International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 12 | Dec 2020 www.irjet.net p-ISSN: 2395-0072

Automated Pesticides Spraying Robot- Agrobot

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Abstract - *Implementation of new idea and new technology are the valuable gift to the recent generation. Utilization of new technology has shrunk the world and brought very easy within our reach. The expansion and growth of the ideas and concepts are directly linked to the economic growth as well as development of the country. This paper presents microcontroller based pesticide spraying robot.*

***Key Words*: Microcontroller PIC18, IC LM317, Robotic arm, IOT, Solar charge circuitry.**

1. INTRODUCTION

Automated pesticides spraying robot is a project that provides farmers an economical pesticides spraying solution with maximum efficiency [1]. PIC18 is very good microcontroller which is used for controlling the robot to follow the exact desired instructions [2]. Robot is controlled using RF communication module to follow the desired instructions [3]. Now a day's android apps are there to control button, voice and line and make very user friendly [4] To provide the framers a low cost efficient solution for spraying the pesticide at desired vicinity of the crops.[5]. Robotic arm provide an advance option for efficiently spraying the pesticide [6] it provides IOT platform to intelligently monitor the path of the specific field.

1.1 Chassis

The structure of the robot is manufactured using the UPVC pipes and connectors. The PVC provides a light weight and solid structure for the chassis of the robot .The structure can be adjusted in width and height manually. This provides an additional option in spraying the pesticide in the field according to the various types of crops. The pesticide tank, communication modules, robotic arm and other essential electronic circuitry is placed upon the acrylic sheet that is mounted on the chassis.

1.2 Robotic Arm

Sample The robotic arm is used for multiple industrial applications, from welding, material handling, and thermal spraying, to painting and drilling. The robotic arm consists of the spraying mechanism, DC motor and BO motor. The arm is controlled using a remote communicating via RF communication module. The arm can make movement in 360 degree and forward, reverse, up and down. Spraying of the pesticide is operated using a nozzle that is attached at the tip of the robotic arm .The robotic arm provides consistent spray of the pesticide and equal distribution avoiding the excessive spray of the pesticide. It improves the work efficiency and avoids direct contact of human with harmful pesticide.

1.3 Microcontroller PIC18

The PIC (Programmable Interface Controllers) microcontrollers are the world's smallest microcontrollers that can be programmed to carry out a huge range of tasks. Every PIC microcontroller architecture consists of some registers and stack where registers function as Random Access Memory (RAM) and stack saves the return addresses. The main features of PIC microcontrollers are RAM, flash memory, Timers/Counters, EEPROM(Electronically erasable read only memory), I/O(Input/output) Ports, USART(Universal Synchronous and Asynchronous Receiver Transmitter), CCP (Capture/Compare/PWM(Pulse Width Modulation) module), SSP(Serial Slave Point), Comparator, ADC (analog to digital converter), PSP(parallel slave port), LCD and ICSP (in circuit serial programming) The 8-bit PIC microcontroller is classified into four types on the basis of internal architecture such as Base Line PIC, Mid Range PIC, Enhanced Mid Range PIC and PIC18. The microcontroller provides the commands to other modules.

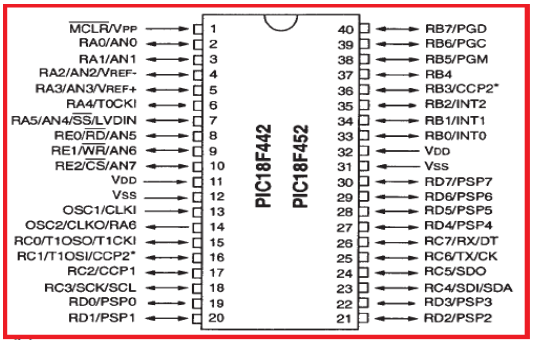

Fig -1: Pin Diagram of PIC 18

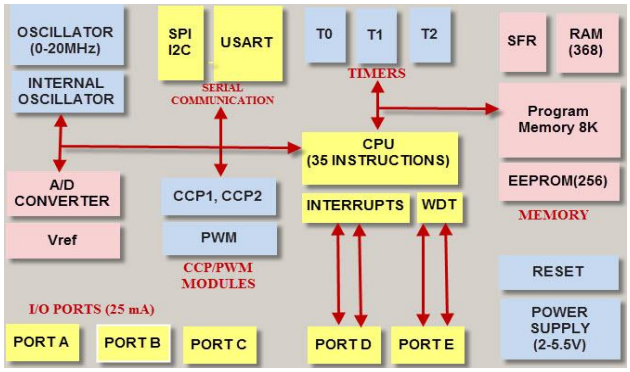

Fig -2: Architecture of PIC18

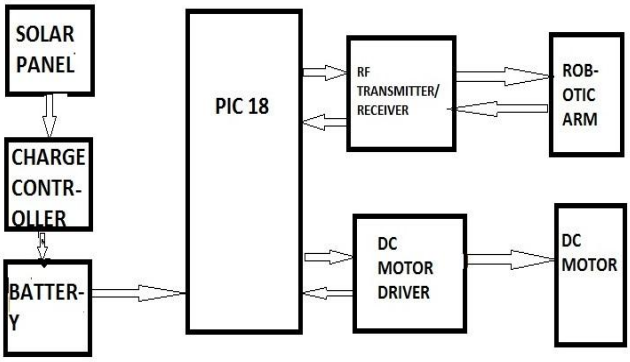

Fig -3: Block Diagram of the Robot

1.4 Battery/ Solar Charging Circuitry

The 5000mah (milliampere - hour) Lithium Polymer battery is used to operate the robot and solar energy is used to charge the battery. The battery is used to power the microcontroller and other essential circuitry involved in the operation of the robot .The solar panel of O/P (Output) 17V is used charge the battery using a solar charge circuit that involves LM317 as the charge controller IC. The battery is light on weight which is an important aspect in working of the robot

2. METHODOLOGY

Agrobot is a multifunctional robot that performs noteworthy capacities typically required in Agriculture field i.e. spreading the fertilizer. Agrobot comprises of a control unit which chooses field estimation in length and breadth. The height of the robot and the sprinkler can be adjusted manually. This is a working undertaking that has been totally amassed properly tried and employments Mechanical/Electrical/Electronic segments according to the necessity of the model of Agrobot. IoT (Internet Of Things) is used to operate the functions through the mobile with the connections of GPRS RS 32 to the android based mobiles and it can handle the process by automatically and artificially. The microcontroller is used for controlling the robot according to the mechanism of agrobot. To control the device from the mobile place we are using IoT technology. IoT process that information which is received by the receiver. The movement of the robot depends on the instruction (commands) received by the receiver unit. This semi-automatic robot which works on open architecture principle, so it reduces human labor. It works faster than human efforts which definitely save time. The robot should work according to the desired operation and should provide fertilization process on the operated field without any errors in different environmental conditions.

3. CONCLUSION

Now a day's agriculture greatly depends upon different robotic machinery for the cost and best accuracy point of view. The programming and interfacing was the master key during final stage and also successfully complete of this work. For perfect performance one should check the battery activities in the designed circuit properly. The project can be implemented using the metal chassis with much powerful motors to provide robust operations in all terrain. The project will benefit small scale farmers and will provide an economical solution and help them financially.

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