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A Novel Pesticide Spraying for Agriculture Crops Using Drones

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ABSTRACT: There are too many technologies involved in today's Agriculture, out of which spraying pesticides using drones is one of the emerging technologies. Manual pesticide spraying causes many harmful side effects to the personnel involved in the spraying process. The Exposure effects can range from mild skin irritation to birth defects, tumors, genetic changes, blood and nerve disorders, endocrine disruption, coma or death. The WHO (World Health Organization) estimated as one million cases of ill affected, when spraying the pesticides in the crop field manually. This paved the way to design a drone mounted with spraying mechanism having 12V Pump, 6 Litre storage capacity tank, 4 nozzles to atomize in fine spray, an octocopter configuration frame, suitable landing frame, 8 Brushless Direct Current (BLDC) motors with suitable propellers to produce required thrust about 38.2 KG(at 100% RPM) and suitable Lithium Polymer (LI-PO) battery of current capacity 22000 mAh and 22.2 V to meet necessary current and voltage liquids over buildings, water bodies and in highly populated areas by changing the flow discharge of the pump.

KEYWORDS: Agriculture Crops, Automation, Microcontrollers

I.INTRODUCTION

The Indian Agricultural sector is the most important sector as it amounts to a staggering 18% of India's Gross Domestic Product (GDP) and also provides employment to 50% of the national human workforce. Our country is dependent on agriculture so much, has yet to tap into the real potential of agriculture, because of improper methods of monitoring crops and the irrigation patterns and the pesticides required to be applied. In India, there are over 35 drone start-ups that are working to raise the technological standards and reduce the prices of agricultural drones. This project aims to develop Unmanned Aerial Vehicle (UAV) for overcoming this problem and also spray large amounts of pesticides within smaller interval of time using Octocopter.

Wireless technology using various sensors for precision agriculture has become a popular research with the greenhouse effect. People are utilizing the merits of embedded system into monitoring and control system for agriculture parameter. Monitoring parameters of temperature and humidity is an important means for obtaining high-quality environment. automatic monitoring is an effective method in order to avoid interference environment and improve efficiency. Today, Ethernet network, IOT wireless network are used to transmit data in Automatic crop field Monitoring System. This paper gives a review of remote control and monitoring systems based on existing technologies and IOT based remote control and monitoring system with PH level and temperature monitoring system is proposed. The design presented has the advantage of iot technology. A Wireless Sensor Networks (WSN) is a system comprised of sensors, microcontrollers and power sources. Recent advances in wireless sensor networking technology have led to the development of low cost, low power, multifunctional sensor nodes. Sensor nodes enable environment sensing together with data processing. Instrumented with a variety of sensors, such as temperature, humidity and volatile compound detection, allow monitoring of different environments. They are able to network with other sensor systems and exchange data with external users. Sensor networks are used for a variety of applications, including wireless data acquisition, machine monitoring and maintenance, smart buildings and highways, environmental monitoring, site security, automated on-site tracking of expensive materials, safety management, and in many other areas. A general WSN protocol consists of the application layer, transport layer.

II. BLOCK DIAGRAM

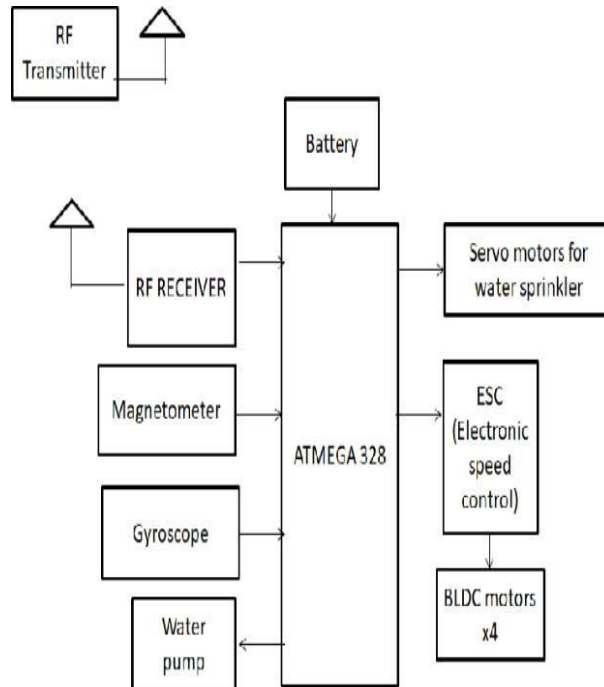


Fig:1.Block Diagram

In existing system Farmers, especially when they spray pesticides, take too many precautions like wearing appropriate outfits, masks, gloves etc so that, it does not cause any harmful effects on them. To avoiding the pesticides is also not completely possible as the required outcome has to be met. Manual pesticide spraying causes many harmful side effects to the personnel involved in the spraying process.

A. ARDUINO UNO

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),^[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.

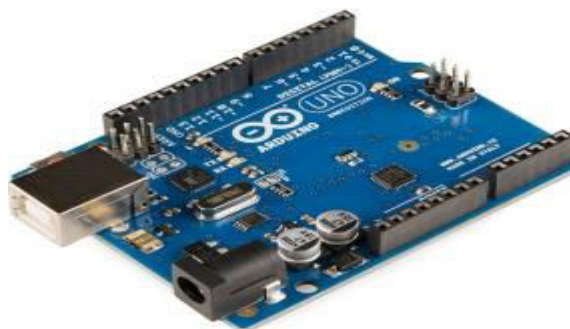


Fig:2. Arduino UNO

The project's board designs use a variety of microprocessors and controllers. These systems provide sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards ("shields") and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. The microcontrollers are mainly programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project. The Arduino project started in 2005 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors. To Implementation of unmanned aerial vehicles with the potential to improve the soil and plant knowledge, efficiency of input, and economical and environmental sustainability.

III. SIMULATION RESULT

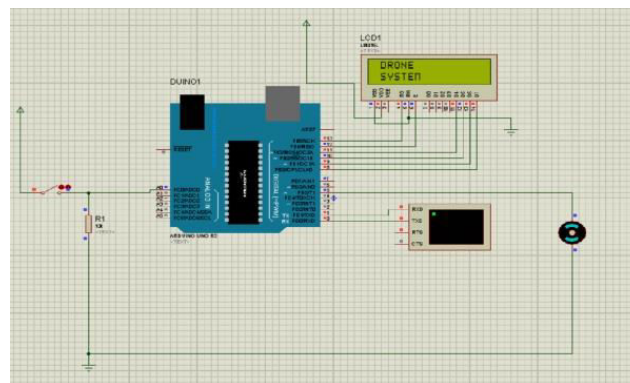


Fig:3. Simulation Result

IV. CONCLUSION

Present work is attempts to save the natural resources available for human kind. By continuously monitoring the status of the soil, we can control the flow of water and thereby reduce the wastage. This review is proposed to supports aggressive water management for the agricultural land. Microcontroller in the system promises about increase in systems life by reducing the power consumption resulting in lower power consumption. In this paper we have described a design of a drone mounted spraying mechanism for Agricultural purpose and for spraying disinfectants. This method of spraying pesticides on Agricultural fields reduces the number of labours, time, cost and the risk involved to the personnel involved in spraying the liquids. This drones can also be used in spraying disinfectant liquids over buildings, water bodies and highly populated areas. In this manuscript different types of system useful for Agriculture wonder drone system using micro-controller 8051, Agriculture wonder drones system using Atmega 328 microcontroller and Agriculture drone system using GPS were discussed. Mainly the paper focused on selection of best compatible design for drones system for Agriculture purpose. Some of the exiting implementation was discussed with their advantages and disadvantages. Finally it is conclude that if the system design with the use of Atmega 328 then it will be the more efficient implementation. In line to this the experimentation and expected result also discussed for further implementation. Through the collection and analysis of qualitative data, this study first developed three TF domains, namely, technological capabilities, technological strategies, and regulations of relevant technology. Subsequently, the three domains were employed to further analyze the cognition of the three key groups (farmers, pesticide sprayers, and agriculture officials) and present their fundamental cognitive differences regarding the promotion of UAVs in pesticide spraying (TF domains), and how this cognitive difference resulted in resistance toward the adoption of UAVs, subsequently causing policy implementation to be not as effective as expected. The theoretical implications and contributions of the results of this study are described thereafter.



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