DRONE FOR SMART AGRICULTURE

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ABSTRACT

One of main source of income in of India is Agriculture. The production rate of crops in agriculture is based on various parameters like temperature, humidity, rain, etc. Which are natural factors and not in farmers control. The field of agriculture is also depends on some of factors like pests, disease, fertilizers, etc which can be control by giving proper treatment to crops. Pesticides may increase the productivity of crops but it also affects on human health. we are going to discus different architecture based on unmanned aerial vehicles (UAVs). The use of Crop Monitoring 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, Crop Survelliance, Crop Monitoring ,Irrigation Monitoring, Livestock Monitoring etc. This describes the development of quad copter UAV and the Monitoring mechanism. The discussed system involves designing a prototype which uses simple cost effective equipment like BLDC motor, Arduino, ESC wires, etc.

INTRODUCTION

What is Drone?

Drones are flying devices, which can be controlled using a remote or smartphone. Drones are also called 'Unmanned Aerial Vehicle' (UAV).As per records, the earliest version of drones was used in 1849. But from then, drones were mostly used for military purposes. Only a few years ago, the miniaturization of drones allowed multiple industries to start leveraging drone technology.Now, drones are accessible to the general public. They are being used for many reasons such as personal interests, commercial purposes, military use etc.Agricultural drones.

Agricultural drones are drones applied to farming in order to help increase crop production and monitor crop growth. Through the use of advanced sensors and digital imaging capabilities, farmers are able to use these drones to help them gather a richer picture of their fields. Information gathered from such equipment may prove useful in improving crop yields and farm efficiency.

Agricultural drones allow relief for the modern day farmer. Drone technology can cut down labour requirements and reduce resource requirements. Farmers are also able to use drones to retrieve aerial-view images of their fields. Visualizing its potential, first Japan Govt. deployed drones for pin pointing cause for dwindling of rice farmer in1986. About 35% of Japan's rice fields" pest control is being accomplished with UAV. Now, Ministry of Agriculture, Forestry and Fisheries are focusing vigorously on use of drone in area of agricultur. The majority of the crops are dependent on rain, with around 45 of the land irrigated. It determines that around 55% of the total population in India depends on farming which is dependent on rain.

Due to the acute labour shortage and high labour cost, changes in the climatic conditions, crop losses due to pests, poor availability of the funds and agricultural inputs, wastage of inputs, terrible support price structure these are all the problems which are limit the access for good quality of food for the people. Even though agriculture is the 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. In order to keep with the challenges, there is need to find ways to improve our current farming practices and processes with improved technologies Agricultural drones provide relief for the modern day farmer, which are helping to increasing productivity level and declining expenses by reducing the need for human labour and other input resources.

LITERATURE SURVEY

Prof. P. P. Mone, ChavhanPriyankaShivaji, JagtapKomalTanaji, NimbalkarAishwaryaSatish has published a paper entitled "Agriculture Drone for Spraying fertilizer and Pesticides". In this paper authors has given detail about implementation of Agriculture drone for automatic spraying mechanism. In this paper, they gave problem statement of World Health Organization

where it estimates that there are 3 million cases of pesticide poisions in each year and upto 220,000 deaths, primarily in developing

countries. In this paper they also explain what precautions the farmer should have to use to avoid harmful effects of pesticides and

fertilizing effects as well as cost effective technology using components such as PIC microcontroller for the control of agriculture

robots. The published paper is available at IJRTI, Volume 2, Issue 6, 2017.[1]

Prof. S. Meivel M.E., Dr. R. Maguteeswaran Ph.D., N. Gandhiraj B.E., G. Srinivasan Ph.D. has published a paper entitled

"Quadcopter UAV based Fertilizer and Pesticide Spraying System". In this paper authors has given detail about implementation of

Agriculture wonder drone. They gave detail about Quadcopter UAV and sprayer module and also discuss pesticide content to the

areas that can't easily accessible for human beings. They discussed used of multispectral cameras which is used to capture remote

sensing images to identify the green field as well as the edges of crop area. Total pay load lift of their quad copter is 8 kg. They used

QGIS software for the purposed of analyzing the remote sensing images. The published paper is available at International Academic

Research, Journal of Engineering Sciences, Volume 1, Issue 1, February 2016.[26]

METHODOLOGY

The proposed system is an embedded system which will closely monitor and control the microclimatic parameters of a greenhouse on a regular basis round the clock for cultivation of crops or specific plant species which could maximize their production over the whole crop growth season and to eliminate the difficulties involved in the system by reducing human intervention to the best possible extent. The system comprises of sensors, Analog to Digital Converter, microcontroller and actuators. When any of the above mentioned climatic parameters cross a safety threshold which has to be maintained to protect the crops, the sensors sense the change and the microcontroller reads this from the data at its input ports after being converted to a digital form by the ADC. The

microcontroller then performs the needed actions by employing relays until the strayed-out parameter has been brought back to its optimum level. Since a microcontroller is used as the heart of the system, it makes the set-up low-cost and effective nevertheless. As the system also employs an LCD display for continuously alerting the user about the condition inside the greenhouse, the entire set-up becomes user friendly.

WORKING

Drone best practices in agriculture

Crop surveillance

By using drones for agriculture mapping, farmers can stay updated on the health of plants in a particular area and indicate which field areas require attention. Based on accurate, real-time info, farmers can take measures to improve the state of plants in any location.

It is important to assess crop health as well as early diagnosis of crop incidence to ensure good agricultural productivity. For example, stress related to moisture deficiency, pest, fungal and weed infestation needs to be identified early enough to give farmers a chance to reduce it. This process requires that remote sensing images be provided frequently (at least, weekly) and delivered to the farmer quickly, usually within 2 days.

Also, crops do not generally grow evenly across the field and consequently crop yield can vary greatly from one spot in the field to another. These growth differences may be a result of soil nutrient deficiencies or other forms of stress. Remote sensing allows the farmer to identify areas within a field which are experiencing difficulties, so that he can apply, for instance, the correct type and amount of fertilizer, pesticide or herbicide. Using this approach, the farmer not only improves the productivity from his land, but also reduces his farm input costs and minimizes environmental impacts.

CONCLUSION

In this manuscript different types of system useful for Agriculture wonder drone system using micro-controller 8051, Agriculture wonder drone system using Atmega 328 microcontroller and Agriculture drone system using GPS were discussed. Mainly the paper focused on selection of best compatible design for Drone 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 644PA then it will be the more efficient implementation. In line to this the experimentation and expected result also discussed for further implementation

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