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AGRI REMOTE CONTROL PESTICIDE ELECTRONIC SPRAYER ROBOT

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ABSTRACT

This paper presents a technological solution to the current human health hazards involved in spraying of potentially toxic chemicals in the confined space of an atmosphere. This is achieved by the design and construction of an electronic sprayer robot for use in pest control and disease prevention applications in commercial Farm. The effectiveness of this platform is shown by the ability to successfully navigate itself down rows of a Farm, spray the pesticides effectively while the farmer controls it from a far distance. And this pesticide spraying system efficiently covers the plants evenly with spray in the set dosages.

Keywords— Electronic Sprayer Robot, Pesticide Spraying System, Human Health Hazards.

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1. INTRODUCTION

In India after the independence the demand of food increased drastically and in order to meet the heavy demand of food the farmers had to increase the productivity of the crops so that they can be made market ready as fast as possible .To meet this need the farmers had to use more amount of fertilizers. Fertilizers are mainly classified as organic and inorganic fertilizers. The organic fertilizers (animal wastes and plant residues) must be broken down into inorganic forms in the soil before plants can take up the nutrients required for growth and reproduction. They are relatively inefficient because they contain low concentrations of nutrients and hence, large volumes of material need to be transported and spread over fields to overcome deficiencies. Also, organic fertilizers take time to breakdown into inorganic forms and become available to plants. In contrast, inorganic fertilizers have a high concentration of nutrients that are rapidly available for plant uptake. Relatively small quantities of inorganic fertilizers are required and transport and application costs are low. In addition, inorganic fertilizers can be formulated to apply the appropriate ratio of nutrients to meet plant growth requirements.

The main businesses of Indian people is agriculture and the economy of the nation is decided by agriculture .The agriculture production is being stimulated by various environmental parameters like temperature, rain and other weather parameters in factors such as quality and quantity that are beyond control. The productivity of the crop is affected by other major biological parameters such as pests, disease and these parameters can be controlled by human beings for improvising the production of crop.

The purpose of agricultural robotics is not only to apply robotics technologies on the field of agriculture but withal to

utilize the agricultural challenges to develop incipient techniques and systems. Robots are taking over more and more functions from humans where precision and repeatability in routine tasks are needed and where human workers are exposed to peril. One such task is cultivation of crops in fields and greenhouses where human operators still manually perform most operations on the crop albeit they are often highly perpetual and sometime even perilous.

2. LITERATURE REVIEW

Recent Century is full of of technology, none field can't be remain without use of the technology, Agriculture is one of those fields. More than 42% of the total population in the world has chosen agriculture as their primary occupation. The farmers have to do many works, such of them are also not good for their health. Some problems about also their crops as some insects can damage their crops. To decease or remove these damages different types of pesticides available .But they are not safe for human health while spraying.

Due to the spraying of pesticides the farmers get infected towards various type of diseases like soil borne, air borne and water borne. These diseases are very contagious and can cause severe health hazards.

3. PROPOSED SYSTEM

This project proposes the design of remote control spraying pesticides robots. Test results show that the design realizes spraying pesticides by robot to replace staff job, and achieves good results.

"Automation as a part of solution"
The actual concept is to make an automated robot using ARM7 controller which will eliminate all the health issues. The block diagram for this is as shown in fig.1. It will Produces Efficient and health conscious operation due to remote control.
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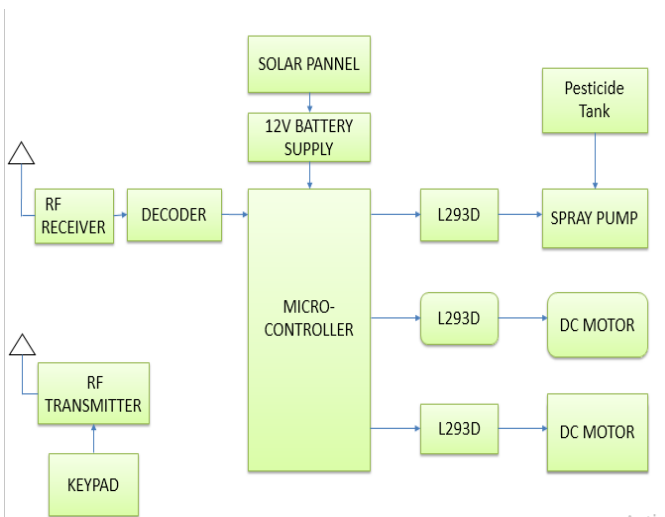
Fig-1: block diagram of proposed system.

3.1 Working Principle

Now a days there is increase in insecticides & other fungus attack on crops. Hence we need more pesticide spraying. For this we develop Smart Remote Control Pesticide Electric Sprayer. Which is mounted on robot type mechanism.
Input unit consists of the power supply unit in the form of 12V DC Battery. Which provides power to each and every electronic component in the Robot. We also can use SOLAR PANEL for Battery charging at site. The pesticide storage tank for storage of pesticide in liquid form.

The ARM 7 Controller LPC2148 is the Heart of the Robot. The Driver Circuit is connected to the ARM 7 Controller which in turn is connected to DC Motors For the purpose of Driving the Robot. The Remote Control unit controls the direction of the robot wirelessly. It can move Forward, Reveres, Left and Right by RF Remote Control. The Pesticide Pump is used to transfer the pesticide from storage tank to the Sprayer head. The Spraying Pump Will spray the pesticide in specified direction.

3.2 Hardware used

The hardware used for the proposed system is consisting of following components.

3.2.1 ARM 7(LPC2148) Description:
a) In ARM (LPC2148) the pin from P0.11 toP0.22 except P0.14 is given to LCD.
b) P0.14 pin is for program and run mode switch.
c) P1.16 to P1.23 is for 4x4 keypad interface.
d) P0.5 (MISO),P0.6(MOSIO),P0.4(SCK) is given to SPI memory.
e) P0.25 is given to the audio amplifier which a analog output from LPC2148.
f) P0.0 (TXD0),P0.8 (TXD1),P0.1(RXD0),P0.9(RXD1) this pins are used for MAX3232 connections.
g) Pin 49 is for the connection of battery.
h) Pin 23,51 , 43 are for Vcc connections.
i) Pin no.18,25,50,42,6 are connected to ground.
j) Capacitors are connected to Vcc pin for passing ac voltage to ground and blocking of dc voltage for controller.
k) Pin no.61, 62 consists of crystal oscillator for controller.
l) Pin no.3, 5 are for RTC crystal oscillator which is of 32kHz.
m) Pin 51 is for reset function.
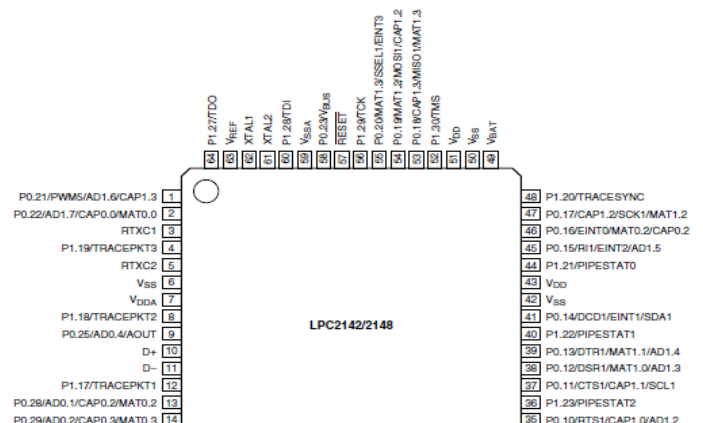
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[1]. Reference1

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Fig-2: Pin diagram of LPC 2148.
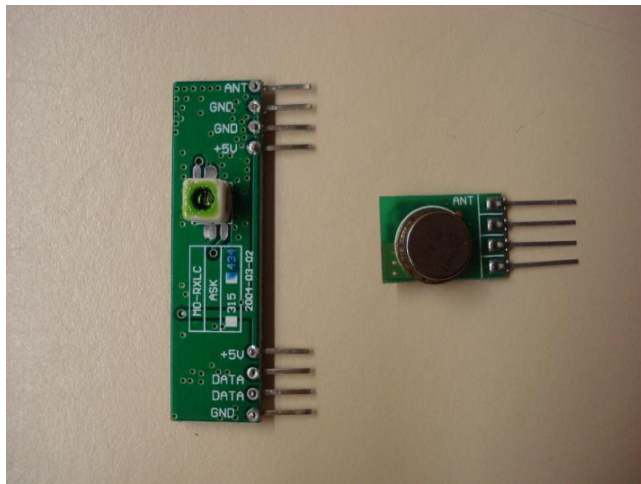
3.2.2 RF Module:

Fig-3: RF Transmitter & RF Receiver.

Radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can receive these signals only if it is configured for that frequency.

This **RF module** comprises of an **RF Transmitter**

This circuit utilizes the RF module (Tx/Rx) for making a wireless remote, which could be used to drive an output from a distant place. RF module, as the name suggests, uses and an **RF Receiver**. The transmitter/receiver (Tx/Rx) pair operates at a frequency of **434 MHz**. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna

connected at pin4. The transmission occurs at the rate of 1Kbps - 10Kbps.The transmitted data is received by an RF receiver operating at the same frequency as that of the transmitter.

The RF module is often used along with a pair of encoder/decoder. The encoder is used for encoding parallel data for transmission feed while reception is decoded by a decoder. HT12E-HT12D, HT640-HT648, etc. are some commonly used encoder/decoder pair ICs.

3.2.3 DC Motor:

A motor is an electric machine that converts electrical energy into mechanical energy. There are many confusion arises when motors categorized, but mainly two types that is AC & DC. Here we only interface simple DC motor.
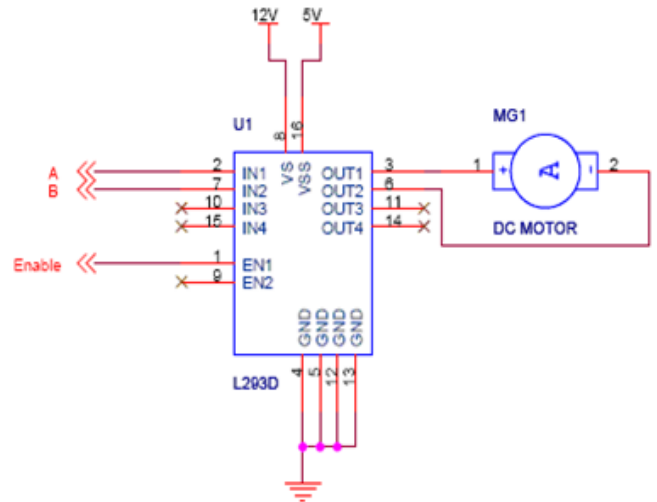
3.2.4 L293 Driver:

Fig-4: L293D Driver IC.

L293D is a dual H-Bridge motor driver, So with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fix direction of motion the you can make use of all the four I/Os to connect up to four DC motors. L293D has output current of 600mA and peak output current of 1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included within the IC. The output supply (VCC2) has a wide range from 4.5V to 36V, which has made L293D a best choice for DC motor driver.

handling and easy maintenance and other characteristics of individuals with a broad market in agricultural production.
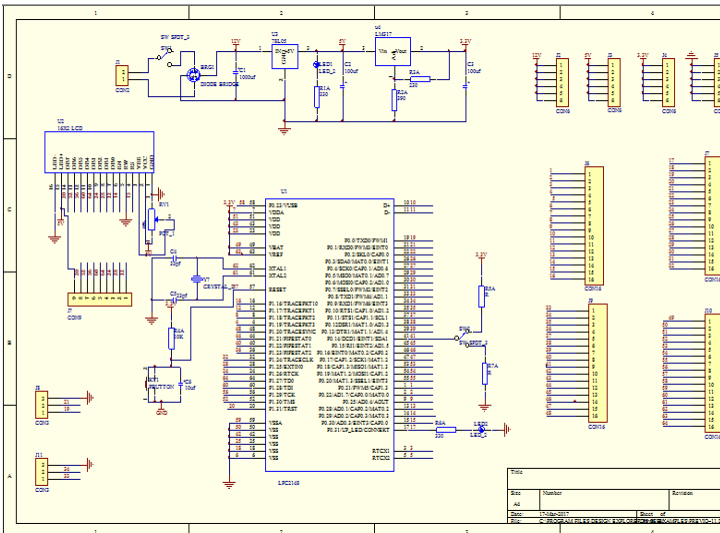
Fig-5: Overall design of Electronic Sprayer Robot system.

4. MERITS

- Wireless operation will eliminate the health issues and would even save them from tedious work.
- It will have less use of manpower.
- Efficient and health conscious operation due to remote sensing.
- With the help of live feed of spraying the farmer is expected to control the robot wirelessly from a distant place.
- With less manual effort we can do a lot of work.

5. DEMERITS

- During the rainy season the sloppiness would reduce the speed of the robot.
- All the electronics components mounted on the chassis need to be covered properly else environmental changes could alter the output.
- If Battery Discharge on more use, Work stops meanwhile.

6. CONCLUSION

An intelligent robot system spraying pesticides, to control the robot through a wireless alternative to manual completion of crops spray test, reducing direct exposure to pesticides and the human body, reduce pesticide harm to people, and improve production efficiency. It can be good at different terrain, different heights crops by spraying operation tests show that a certain protective, practical, mobile robot, better spray effect at the right working environment, such Its low cost, ease of

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