

Weed Detection in Farms using A.I. Automated Unmanned Aerial Vehicle

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Abstract :- In modern era the technology still there are fields in which technology is not progressing as it is supposed to. We always stress on the matter of animal and human safety but we still fall behind which in this case is due to ignorance to WEED, it is know that weed is abundant in nature and mostly grows in wild near farmlands, where cattle roam and children plays in villages. When they eat even a small sample of weed it can cause some serious damage to cattle and children. To avoid this situation we have developed a drone which can detect weed in real time and then by applying proper process we can eradicate weed from the wilderness near our neighborhood, in this process we have a developed an algorithm using the principles of machine learning and neural networks to identify the presence of weed. The algorithm will be fed the data collected with the help of an fully automatic drone which has a camera module in it to collect data set in the form of images. Also we are using regression modules to divide the color image into grey scale analyses every pixel and then use clustering to get the output of detection.

1. INTRODUCTION

Have people ever thought that we can detect a small species of plants from feet above the sky in real time and save lives of thousands of children and cattle. This is way also we can cover large range of distances in less amount of time as aerial scanning of farmlands is the most efficient method and considering the time this method can save a lot of time and cost of eradication will also be reduced.

2. LITERATURE REVIEW

N. Sriskanthan and Tan Karand in their work have presented an application of Bluetooth Technology for Home Previous Research on existing Home

AUTOMATION SYSTEMS:

The Bluetooth technology which emerged in late 1990's is used for implementing the wireless home automation system. Various appliances such as air conditioners, home theatres, cellular phones etc., are interconnected, thus creating a Personal Area Network in Home Environment. The communication between several client modules and the host server takes place through the Bluetooth module. A Home Automation Protocol has been developed to enhance communication between the host server and the client modules. The system also allows integration or removal of devices to the network which makes the system scalable. The wireless system aims at reducing the cost of

Home Automation. But the system does not use the trending mobile technology.

A. Z. Alkar and U. Buhur have developed an internet based wireless home automation system for multifunctional devices. A flexible, low cost, wireless solution to the home automation is introduced. The transformation of the initial simple functionality control mechanism of devices to more complex devices has been discussed. The home appliances are connected through a server to a central node. The system is secure from unauthorized users by using SSL algorithm. During tests, the wireless communication was found to be limited to <100 meters in a concrete building Muhammad Izhar Ramli, Mohd Helmy Abd Wahab, Nabihah developed a prototype electrical device control system using Web. They have developed a web based controller, for controlling electrical devices. Whenever the condition of server is down they also set their server with auto restart. The system does not use mobile technology. Being a web based system; this application is less effective since the use of headphones and Smart phones is increasing rapidly.

E. Yavuz, B. Hasan, I. Serkan and K. Duygu have designed and implemented a telephone and PIC remote Controlled device for controlling the home electrical devices. In this Pin check algorithm has been introduced where it was with cable network and not wireless communication. The system ensures safety as it cannot be used by unauthorized users as the system uses Pin check system. The architecture is very complex, but it gives an idea of remote handling of home automation system. Shahriyar, E. Hoque, M. M. Akbar, S. Sohan, I. Naim, and M. K. Khan presented a GSM based communication and control for home appliances. Different AT commands are sent to the Home Mobile for controlling different the drawback of this system is that a appliances. Graphical User Interface (GUI) is not provided to the user. Different AT commands have to be remembered by the users to control the connected devices. Also, the system supports Java enabled mobile phones. The system thus becomes less functional as nowa days the use of Java enables phones are reducing and the use of Android phones are increasing tremendously.

Jitendra Rajendra Rana and Sunil N.Pawar in their paper have implemented a zigbee based home automation system. Zigbee is a high level communication protocol used to create personal area network. It supports any kind of micro controller. The system eliminates the complication of wiring in case of wired automation.

Considerable amount of power saving is also possible. Operating range is more than Bluetooth. But the system does not allow remote monitoring and controlling of appliances.

R. Piyare and M. Tazil have presented the design and implementation of a low cost, flexible and wireless solution to the home automation. The system uses Bluetooth technology where the cell phone is used for interaction between the host server and the client modules. This system can be used by any appliances that require On-off switching applications without any internet connection. The drawback of this system was that the wireless communication system was found to be limited to a range less than 50m in a concreted building and maximum of 100m range in an open range. The system supports only the symbian OS cell phones.

3. ML (MACHINE LEARNING) :

The rapid development of information technology (IT) has brought forward a hyper connected society in which work can be done with a single gesture of hands or by reading facial expressions in 21st century with digitization of almost everything it is about time that we decide and implement digital methods in this sector. ML is the method which gives our machines capability to learn regularly from the ever changing environment and adapt according to the changes so that there is a lesser need to implement manual changes also this will ease out the pain of manual work.

4. PIXHAWK FLIGHT CONTROLLER

It is a flight controller device which gives our drone flying capabilities and using mission planner software we can make this drone fully automatic.

This means that we don't need to control this drone manually after fixing the GPS coordinates the drone will fly on its own and take the picture of the field and save the images for further analysis and send the data set to cloud for computation.

5. FPV CAMERA

FPV CAMERA is a visual camera which gives high definition 4k imaging of the field which helps in better detection of weed. It is a 1200tvl CMOS camera for RC DRONES using video telemetry transfers the data to a local storage from where the data is sent for further computation.

6. CONCEPT REVIEW

The main aim of the project is to develop a system that will provide a automated algorithm which will first take data sample from an automatic drone.

The algorithm works on the principle of neural networks and uses a feature distribution column to determine the presence of weed by comparing the plants feature with general weed plant features.

In the end we get a result regarding the suspected crops and if the result is positive than further action is taken.

7. WORKING

In weed monitoring system the drone is a quadcopter which consists of four motors the main control unit of the drone is a pix hawk flight controller which controls the operation of the drone the pix hawk flight controller is programmed to work as a automated drone with a help of a software called mission planner which calibrates the GPS sensor and GYRO sensor attached the drone for in flight stability.

Apart from that the drone consists of a FPV (first person view camera) which captures the images and transfers it to the local storage device using telemetry the stored data is sorted and arranged in the database for ease of access and the sorted data is made into a data set.

The stored data set is then transferred to the cloud storage for analysis where first the algorithm converts the images into grayscale and the gray scaled images is broke into pixels and the feature is then compared with the ideal features. After the comparison the images are reconstructed and we get the result in the form of match percentage.

Based on the percentage the eradication of weed is done and nearby areas are alerted and investigated for any effects of weed. And if there anything suspicious than the concerning authorities are alerted and further action is taken.

APPLICATION

1. SMART SURVEILLANCE

This drone can be used for providing safety from wild animals as well as poisonous plants.

2. DRUGS DETECTOR

Police can use this drone for detecting drugs and capture it using fpv they can be sure whether the suspected consignment is really harmful and illegal.

9. CONCLUSION

In todays world of developing technologies this system provides a solution to agricultures never-ending problem of providing safety to farmers from harmful weed plant saving their cattle and children this is also an efficient method compare to other techniques and can used by police also for catching drug mafia.

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