ANDROID MOBILE CONTROL SMART PESTICIDE SPRAYING ROBOT

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Abstract – Starting from an intelligent spraying robot that will reduce pesticide and human health harm, there by protecting farmers and reducing labour intensity. The robot will have a complete path planning and navigation systems, as well as driving obstacle avoidance with driving control, spraying mechanism and multi sensor module integration. The spray robot will be designed with obstacle avoidance, spraying, and sensor integration simulations and analyses. It is used not only to track motion and monitor orientation, but also compensate for path error to achieve batter stability and reliability. Meanwhile, the spraying system will be modified to eliminate leakage and prevent repeated spraying, with automatic sprays changing according to the target. This is propose and insecticide spraying system that will help farmers in agriculture.

Key Words: *DC Motor, Arduino UNO, Bluetooth Module, Relay*

1.INTRODUCTION

Agriculture is the primary source of income for India's population, which accounts for near by 60% of the country's total population. Farmers work in their fields and grow different crops based on the environment and available resources. To meet the high demand for food from such a large population, Farmers must use large amount of pesticides to increase food production. Conventional manual pesticide spraying operations is completely expose the pesticide liquid to the work environment, causing great harm to human body and when the pesticide comes into contact with the farmer during spraying, it can cause skin cancer and asthma.

Increased pesticide spraying can affect consumer health as it enters the food chain. So we designed and an automated robotic system that can spray restricted amount of insecticide only when the insect is detected to solve the problem above-mentioned. This not only saves the farmer from life-threatening diseases and physical problems, but also saves his money due to the use of restricted pesticide. That is why farmers help in economic development of the country. Using this type of robot reduces the time required to spray pesticide liquid and will help reduce the workload of framers in any season or condition. Surely this idea will accelerate their company to reach new heights and also be more profitable. The implementation of our robot is largely dependent on farmers awareness, which we believe will be easily generated due to its numerous benefits. The proposed aims to enhance farmer safety while carrying out cropping activities such as spraying chemicals, fertilizers, and pesticides. The research shows its relevance in the field of Agricultural Engineering, Electrical Engineering, Electronics Engineering, Telecommunication Engineering, Mechatronics Engineering, Environmental Engineering, Biomedical Engineering, Mechanical Engineering etc. The detection and tracking of moving objects are widely used as low-level function of computer vision applications, such as video surveillance, robotics, authentication systems, user interfaces through gestures and pre-stage of MPEG4 image compression as discussed earlier. The rest of the paper is organized as Section II includes a brief overview of the Literature Review, Section III includes the Proposed System And the function of the robot, Section IV includes the Results, advantages and its

applications in various fields. Finally, Section V and VI includes Conclusion and Future work areas that present the implications of the proposed system.

2.LITERATURE SURVEY

Robotics model provides a facility to control the movement of agriculture vehicle. Plant diseases can reduce the quality and quantity of agricultural products, resulting in serious port-effect situations. Cultivated crops face many challenges, including early detection of pests. First stepentails regularly keep a close eye on the plants. The diseased trees will then be classified and the affected parts of the trees will be photographed with a camera. Pre-processing, transformation, and clustering are then applied in the images. The images are then presented as input, to the processor and the processor compares them. If the image provided is an affected image, an automatic insecticide sprayer is used to apply the insecticide to a specific areas of the leaf. If not the processors will automatically discard it and the robot will continue on its way. A new wireless robot is designed to remotely control the necessary commands from the PC section at the receiver side. Based on the written program, Independent tasks such as moving the wireless robot to the correct path whenever the robot encounters an obstacle, making some strange noise whenever the wireless robot experiences a unknown movement, spraying of pesticides, and turning on the electric motor. Crop fields are deficient in moisture. Created an agriculture robot vehicle that navigates between crops based on the farmer's joystick instructions. The transmitted instructions will be received at the receiver end, and the movement of the robot will be determined. This robot will detect insects using image processing and pesticides.

3.BLOCK DIAGRAM
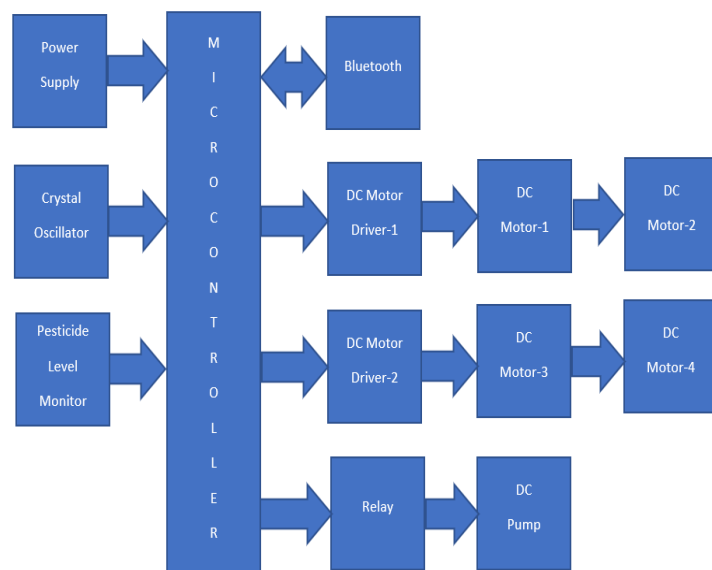
Working:

PIC16F877A Specs

Here's a few of its specifications:

- Bus width – 8 bits

- Pin Count – 40 (PDIP, SOIC) / 44 (QFN, PLCC, TQFP)

- Program Memory – 14.3 kilobytes

- CPU Speed – 5 million instructions per second

- RAM Size – 368 bytes

- EEPROM Size – 256 bytes

Obviously, the PIC16F877A trumps the PIC16F84A is based on the above numbers. But what separates this microcontroller these are the features:

- 10-bit, to 8-channel Analog-to-Digital Converter (A/D)

- Synchronous Serial Port (SSP) with SPI (Master mode) and I2C™ (Master/Slave)

- Universal Synchronous Asynchronous Receiver Transmitter (USART/SCI) with 9-bit address detection

We build the android application to control this spraying rover. First we need to connect the Arduino application with the Bluetooth module HC 05 to control all the hardware components of the spraying rover. We can easily control the spray rover when we connect Bluetooth. To this we can add four brushless DC motors with L293D motor driver. Connection of microcontroller brushless DC motor is powered by brushless motor driver and power supply from 12V battery. Motor drivers are able to manipulate the rotation of the motor using a phase connected gate driver mosfet on its circuit. Another set of DC motors is also used here to control the sprayer part of this rover. The DC motor is a rotary or linear actuator that can control angular or linear position, velocity, and acceleration with precision. The main purpose of this servo motors is to move the sprayer according to the needs of the users. We used this DC motors as the arm part to move the sprayer accordingly. Arduino uno board receive commands from android application and acts accordingly. In this system 6V pump we used. the pump is connected with Arduino and goes through a buck convertor and relay module that helps control the high voltage pump. A relay is a switch that is electrically controlled by an electromagnet. A low voltage, such as the microcontrollers 5 volts activates an electromagnet, which pulls a contact to make or break a high voltage circuit. Here, we used a 12V battery which is actually high, so we use a buck converter here to convert high voltage DC current to low voltage DC from input to output. A Buck converter steps down the DC voltage. The operation of the circuit is determined by the conduction state of the MOSFET: On-state: The current flowing through the inductor increases and the diode turns off. From the inductor to the capacitor energy is transferred, the inductor current decreases. In the rover,

we have also added humidity sensors and temperature to predict weather before spraying pesticides. **DC Geared Motor, 100 RPM, 12V, Torque up to 2 Kg-cm**

This DC Motor with Metal Gear Head is generally used in various robotics applications , It has following electrical and mechanical specifications.

Specifications:

Motor Type	:	DC with Gear Box, Metal Gears
Base Motor	:	DC 3000 RPM
Shaft Type	:	Circular 6mm Dia with Internal Hole for coupling, 23 mm shaft Length
Maximum Torque:		~3 Kg-cm at 12V
RPM	:	100 RPM at 12V
Weight	:	130 Gm
Max Load Current:		~330mA at 12V

ADVANTAGES

- Reducing direct exposure to pesticides and the human body and improve production efficiency.
- They also operate with closer tolerances.
- They produce less errors and higher speed, and the machine can reliably detect high-quality objects.
- Robots can reduce pesticide use on farms by up to 30%.
- Robots have the potential to create jobs for those who must build and repair them.

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