ANVESAK
ISSN : 0378 – 4568 UGC Care Group 1 Journal

PESTICIDES SPRAY DRONE DESIGN FOR SMART AGRICULTURE

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Abstract—The main aim of this is to save the time for the farmers while spraying the pesticides for a larger crop. So by using the drones the farmers can spray the pesticides in a faster way and reduce the time loss. Among its various applications, the use of drones in farming, called agricultural drones, can help in increasing the yield of crop and to monitor its growth. This type of drone is termed as agricultural drone. As there are many types of drones which are used for various purposes and the drone which we are using is for the agricultural purpose so it is called as the Agricultural drone. By using this we can calibrate the values of the rotation of drone.The use of pesticides in agriculture is very important to agriculture and it will be so easy if will use intelligent machines such as robots using new technologies. This paper gives the idea about various technologies used to reduce human efforts in various operations of agriculture like detection of presence of pests, spraying of UREA, spraying of fertilizers, etc.

Keywords: Brushless Sensors, ESC, Motors,Propeller.

I.INTRODUCTION

In India, Agriculture is a major sector of our economy but still it is far short of western countries when it comes to adapting latest technologies for better farm output. Farmers in developed world have started using agricultural drones equipped with cameras to improve the process of crop treatment.

Kale et al. (2015) used agriculture drone for spraying fertilizer and pesticides. Architecture based on unmanned aerial vehicles (UAVs) which can be employed to implement a control loop for agricultural applications where UAVs are responsible for spraying chemicals on crops. The process of applying the chemicals is controlled by wireless sensor network (WSN) deployed on the crop field.

Huang et al. (2015) developed a low volume sprayer for an unmanned helicopter. Thehelicopter has a main rotor diameter of 3m and a maximum payload of 22.7kg. The helicopter used one gallon of gas for every 45min. The method, system and analytical results from this study provide an extendable prototype that could be used in developing UAV aerial application system for crop production management with higher target rate and larger VMD droplet size. Xue et al. (2016) developed an unmanned aerial vehicle based automatic aerial spraying system. The system used a highly integrated and ultra- low power MSP430 single-chip micro-computer with an independent functional module. This allowed route planning software to direct the UAV to the desired spray area. for crop production management with higher target rate and larger VMD droplet size. Xue et al. (2016) developed an unmanned aerial vehicle based automatic aerial spraying system. The system used a highly integrated and ultra-low power MSP430 single- chip micro-computer with an independent functional module. This allowed route planning software to direct the UAV to the desired spray area.

LITERATURE SURVEY

World health organization has found

that manyof the deaths are caused due to the pesticides that are sprayed in the fields. As that pesticides produces harmful gases that produces harmful gases that effect the farmers and causes the death. Pesticide exposure can cause a range of neurological health effects such as memory loss, loss of coordination, reduced speed of response to stimuli, reduced visual ability, altered or uncontrollable mood and general behavior, and reduced motor skills. Two types sprayers are available Hydraulic and low volume sprayer. Groundnut, Cotton, Pomegranate, Grapes, Silkwormfeed, etc require pesticide spraying.

Huang *et al.* (2015) made a low volume sprayer which is integrated into unmanned helicopters. The helicopter has a main rotor diameter of 3 m and a maximum payload of 22.7 kg. It used to require at least one gallon of gas for every 45 minutes. This study paved the way in developing UAV aerial application systems for crop production with higher target rate and larger VMD droplet size.

Kurkute *et al.* (2018) worked on quad-copter UAV and its spraying mechanism using simple cost-effective equipment. The universal sprayer system is used to spray for both liquid and solid content. In their research, they have also compared different controllers needed for agricultural purposes and concluded that quad- copter system with Atmega644PA is the most suitable due to its efficient implementation.

Rahul Desale *et al.* (2019) described an architecture based on UAV that could be employed for agricultural applications. Their UAV was designed not only for spraying but also for monitoring agricultural fields with the use of cameras and GPS. Their design was optimized for cost and weight.
They used a micro controller kk 2.1.5 which has inbuilt firmware. Prof. B. Balaji *et al.* (2018) developed an hexacopter UAV with the purpose of spraying pesticides as well as crop and environment monitoring using Raspberry Pi that run on python language. Their UAV also contains multiple sensors like

DH11, LDR, Water Level Monitoring sensors. From this experiment, they finally concluded that with proper implementation of UAVs in the agricultural field almost 20%- 90% savings in terms of water, chemical maltreatments and labor can be expected.

II. EXISTING SYSTEM

In the existing system farmers typically spray their fields with a product containing glyphosate to eradicate weeds before crops are planted or begin to grow. When glyphosate comes into contact with a weed, it moves to the plants shoots and roots where it interferences with the production of certain amino acids that are essential to plant growth.

Glyphosate can also be sprayed on fields where herbicide-tolerate crops- such as canola, corns and soya-beans are growing to control just the weeds without affecting the crop. Using glyphosate with herbicide tolerant crops has allowed farmers to adopt what is called conservation or no-till agriculture.

Canada because glyphosate can control the weeds without afarmers having to plow their fields, farmers can make fewer passes over the fields with equipment. This has reduced soil erosion, improved soil health and fertility by leaving nutrient and water in the soil, and lowered greenhouse gas emission on farms.

PROPOSED SYSTEM

Future of a quad-copter is quite vast based on various applications fields it can be applied to Quad-copter can be used for conducting rescue operations where it's humanly impossible to reach. Thus these can be used in day to day working of a human life, ensuring their well- being. In the future purpose the drones are also used for the pandemic situation. As now a days the pandemic is been increasing so by using the drone we can spray the sanitizers for a whole city or for a larger number of

buildings in a COVID situation.

BLOCK DIAGRAM & WORKING

The radio signals will be transmitted from Transmitter and it will be received by the receiver in the drone. From the receiver the signal goes to the flight controller which monitors and controls.

The flight controller sends this desired speed to ESC which translates this desired speed into a signal that the motors can understand.

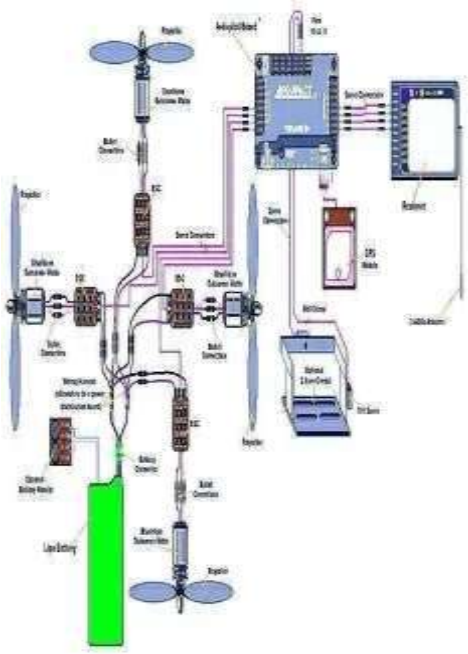

Fig1. Block Diagram

The propellers are mechanically coupled to the motors so that they rotate and produce thrust.

Fig: 2 Flight Controller

COMPONENTS USED

Flight Controller: The flight controller helps in the maneuvering operations and also it provides auto level function. The

Motor: Outer runner BLDC motors in which there are no brushes, they have a permanent magnet. The RPM of the motor can be controlled by varying the input current. This motor T-MOTOR MN KV115 and p24x7.2F propeller produces a maximum thrust of 4783 grams.

Fig 3. Motor

Electronic Speed Controller: The electronic speed control, or ESC, is what tells the motors how fast to spin at any given time. You need four ESCs for a quadcopter, one connected to each motor. The ESCs are then connected directly to the battery through either a wiring harness or power distribution board. Many ESCs come with a built in battery eliminator circuit (BEC), which allows you to power things like

your flight control board and radio receiver without connecting them directly to the battery.

Fig:.4 ESC

Propeller: A propeller is a type of fan that transmits power by converting rotational motion into thrust. A pressure difference is produced between the forward and rear surfaces of the air foil-shaped blade, and a fluid (such as air or water) is accelerated behind the blade. Propeller dynamics can

be modeled by both Bernoulli's principle and Newton's third law.

Fig:.5 Propeller

LI-PO Battery: A lithium polymer battery,or more correctly lithium-ion polymer battery (abbreviated variously as LiPo, LIP, Li-poly and others), is a rechargeable battery of lithium-ion technology in a pouch format. Unlike cylindrical and prismatic cells, LiPos come in a soft package or pouch, which makes them lighter but also less rigid ESC. It uses ATMEL mega 644PA 8- bit AVR RISC- based microcontroller with 64k of memory. Accelerometer and gyroscope sensors in the flight controller processes output to the ESC.

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Sanitization of the large buildings. o the ESC.

Fig:6 Li-po Battery

II. CALIBRATION OF DRONE

Calibration of drone is of 2 types

a. IMU Calibration

b. Compass Calibration

a.IMU Calibration: An IMU is a circuit that keeps the drone level and flat. IMU control the pitch and roll. Calibrating the IMU is can be done indoors on a flat surface like a table

b.Compass Calibration: Compass calibration is used to find true north. It is necessary to calibrate if the drone will be flying in a new location (more than 6 miles away) or if there are error.

VIII.CONCLUSION

This method of spraying pesticides on Agricultural fields reduces the number of labour, time, cost and the risk involved to the personnel involved in spraying the liquids.

This drone can also be used in spraying disinfectant liquids over buildings, water bodies and highly populated.

IX.FUTURE SCOPE

As now a days the pandemic situation isbeen increasing so we use the drone for the sanitization of the large buildings.

As they also used to find out the location and helps the farmers for the better agriculture purpose.

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