AUTOMATIC MONITORING OF PEST INSECTS TRAPS USING IMAGE PROCESSING

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ABSTRACT:-

Monitoring pest insect population is currently an important issue in crop protection. At farm level insect population monitoring is routinely operated by repeated surveys by a human operator of adhesive traps, disseminated through the field, where insects remain stuck when attracted. This is a laborious and time-consuming activity, and it would be of great advantage for farmers to have an affordable system performing this task automatically. A system based on a distributed imaging device operated through a wireless network that is able to automatically acquire and transmit images of the trapping area to a remote host station is proposed. The station evaluates the insect density evolution at different farm sites and sends a message to the server that need pesticides when insect density goes over threshold or an alarming level through GSM technology. The network architecture consists of a master node hosted in a PC and a set of client nodes, spread in the fields, which act as monitoring stations. The master node coordinates the network and retrieves the captured images from the client nodes. Microcontroller based hardware system with a serial port cable and a GSM modem which is interfaced with PC is used to send messages to the particular numbers for required attention in this regard for further action.

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INTRODUCTION:

An accurate and timely monitoring of pest insects population is a key issue in crop protection. At farm level, pest population levels during crop season are routinely monitored by means of adhesive traps disseminated through the field at appropriate spatial density, when insects remain stuck when attracted into by colour appearance or odorous baits like sex pheromone. This task requires repeated surveys in the field with visual observations of traps and recording of the number of insects captured by a human operator. Being these survey process a highly laborious and time consuming operation, they are unlike to be conducted at the necessary monitoring frequency, often yielding poor results, significantly affected by observer's skill or fatigue, or by surveying conditions. The ongoing developments in new micro, low cost imaging devices and in wireless communication technology could give a valuable contribution in facing automatic monitoring of pest insects by establishing a camera able to remotely assess the adhesive traps captures in the field. Indeed a successful development of such system would potentially allow taking decisions about insect control strategies at farm based on continuously updated maps of pest insect population levels which are retrieved in a server from a distributed network of sensor wireless units transmitting from the field. An alternative solution, explored in this study, is based on adopting very simple stations only having ability of capturing and transmitting images through low power wireless networks. A host station will process all the received images and count the trapped insects. This same station will eventually provide an interface to the operator to show in real time the population map and its trend, as well as a message will be sent through GSM module when insect density goes over an alarming level.

REVIEW OF LITERATURE:-

- It is given that, pests are those that directly damage the crop, and pest control has always been considered the most difficult challenge to overcome. A well-known technique to perform pest control monitoring is based on the use of insect traps conveniently spread over the specified control area. Depending on the kind of insect, each trap is properly installed with pheromones or other chemical substances that attract the insects we want to capture. The traps are designed in such a way that insects entering in the trap are unable to leave it, so pest monitoring systems will periodically collect the data of each trap captured to perform an efficient pest control monitoring,[2].

- To get most reliable results, image processing should be performed only on the trap active area,[1].
- The large scale, long distance, and long-term monitoring for agricultural information can be achieved by using proposed monitoring system. Much improved spatial resolution and temporal resolution is obtained compared to traditional methods for monitoring the data of pest population.[6].
- Energy saving of wireless sensor network node is usually available from the hardware, operating systems and communication protocols. In this project we are using GSM modem which uses low power,[5].
- Using GSM was 100% based on cross checking the sent and received data, and the integrity of transmission is guaranteed. Also by using GSM, data or message can be saved from attacks and information is provided to the user,[7].

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