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HIGHTECH-SPRAYER

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Abstract: *In India, near about 70% people are dependent upon agriculture. So the agricultural system in India should be advanced to reduce the efforts of farmers. Various number of operations are performed in the agriculture field like seed sowing, weeding, cutting, pesticide spraying etc. Very basic and significant operation is Pesticide Spraying. But the present methods of Pesticide Spraying are problematic. In order to reduce pesticides in agricultural production caused by direct contact with the human body injury and improve the efficiency of agricultural spraying operations, this paper proposes the design of Ultrasonic Sensor controlled spraying pesticides robots. For monitoring the PIC controller, Sensing a obstacles and spraying operation. Test results show that the design realizes spraying pesticides by robot to replace staff job, and achieves good results.*

Keywords: *Zigbee Module, Ultrasonic Sensor, Robot, Spraying*

1. INTRODUCTION

India is known as one of the most agriculture based country. Various kinds of crops, fruits are grown in India and even made many products from that. As because of good quality of that it is exported all over the world. Agriculture is an important sector of Indian economy as it contributes about 17% to the total GDP and provides employment to over 60% of the population. An understanding of soil chemical properties is important because of their effect on nutrient availability to plants. Also, these properties may usually be favourably altered with the use of lime and/or fertilizer materials With the development of these modern lime and fertilizer materials, as well as equipment for handling and application, amending soil chemical properties became a cheap and easily accomplished task relative to the high returns often achieved. The challenge for agriculture is to increase food production in a sustainable way. One important aspect of this challenge is the use of agricultural pesticides which add persistent

organic chemicals to ecosystems. Spraying of pesticides and fertilizers is also dangerous to human being. This project is a new way of approach in the field of robotics by integrating the new technologies together to perform the agricultural work in the small area fields aims mainly focuses on safety of human being who perform hazards works in the agricultural fields and also to increase the production which is required in today's fast growth population in eco-friendly manner.

2. THE BASIC PRINCIPLE

For increasing production in agriculture field or Green House all the field operations such as preparation of soil, planting, watering, spraying of fertilizers and pesticides should be carried out in a proper way. Pesticides and fertilisers sprinkling are very much hazardous to farmers. From past several years there is a huge growth in agriculture field work techniques. System is based on the robot having 4 wheels. The robot chassis of strong Steel base. The robot can move in all 4 directions Forward, Reverse, Left & Right. Along with the same the robot movement is carried out under the obstacle detection Ultrasonic sensors. Sprinkling action carried out automatically. Compared with the traditional medicine spraying techniques the advance system is vary superior . In traditional system there was direct contact of person to the medicines was highly dangerous to the health of that person . The project idea consist of robot which sprays fertilisers in the farm. A robot carries fertiliser or pesticides tank having water level sensor to sense the level of fertilizers or pesticides. This concept contain two main parts as transmitter and receiver. At the transmitter side personal computer(PC) or laptop, MAX 232 and Zigbee transmitting antenna are present. This whole transmitter section is responsible for sending commands to receiving side of robot. At the receiving side different modules such as Spraying Module, Object Detection Module, Nozzle Up-Down control Module are present. These all modules are driven by separate relay drive circuits individually. When command is placed by transmitter side, the required action takes place. The water level sensor can sense the level of fertilisers or pesticides, if it is below the threshold level then it gives message on the LCD Display. Also ultrasonic sensor can detect objects on the path of robot so that it can be handled by transmitter side and changing the path of robot.

3. BLOCK DIAGRAM

A] TRANSMITTER SECTION:

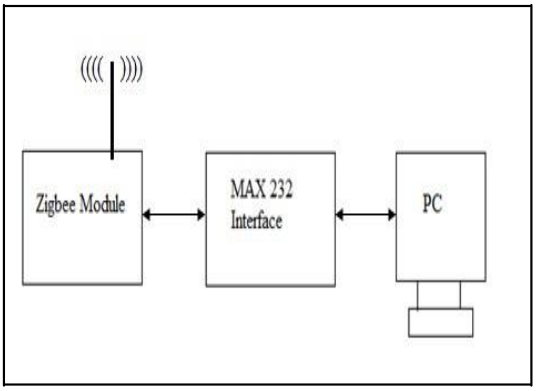


Fig1. Transmitter Block Diagram

B] RECEIVER SECTION:

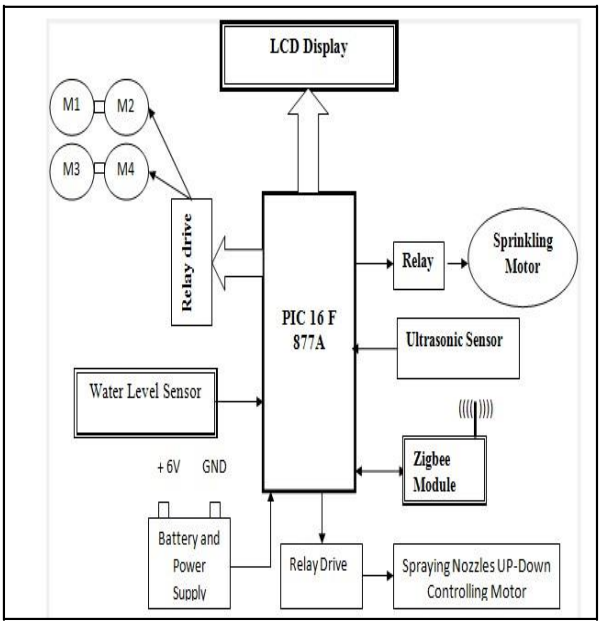


Fig 2. Receiver Block Diagram

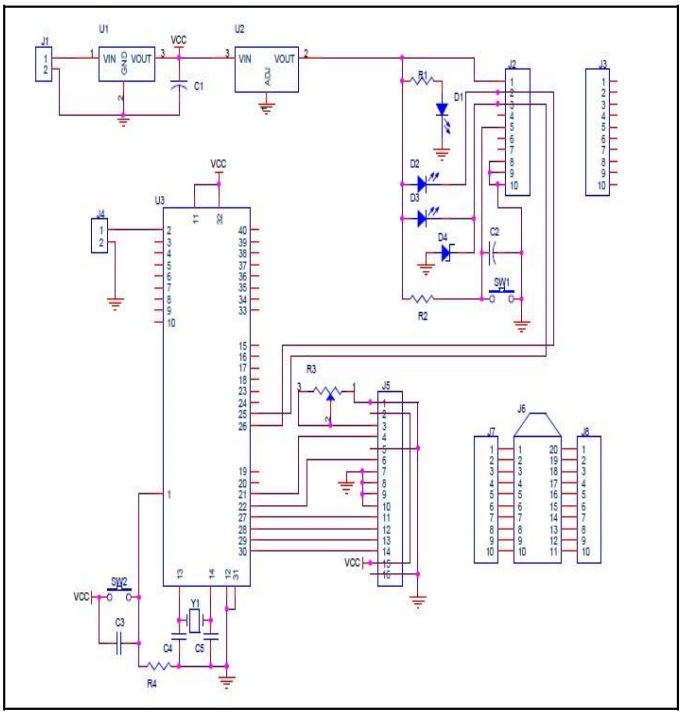


Fig 3. High-Tech Sprayer Schematic

4. Hardware Design

4.1. System Control Sections

In this part by PIC16F877 Microcontroller as the core controller. In PIC Controller, a clock/machine cycle, with high-speed, high-reliability, low power consumption characteristics, Only 35 single-word instructions to learn, All single-cycle instructions except for program branches, which are two-cycle. Operating speed: DC 20 MHz clock input and DC 200 ns instruction cycle. Up to 8K x 14 words of Flash Program Memory, Up to 368 x 8 bytes of

Data Memory (RAM),Up to 256 x 8 bytes of EEPROM Data Memory.

4.2.Sense the Obstacles

For Sensing the Obstacles, used Ultrasonic Distance sensor which is compact size, higher range and easy usability make it handy sensor for distance measurement, mapping. The distance measurement displayed on Liquid Crystal Display(LCD). From these Ultrasonic sensor 3 pins are using that is GND for supply ground, TX-OUT for serial output data(TTL 5V level) at baud rate and +5V for power supply. Used Ultrasonic Sensor under these specifications that is Supply voltage is 5v,Supply current is 15mA,Output data speed is 9600Bps,Output data format is 8-N-1 that is 8 data bytes, No parity,1 stop bit. Minimum range of Ultrasonic sensor is 10 centimetre(0.1meter) and maximum range is 400 centimetres(4 meter).Accuracy of +-1cm,Resolution 1 cm and Modulated frequency 40Khz.Serial data of 9600 bps TTL level output for easy interface with any microcontroller.

4.3.Spray Modules

Spray module consists of a spray head, pumps, relays, rod and DC motor. In the back of the robo create a lifting device, using an ordinary DC motor using high-power motor drive circuit. height 17.5cm, install the motor, spray the platform increases to the height of the highest point of the spray head is 65cm,the height of the lowest point is 30cm. 5V power supply, the rotation angle 0-180 degrees. A microcontroller I/O control transistor base, through the transistor drive relays, pumps and power through the relay is turned on, the pump suction end is connected to the bottom of the bottle, and the other end connected to the spray head, spray from the spray head, the microcontroller I/O port can control the working status of the pump.

4.4.Drive Models

DC motor relay driver using because it is a high-voltage, high current drives. 3.5 RPM to 1000 RPM at 12V DC motors with Gearbox, RPM can vary when operating from 3 to 15V,5kgcm torque,3000RPM base motor,6mm shaft diameter with internal hole,125gm weight, Same size motor available in various rpm, No-load current = 60 mA(Max), Load current = 300 mA(Max).

5. Software Design

We are using here Visual Basic 6.0 and Micro C programming languages.

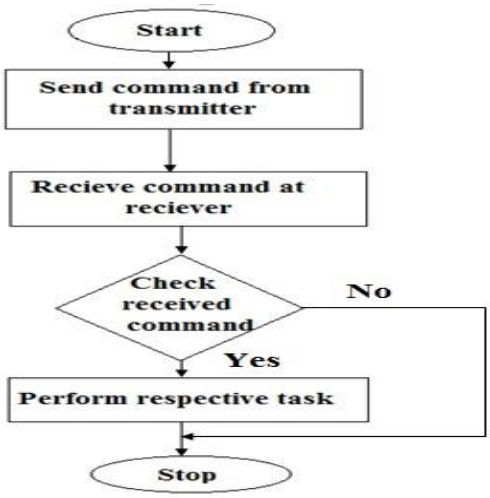
5.1 Visual Basic 6.0

Visual Basic is a tool that allows you to develop Windows (Graphic User Interface - GUI) applications Visual Basic is **event-driven,** Once an event is detected, the code corresponding to that event (event procedure) is executed.Visual Basic is useful debugger and have error-handling facilities. Powerful database access tools also obtainable and ActiveX supportable.

5.2 Micro C

MicroC is a powerful, feature rich development tool for PICmicros.It is designed to provide the programmer with the easiest possible solution for developing applications for embedded systems, without compromising performance or control

6. Flowchart –



Flow chart 1

6. Robot Mechanism

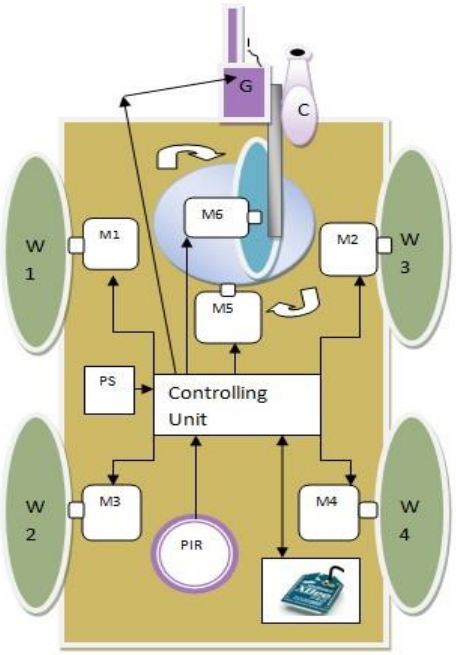


Fig 4. Robo mechanism

7. Conclusion

With this system as spraying action is carried out remotely. The direct contact with pesticide on human being will be avoided. Also system will be helpful for uniform spraying with minimum manpower. This concept is also avoid bad impacts of fertilisers on the human body.

8. Acknowledgement

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.9. References

[1] Z. Zhang, and Y. Liu, "Effects of chemical pesticides on human health" *Shanghai Journal of Preventive Medicine, vol. 15, no. 8, pp*383-384, 2013.

[2] N. Dai, "Development and application of Agricultural Robot, "Agricultural *Research, vol. 31, no. 2, pp. 241-243, 2009.*

[3] G. Gao, H. Zhou, and X. Niu, "An intelligent variable spraying decision-making system based on fuzzy neural network for greenhouse mobile robot", *Intelligent Computing for Sustainable Energy and Environment, vol. 355, pp. 257-265, 2013*Y. Chen, X. Peng, and T. Zhang, "Application of wireless sensor networks in the field of agriculture," in Proceedings of the ASABE Annual International Meeting, publication no. 1110617, Louisville, Ky, USA, 2011