
- Inhaling of pesticide can cause death .

2.2 SOLUTION

The solution for above problems are given by different Scientist and Engineers. Various surveys are carried out by the experts. There are different IEEE papers and Reports published by different peoples. According to various reports it is stated that most of the agriculture equipments that are been projected a various fields, that is either by researchers or by engineers are practically very difficult to implement. This equipments are made mostly very complex in terms of field operation or either less efficient as they are implemented based upon the basic concept from design point of view. Hence we are designing a robot which will over come these problems. The robot basically help the farmer for pesticides and chemical spraying which will automatically reduce their problems. This will ensure that the productivity of crops will increase and it will minimize the wastage of pesticides. It will help in reducing health issues such as respiratory problems, back pain, various effects on health.

3. MODELING/DEVELOPMENT OF SYSTEM

The figures shown below are the circuit diagram of AGROBOTS. The circuit diagram shows the connections and placement of components. The circuit diagram includes the circuit of transmitter as well as reciever.

3.1 CIRCUIT DIAGRAM

In this project a remote is designed with the help of RF module, which encodes the data to the robot for controlling the movement as well as spraying of pesticide. The robot is equipped with RF receivers, which decodes and control it. The transmitting and receiving modules are constructed using ARM7 and motors to control its motion. The system includes DC motor to drive the vehicle. The whole assembly is controlled by ARM7 microcontroller.

3.2 ALGORITM

1. Start
2. Initialize UART and I/O ports.
3. Display on LCD.
4. Check for motion, move the robot.
5. Display on LCD.
6. Check for up down condition and move sprayer.
7. Display on LCD.
8. Check for RTC data and send data to remote.
9. Display on LCD.
10. Repeat step 3.
11. Stopp

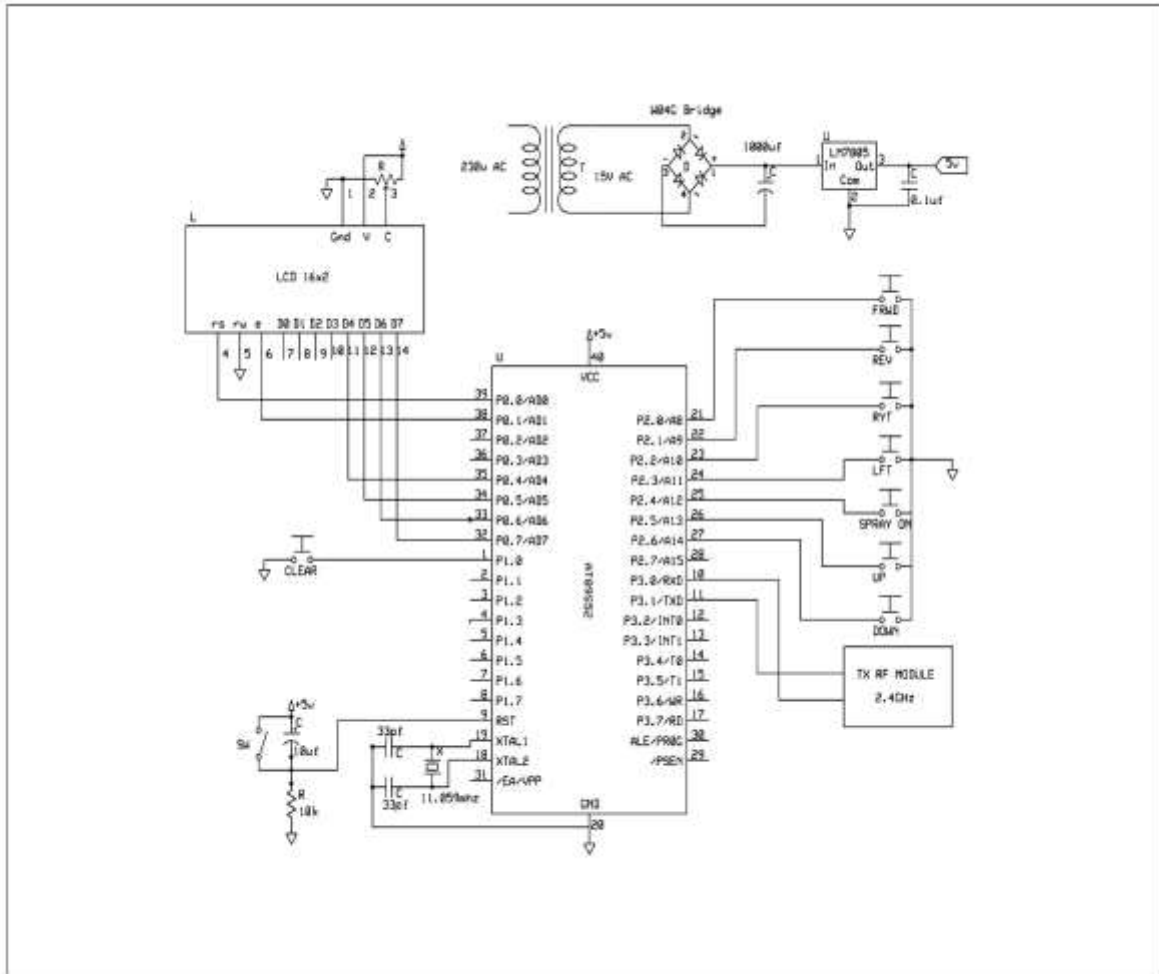


Fig -2: CIRCUIT DIAGRAM OF TRANSMITTER

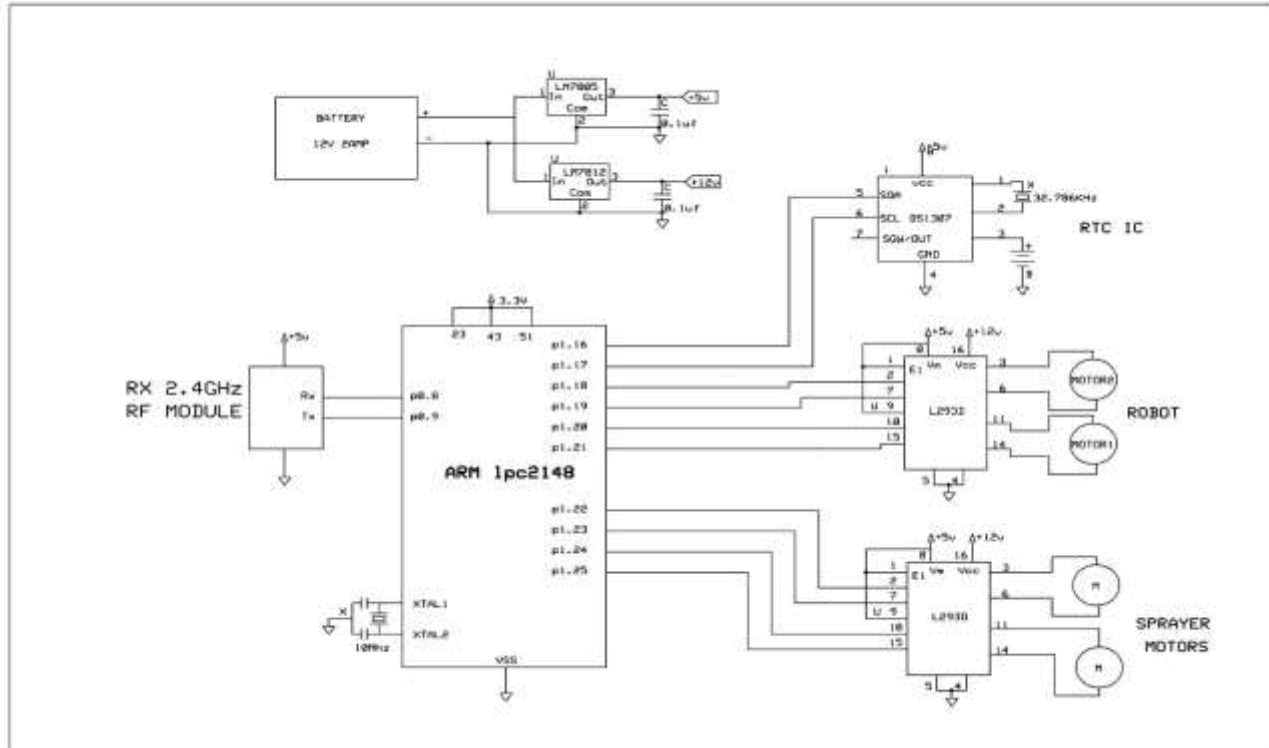


Fig -3: CIRCUIT DIAGRAM OF RECIEVER

3.3 APPLICATION

- Green house.
- Farms.
- Any device controlling .
- Machines controlling system in industry.

4. CONCLUSIONS

In this we have introduce the concept of agrobot. The main motive of the project is to minimize labour work and side effects of pesticides to the farmer.This project will ensure the ease of pesticide spraying with low cost and minimum utility of resources.The agrobot will spray pesticides and maintain a record of the last spray making the farmer updated with the last spray.The spraying part can be adjusted at a certain height according to the plant and reduce leakage spray and heavy spray as much as possible.This project will surely help farmers to produce quality product without harming their health.We are sure that once this concept is presented in manner suitable to indian market,it will differently help in bringing down the side effects due to chemicals and pesticides.

5. ACKNOWLEDGEMENT

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6. REFERENCES

- [1] Robotics technology and flexible automation by S.R DEB.
- [2] Computer aided manufacturing by P.N Rao and N K TEWARI.
- [3] Sammons PJ,Furukawa T,Bulgin A,"autonomous pesticide spraying robot for use in greenhouse[A],2008.
- [4] B.Astrand,A.Baerdveldt,"A vision based row following system for agriculture field machinery",mechatronics,vol.15,no.2,pp.251269'2005.
- [5] Sammons PJ,Furukawa T,Bulgin A.,"Autonomus Psticide Spraying Robot for Use in A Greenhouse[A]",Australian Conference on Robotics and Automation,Sydney Australian 2008.
- [6] Zhang Ying,Mu Nan,Zhang Xueqin,"The Development Status and Trends of Facility Agriculture Overseas[J]".
- [7] mechatronic Based Remote Controlled Agricultural Robot by Vijaykumar N Chalwa,Shilpa S Gundagi
- [8] B.Astrand,A.Baerdveldt,"A Vision based row-following system for agricultural field machinery",Machatronic,Vol.15,No.2,pp.251269,2005.
- [9] R.Eaton,J.Katupitiya,K.W.Siew,B.Howarth,Autonomus farming:Modeling and control of agricultural machinery in unified framework",In Proc. 15th Int. Conf. Mechatronics and Machine Vision Practice,Auckland,New Zealand,Dec.2008, Vol.1,pp.499504
- [10] Simon Blackmore,Bill Stout,Maohua Wang,Boris Runov,Robotic Agriculture the future of agricultural mechanisation?"Agro Technology the Royal Veterinary and Agricultural University Agrovej 10 DK-2630 Taastrup,Denmaek.

