Perspectives in Communication, Embedded-Systems and Signal-Processing (PiCES) – An International Journal
ISSN: 2566-932X

Pest Detection and Obliteration Based Robotic System

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Abstract: Agriculture is the back bone of the country and the growth of any country's economy is directly dependent and proportional on the agricultural produce of that country. Hence, it becomes extremely important to safeguard and assist farmers in every way possible to help them achieve an excellent yield. In a technological aspect, this can be achieved by devising different instruments which can help the farmer to plough lands, sow seeds or even help him to keep an eye on the farm in his absence to spot intruders, insects or even rodents. This paper surveys one such aspect of utilizing technology for farms and that, is to detect pests.

Keywords: Image processing; Threshold; Pesticides; Intelligence; Microcontroller

I. INTRODUCTION

Agriculture is the major contributor towards India's GDP. Thus, in order to assist growth of farmers, Government has provided several schemes and plans for their welfare, such as harvest storage units, fertilizer distribution and irrigation system. Yet a major problem faced by them is the pest infestation. These pests can directly tamper the harvest of the plants/crops, thus incurring a huge loss for a farmer. Now a day's major problem faced by the formers is detection of pests in their crops.

Thus, in order to overcome from these problem many ideas and methods are introduced. Black light traps and sticky traps are used for detection of pests in fields for analysis of pests. Manual examination of wide crop fields is very time consuming and less efficient. It also requires availability of experts, so it becomes a very costly activity. One technique for pest monitoring is the use of sticky traps, on which pests get stuck when they come in contact with it. A camera is used to take an image of the sticky trap. By considering this image some experts manually estimates the category of pests and theirs count on leaves during that time. These manual techniques not only provide inefficient results, but also prove to be a danger for environment. Hence, to put a check on this, farmers spray huge amount of pesticides on their crops. Extensive and continuous exposure of these pesticides can cause asthma and skin cancer. Thus, in order to save the lives of the farmers and their families, we plan to develop a pest detection algorithm in real time. Automatic detection using image processing technique is the best approach for the detection of pests from the crops. Which uses classification algorithms to classify them using different properties of the images. For this paper, the dataset containing of images of infected leaves are collected from the various crop fields and then various techniques were applied on images for processing. 'Threshold technique' was used to differentiate the pests from the background on image leaves. Detection of pests using this technique is very simple and it gives accurate results. Different properties of the images are extracted, which can be used as input for algorithm to classify images with pests and without pests. The outcomes of the algorithm will be communicated to the robot, which shall be responsible for spraying pesticides at pests.

In this paper, the focus has been to examine white flies, yellow flies (aka hornets) and aphids as these are very small and difficult to examine by the naked eye and can damage the fields on a large scale. The proposed algorithm counts pests on leaves and then estimates the number of the white flies, yellow flies (aka hornets) and aphids per leaf. This paper introduces a method using which white flies, white flies, yellow flies (aka hornets) and aphids are automatically identified from the leaves and pesticides are sprayed automatically based on the

count of pests. This proposed technique avoids wastage of pesticides and environment friendly.

II. LITERATURE SURVEY

There has been some earlier work in the field of automated pest detection in crops. Vision-based Pest Detection and Automatic Spray of Greenhouse Plant done by Yan Li, Chunlei Xia and Jangmyung Lee. This method position of the pests are automatically detected and spraying pesticides on the plant leaves where the pests are present using depth measurement based on a binocular stereo vision system which is implemented by a single camera. The experimental results show that the measured depth is accurate and measurement error is acceptable for controlling the pests. In this method they are only focus on red pests on the plant leaves only in greenhouse.

Muhammad Danish Gondal and Yasir Niaz Khan proposed Early Pest Detection from Crop using Image Processing and Computational Intelligence in this algorithm first, the image is converted to a gray scale image. Then the pixels to be subtracted are calculated from the original image after calculating the background of the image. It is adjusted to improve the image quality. White fly is detected from the plants using binary image. In this method only the white fly is detected on plants.

Identification and Counting of Pests using Extended Region Grow Algorithm. This system was proposed by martin, this algorithm gives a great results in detection of pests on plant leaves and pesticides are sprayed based on the count of pests to save the pesticides but it will take lot of time for processing images and spraying pesticides.

Agricultural Robot – A pesticide spraying device by P. Rajesh Kanna and R. Vikram a movable spraying gadget was designed based on principle of one target one shot spraying strategy in this method the amount of pesticide spraying is based on object or an plant this leads to wastage of pesticides.

III. CONCLUSION

A camera is installed on the robot that captures the real time video of the plant and sends it to video processor. The video processor houses the algorithm that can detect pests. White flies, yellow flies (aka hornets) and aphids will be detected using this algorithm. If pests are fount, a signal is sent to the robot through a microcontroller to spray the pesticides. Once the pesticide is sprayed the robot must move to capture the live feed of the next plants and it stops only if any pest is found.

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