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A Review on Dynamic Features Extraction System for Pest Detection

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ABSTRACT

In agriculture pests can destroy the production on land so need to remove pests from soil for better agriculture production. Supervision of farmland pests is a vital to spray agriculture in a timely and appropriate manner, which gives guarantee of good production in agriculture. Here we discussed some methods that are required for gaining dynamic characteristics of pests by utilizing machine vision. Generally these characteristics are collected from farmland. First step is pests and the background images are divided by using color feature and thresholding methods. Second step is applied Gaussian filtering to obtain the shape features and the number of pests. Lastly frame-to-frame differencing method is used to obtain the quantity of pest motion. The experimental results shows that the 99%.accuracy rate. It can provide quantitative information of pest activity for plant protection personnel. Proposed system can also be used in large-scale crop pest supervision.

Keywords : Image Processing; Feature extraction, Gaussianfiltering

I. INTRODUCTION

Pest detection and control is at least as old as agriculture because there has always been a need to keep crops free from pests. A number of techniques so far proposed for pest control in agriculture using wireless sensor network. In japan they conduct an experiment to understand the crop-weather and pest relation using wireless sensor network and independent pest and disease dynamics of peanut crops. It uses many data mining techniques to turn the data into useful information and correlation of crop / pest / disease and climate field. An attempt has been made to understand the hidden relationship between interrelated disease and pest and weather parameters. In the end, they develop a collective prediction model, which could aid future respective improved measures. Real-time monitoring of farmland pests has great significance to online application of appropriate amount of pesticides and the effect of reducing crop pests. In China, traditional pest monitoring methods usually require manual counting of pests' bodies. The counter has to be trained to have a certain requirement for pestknowledge, it is time consuming and labor intensive, the accuracy of the results cannot be guaranteed.

In recent years, there has been a large infection area of crop diseases and insect pest as well as the degree of its seriousness, which caused enormous economic losses to the peasants. Crop losses due to pests and diseases are quite considerable, particularly in the Indian semi-arid conditions [Reddy]. Weather plays an important role in agricultural production. Crop is prone to attack by numerous pest/disease to a much

larger extent than many other crops. Significant crop losses by these diseases have been reported. Farmers will use this WSN technology for their benefits in future. Many agricultural areas could benefit if used properly. Some agriculture areas are still in research and among researchers like pest monitoring and control, immediate need of pesticides, monitor need of water and fertilizer.

Plant disease and insect pests have turned into a dilemma as it can cause significant reduction in both quality and quantity of agricultural products. China is one of the countries which suffer from the most serious plant disease and insect pest infection in the world. In recent decades, the loss caused by plant disease and insect pests is far more severe than that by plant fires, so plant disease and insect pests forecasting is of great significance and quite necessary. The naked eye observation of experts is the main approach adopted in practice for detection and identification of plant disease and insect pests [3]. However, this requires continuous monitoring of experts which might be prohibitively expensive in large farms. Further, in some developing countries, farmers may have to go long distances to contact experts, which take the experts too expensive and time consuming [4]. Automatic detection of plant diseases is an essential research topic as it may prove benefits in monitoring large fields of crops, and thus automatically detect the symptoms of disease and insect pests as soon as they appear on plant leaves. Machine learning based on detection and recognition of plant disease and insect pests can provide clues to identify and treat the plant disease and insect pest's inits early stages [5]. But, machine learning is only a process in the recognition methods. Looking for fast, automatic, less expensive and accurate method to detect plant disease and insect pest cases is of great realistic significance.

We discuss a new pest supervision system in this paper, Here light or sexual attractant to attract pests attached to the pest board are used to accomplish the gathering live pest data by real-time transmission of dynamic image information with 4G wireless network, Identification and Quantity of entire pests are gathered by Image processing technology information. This system is characterized for gathering complete live pest information without killing it. The system can provide a complete and effective pest information to pest monitoring personnel, and meet the requirements for relevant personnel.

There is no doubt that efficient fresh agricultural products supply chain management is the key to improve the competitiveness of fresh produce enterprises, and the appearance of things brings a new opportunity for fresh agricultural products supply chain management. At present, there is still a big gap between theoretical research and practical applications, Especially in China

THE SYSTEM OF ATTRACTING AND ACQUIRING DYNAMIC CHARACTERISTICS OF LIVING PESTS

Below we present the issues present to attract the living pest and its dynamic feature extraction

A) Attracting insects: In farmland the surrounding is very complex and there are different types of insect are present in it. This system, the method of pest's attraction can be categorized into two type's method of light attraction and the method of sexual attractant.

I) light attraction method: This method uses the phototaxis of insects to attract the surrounding insects to the pest board in a dark environment at night, but the drawback of this method is that the

insect type cannot be identified, this method applies only to insect present at night time.

II) Sexual attractant method : This method uses sexual attractants to attract pests attached to the pest board, This method can determines the type of insect, but cannot get the information of other types of pest, and the type of attracted pests is relatively simple, and this method applies to daytime insect information statistics. For different working conditions during the day and night, we choose different methods to attract insects. During the daytime, a specific sexual attractant can be added to the pest board to attract specific pests; during the nighttime, Insects will be attached to the pest board through the insects' photo taxis.

B) Dynamic image acquisition: Most pest control sites are located in remote sites, it is difficult to connect LAN communication. Therefore, this system has a long-distance transmission to the original dynamic image, and provide the real-time original dynamic image for the image processing equipment, gives the guarantee for the later insect identification and the counting.

C) Dynamic feature analysis: From farm pests original image extraction of pest information, like number of pests and the quantity of pest motion.

D) Equipment development and the validation of effectiveness: Here Set up farmland pest automatic monitoring system for getting the original image information, algorithmic analysis the dynamic images of pests, compare the results of experimental and verify the effectiveness of the system. The dynamic feature extraction process of pests here we don't have any damage to the body of pests. Compared with the pest monitoring dead body with damaged body, pest activity controlling consist of Advantages:

I) Assure the integrity of the pests, reduce the error of identification, and enhance the reliability of data.

II) Dead body monitoring can only measure the type and number of insects, but live supervision system can give "activity parameters" that is the insect movement amount, it can reflect the degree of insect activity, After communication with agricultural plant protection personnel, we found that the number of farm pests and the amount of pests movement is the most concern of plant protection personnel. The grater pests and pest motion, the more likely to explode pests, so we can prevent and decrease the possibility of pest disaster.

The section I explains the Introduction. Section III presents the literature review of existing systems and Section IV present proposed system implementation details which includes preprocessing and feature extraction Section V presents experimental analysis, results and discussion of proposed system. Section VI concludes our proposed system. While at the end list of references paper are presented.

II. LITERATURE REVIEW

Here author M. Mari, I. Orovi and S. Stankovi present Compressive sensing principle[1] for recovering missing information in image and compressing of the original data. here author analyze the performance and quality of Compressive Sensing approach applied on images captured by the TrapView automated camera station for pest detection. The reconstruction at the decoder side, if only small number of image samples is available, is tested.

The power of wireless sensor network node[2] is usually provided by a dry battery, which the power

energy is limited, and the life cycle of wireless sensor network is determined by the battery directly. On the basis of the analysis of energy-saving mechanism of wireless sensor networks, have come up with a plant electrolyte power, a new renewable energy, which attains energy from the electrolytes in the body of plants. The plant electrolyte power can be used in the tropical crop pest monitoring system and it can also be widely applied in wireless sensor network node associated with the plant.

Here author used some approaches for finding the position and direction of spider[3]. A spider is first extracted from each captured image by background subtraction and extraction of the largest connected component. The extracted spider image is divided into the body part and the leg part in order to estimate the position and the direction in the following steps. The position of the spider is determined as the center of the body part. The direction of the spider is estimated by a combination of an initialization operation and a sequential computation.

Paper[4] is used help the farmer in detecting and controlling plant diseases, thereby controlling the financial losses. We present a method for automatically recognizing the plant species based on leaf shape for five different species of common garden plants, Anant (Gardeniajasminoides), Aboli (Crossandra), Chandani (Crapejasmine), Jui (Common Jasmine) and Jaswand (hibiscus). The work focuses on identifying garden plants species which will act as an input to a decision support system (DSS) that would be developed for giving advice to farmers as and when required over mobile internet.

Here author did agriculture monitoring[5] of Pakistan land, pest disease monitoring, and different pest control mechanisms. They analyze and classify pest control mechanism in technological, non-technological and integrated solutions. Then compared the pest control mechanisms based on their effectiveness, cost and other performance parameters. Finally, they analyze the feasibility of pest control mechanisms based on the use of WSN for farmers in developing countries.

Data mining techniques and WSN[6] used for agriculture pest or disease prediction. These techniques were used to turn the data into useful information/knowledge/relations/trends and correlation of crop-weather pest/disease continuum. Data driven precision agriculture aspects, particularly the pest/disease management, require a dynamic crop-weather data. An experiment was conducted in a semiarid region to understand the crop-weather-pest/disease relations using wireless sensory and field-level surveillance data on closely related and interdependent pest (Thrips) disease (Bud Necrosis) dynamics of groundnut crop.

This paper introduces the concept of internet of things (IOT) technology[7] to percept information, and discusses the role of the IOT technology in agricultural disease and insect pest control, which includes agricultural disease and insect pest monitoring system, collecting disease and insect pest information using sensor nodes, data processing and mining, etc and proposed A disease and insect pest control system based on IOT.

Identification of pests in the paddy fields [16] is a great challenge in the field of agriculture, therefore effective measures should be developed to fight the infestation while minimizing the use of pesticides. The methods of image analysis are extensively applied to agricultural science, and it provides large protection to crops, which can ultimately lead to better crop management and production. Supervision

of pests infestation relies on manpower, however automatic monitoring has been advancing in order to reduce human efforts.

III. SYSTEM ARCHITECTURE

Image dataset of pests or insects are given as an input for extracting features from them by doing preprocessing on that images. Original images are processed to get the features these features are like color of insect, position of insect, quantity, shape and so on. Then these extracted features are used to identify the test image are insect or not. This can help to improve the agriculture production.

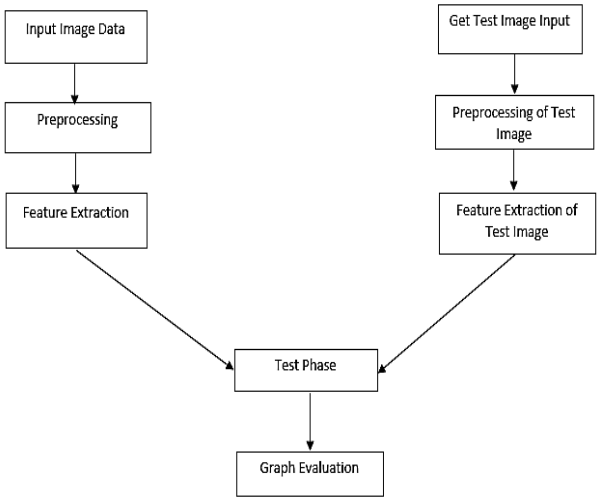

Fig 1. System Architecture

IV. RESULT AND DISCUSSIONS

A. Experimental Setup

All the experimental cases are implemented in Java in congestion with Netbeans tools and MySql as backend, algorithms and strategies, and the competing classification approach along with various feature extraction technique, and run in environment with System having configuration of Intel Core i5-6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM

V. CONCLUSION

Here we discussed some factors that affect the agriculture production one of them is pests or disease present in farmland which has more impact on agriculture production. So for improving the production of agriculture we studied some methods like color feature and threshold, Gaussian filtering to obtain the shape features and the number of pests and frame-to-frame differencing method to obtain the quantity of pest motion.

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