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## Automated Agriculture Irrigation and Surveillance Using Drone

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**ABSTRACT:** In this project, agriculture is done efficiently using several sensors and drone. The invasion of animals inside the farm and fire accident inside the farm is detected and alert will be given to the farmer using GSM module. In animal invasion detecting system, siren is activated automatically to threaten the animals. In the fire accident detection is a manually controlled system by the farmer. The drone watches the crop whether they are affected by pests or fungi using mobile phone camera fixed in the drone which can be viewed using another mobile phone. This overall module also performs automated irrigation process by the help of several sensors like humidity sensor and water level indicator in the farm used to switch the irrigation process according to the situation. This automatic irrigation system is implemented using Arduino processor. The major objective of this system is to reduce the work load of the farmers.

**KEYWORDS:** automatic smart irrigation, animal intruders detection, fire detection, farm surveillance using drone

### I. INTRODUCTION

Water is the most crucial thing in life of living organisms. Each life depends on water. Also when it comes to agriculture, irrigation is one of the major part in cultivating crops. Here water is the primary thing to the crops. The amount of water to be irrigated to the crops differs depending on the variety of the crop to be cultivated. For example, depending on the height of the crop the water should be irrigated. If the crop is sunk inside the water it is waste of water. Suppose if the water is insufficient to the crop, the crop is wasted.

Thus water plays a major role in agriculture also. Here while considering the above example, the amount of water which is to be irrigated to the crop in the farm determines the yield of the crop. At some point it increases the workload of farmers. If the farmer doesn't look after the irrigation even for some time, this may lead to over irrigation of crops and thus wastage of crop occurs. As a consequence, this becomes a major loss to the farmer. Though agriculture is the backbone of India, agricultural field is on the lower side of the economy's expectation. Therefore, to prevent the loses because of over irrigation or under irrigation various irrigation techniques like drip irrigation, canal irrigation are followed by our farmers. But the workload of the farmers didn't reduce. Because the agriculture is the backbone of India, it is necessary to increase the yield of the crops. So it is necessary to ensure that the farmers workload doesn't affect the yield of crops.

Once the seeds are dispersed in the field, the farmer should ensure that the crops aren't affected by any pests or fungi. This should be done regularly till the end of the growth of crops. Spider mites, beetle, bugs are some of the common pests that affect the growth of the crops. Therefore, regular surveillance of the crops should be done by the farmer. This is also one of the major works in agriculture. So to ensure the proper growth of crops the farmer should be watching the crops regularly or even daily. If farmer doesn't watch the crops for some days, it brings huge loss to him in terms of decreased yield and also it increases the workload of the farmer.

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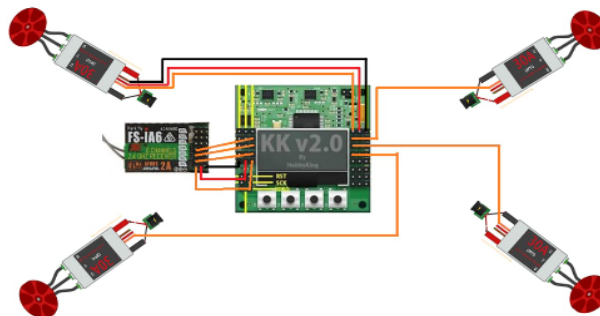
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The other threatening factors that causes major damage to the crops and yield of the crops is decreased in a drastic manner. First thing is the intruding of animals inside the farm during night time. The major creatures are mice, rats and small rodents which invade the crops inside the farm. This causes major damage and infection to the crops. Without famer's knowledge this event happen during nights. So to prevent this occurrence of animal invasion during nights is pretty much impossible to the farmers.

The next issue in agriculture field is the fire accidents that occur during over heat of atmosphere or burning of wasted crops in the nearer field. Unknowingly this fire may spread through to the properly growing farm. If this burning of crops is happening without the knowledge of the farmer, this may bring damage to all the crops. Thus maximum damage will be happened. If the fire accident comes to the knowledge of the farmer at the earliest, he may diffuse the fire quickly and save the crops from huge damage. So the financial loss to the farmers can be reduced drastically by responding quickly under this kind of situation.

## II. RELATED WORK



The drone module consists of 4 brushless motors which is a quad x model. The motors are directly connected to individual ESC's(Electronic Speed Controller). These motors are also given 12V power supply each. ESC's pins are connected to drone controller. The six channel receiver and controller are connected using 4 signal pins. A mobile with camera is fixed below the drone. It is viewed in another mobile using wireless display.

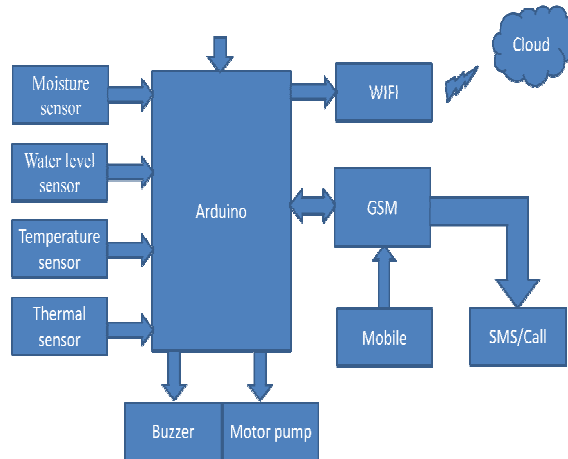
Thus using the mobile camera fixed in the drone, it watches the crops in the farmland. The farmer will come to know whether the crops in the field are affected by any pests or fungi. This is the main part of the drone module in the project.

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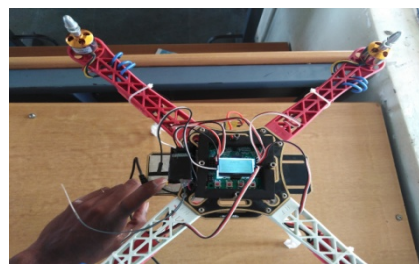
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The other module is the agriculture module. This module mainly does the automatic irrigation process. It consists of different sensors for different specific operations. This module performs automatic irrigation process. Next is the fire accidents inside the farm is detected and alerts the farmer using the GSM module. Also during night time the intruders like mice rodents are also avoided. Some of them are DHT11, moisture sensor, water level indicator, GSM module thermal camera.

## EXPERIMENTAL RESULTS

Figures shows the results of (a) drone output using the six channel transmitter (b) six channel receiver and (c) the agricultural module output



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## III. CONCLUSION

We have implemented an automatic agriculture irrigation surveillance using drone. Our implementation successfully detects the fire accidents and animal intruders inside the farm. We implemented our system in many soil conditions. In the near future this project will be very much useful because it mainly concentrated on reduction of workload of farmers by effective usage of modern technology.

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