SPRAYING PESTICIDES AND FERTILIZER USING AN AGRICULTURAL DRONE

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Abstract:

The main aim of this paper is to design Agriculture Drone for Spraying Pesticides. In this paper, we describe an architecture based on unmanned aerial vehicles (UAVs). The use of pesticides in agriculture is essential to maintain the quality of large-scale production. It is very important to improve the efficiency and productivity of agriculture by replacing laborers with intelligent machines like robots using latest technologies. The paper proposes a new strategy to replace humans in various agricultural operations like detection of presence of pests, spraying of pesticides, spraying of fertilizers, etc. The developed system involves designing a prototype which uses simple cost-effective equipment's like microprocessor, various motors and terminal equipment's which is an aid to the farmers in various crop field activities. This project is to mainly overcome the ill-effects of pesticides on human beings.

Keywords:

Microcontroller, BLDC Motor, Servomotor, ESC, Lippo Battery, UAV, Sprinkler.

INTRODUCTION

Agriculture in India constitutes more than 60% of the occupation. It serves to be the backbone of Indian economy. It is very important to improve the efficiency and productivity of agriculture by simultaneously providing safe cultivation of the farmers. Operations like spraying of pesticides, sprinkling fertilizers are very tedious. Though spraying of pesticides has become mandatory it also proves to be a harmful procedure for the farmers. 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. Avoiding the pesticides is also not completely possible as the required outcome has to be met. So, use of robots in such cases gives the best of the solutions for these problems, along with the required productivity and efficiency. Cost effective technology using components such as PIC Micro controller for the control of agriculture robot, wireless camera to track the path of the robot, stepper motors which facilitate the robot wheels to move and joysticks to guide the robotic

movement are incorporated in this agriculture robotic vehicle to make all of the above feasible.

PROBLEM DEFINATION

The World Health Organization estimates that there are 3 million cases of pesticide poison in each year and up to 220,000 deaths, primarily in developing countries. Organophosphates and carbonates, affect the nervous system. Others may irritate the skin or eyes. Some pesticides maybe carcinogens Others may affect the hormone or endocrine system in the body. Children, and indeed any young and developing organisms, are particularly vulnerable to the harmful effects of pesticides. Even very low levels of exposure during development may have adverse health effects. 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 behaviour, and reduced motor skills. This project is to mainly overcome the ill-effects of pesticides on human beings (manual pesticide sprayers) and also to cover larger areas of fields while spraying pesticides in a short span of time when compared to a manual sprayer. © 2017 IJRTI | Volume 2, Issue 6 | ISSN: 2456-3315 IJRTI1706008 International Journal for Research Trends and Innovation (www.ijrti.org) 35

BLOCK DIAGRAM

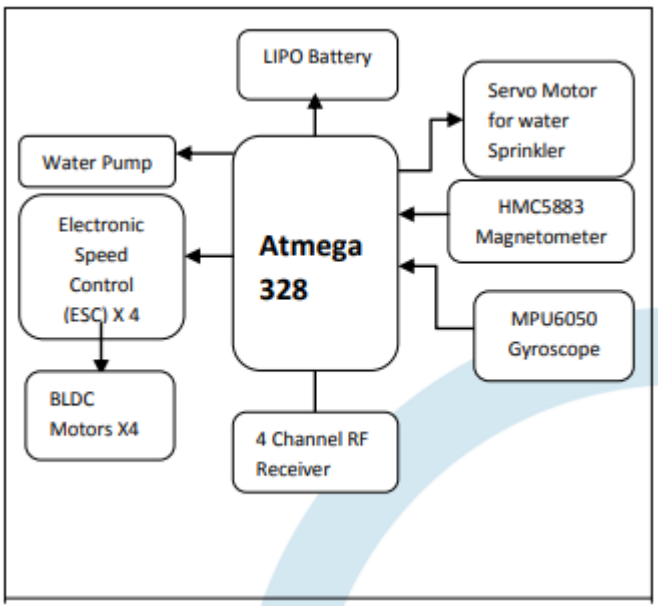

Fig. 1 Block diagram of Agriculture Drone.

II. WORKING:

BLDC:

The brushless motors are multi-phased, normally 3 phases, so direct supply of DC power will not turn the motors on. BLDC electric motor also known as electronically commutated motors.

ESC:

The ESC generating three high frequency signals with different but controllable phases continually to keep the motor turning. The ESC is also able to source a lot of current as the motors can draw a lot of power.

DC:

30PRM 12V DC geared motors for robotics application. Very Easy to use and available in standard size. A power supply is an electronic device that supplies electric energy to an electrical load. ¬

Accelerometer Sensor:

The accelerometer measures acceleration and also force, so the downwards gravity will also be sensed. As the accelerometer has three axis sensors, we can work out the orientation of the device.

Gyroscope Sensor:

A gyroscope measure angular velocity, in other words the rotational speed around the three axes. A gyroscope is a device that uses Earth's gravity to help determine orientation. Its design consists of a freely-rotating disk called a rotor, mounted onto a spinning axis in the centre of a larger and more stable. ¬

LIPO Battery:

LiPo battery can be found in a single cell (3.7V) to in a pack of over 10 cells connected in series (37V). A popular choice of battery for a Quad Copter is the 3SP1 batteries which means three cells connected in series as one parallel, which should give us 11.1V.

III. CONCLUSION:

Agricultural drone have the potential to improve the yield crops. Agricultural drone can help the farmers to transform the agriculture industry. The agricultural sector can benefit significantly from implementation of unmanned aerial vehicles with the potential to improve the soil and plant knowledge, efficiency of input, and economical and environmental sustainability. However, their effective implementation depends upon some mandatory critical aspects that must be considered, including the configuration, mass, payload, flight range and costs. Cost effectiveness can be proven in cases where UAV can be applied to cover large land areas; never the less, improvements remain crucial with regard to battery duration, and consequently, payload and flight autonomy.

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