UNMANNED AERIAL FLYING VEHICLE (DRONE) FOR AGRICULTURAL INSPECTION AND POLLINATION

PROJECT REFERENCE NO: 38S0330

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Introduction:

An unmanned aerial vehicle (UAV), commonly known as a drone and also referred to as an unpiloted aerial vehicle and a remotely piloted aircraft (RPA) by the (ICAO), is an aircraft without a human pilot aboard. They are usually deployed for military and special operation applications, but also used in a small but growing number of civil applications, such as policing and fire fighting, and non military security work, such as inspection of power or pipelines. UAVs are often preferred for missions that are too "dull, dirty or dangerous" for manned aircraft. These days the drones have also been into use of agricultural monitoring system like pollination, water level sensor, sensing good quality plant growth, for pesticide applying etc. Due to their capability of remote controlling they save large amount of energy, manpower and economical cost thus increasing a better yield.

The present way of farming in India is the traditional way inherited from ancestors with less technology deployed to it. The various observations like soil quality, water content, pesticide level etc is overlooked as a result of which it leads to excessive exploitation of the farm and thus reducing yield in the course of time along with increasing pollution level. To overcome this the designed drone helps us in sensing the various field parameters over a large land area thus providing information for a better yield from the farms. Due to the necessary steps taken by the data provided the yield is increased manifolds. This technology is under development in Developed countries which can be implemented in India.

Objective

- The main objective of this project is to bring about a change in traditional way of farming and deploying hi-tech technology to increase the yield.
- This project also helps in remote accessing of large farm area and providing important information linked with plant growth such as soil quality, pesticide level, nutrition content in plant, tress passing, quality of plant growth and illegal entering of animals.
Methodology

The design of the flying drone consists of the quad rotor with four propelling wings. Out of the four motors, the left and right induce pull action, while the front and back induce push action. The brain of the robot is a microcontroller board that has been designed for auto-piloting drones. The microcontroller is combined with an inertial measurement unit. This unit consists of a 3 axis gyro, 3 axis accelerometer and a barometric pressure gauge. An RC transmitter is used to navigate the robot. Functionalities of the robot can be enhanced further by fitting a GPS chip for gauging latitude and longitude and a SONAR system for gauging the altitude. The controller used here is a KK controller kit. The speed of the drone and its direction is being controlled using RF controller. The signal to the motor is given to the motor from the controller kit through the ESCs. The ESCs are electronic speed controlling device used in the drones.

We have implemented a circuitry which is used to sense soil moisture and also detect fire in case of fire hazards. The circuit board consists of two section i.e the sending and receiving end section. The sending board is mounted on the drone which is flown to the respective location for sensing the soil or detecting moisture level. The on board circuitry consists of sensor, multivibrator, driver and a RF transmitter. The receiving end present in the controlling side consists of RF receiver driver and a relay to take the necessary action for the detected problem. A LCD is also been interfaced to indicate the type of problem occurred. We have made use of 555 IC as multivibrator. A digital wireless camera is present for aerial inspection of the field.

Result & Conclusion

Thus the model built by us is a prototype model and it gives basic information about soil moisture content and fire detection. The camera used here helps us to get live video transmission which helps one to monitor farms. Thus this type of mechanism helps in reducing human labour and also provides live information about plant growth. Thus the usual traditional method of farming can be replaced by modern technology.

Future Scope

- By implementing high end sensors real time farm datas can be obtained which acts as a source of information for farmers for taking the required step.
- By implementing GPS and marking GPS location automatic flight can be obtained.
- By increasing the motor thrust capacity pesticide spraying and pollinations of seeds can also be implemented.
- Using high end camera along with image processing plant growth quality can be obtained.