Research carried out on insect detection

info collected

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VISITED SITES:

1. <http://dynamicpublisher.org/gallery/ijsrr-d211.pdf>

PROPOSED SYSTEM:

1. PEST INFESTATION and to classify type of pest.

* List of modules mentioned in the project:

. Image acquisition

. Image processing and classification

. Detection and remedies

. Growth analysis

. Insect count

1. KNOWLEDGE REQUIRED TO CHOOSE THE MENTIONED WAY:

Computer vision, Image processing, Working with board (Raspberry).

1. DOMAIN IT FALLS INTO:

Image processing.

1. <https://www.biz4intellia.com/blog/a-complete-guide-for-iot-based-pest-detection-with-its-benefits/>

PROPOSED SYSTEM:

1. Monitoring pest infestation and crop health.
2. Weather monitoring and analytics.
3. Automated crop health monitoring

* List of modules mentioned in the project:

Sensors:

. Low power cameras and sensors

. High power thermal sensors

. Fluorescence image sensing

. Acoustic sensors

. Gas sensors

1. KNOWLEDGE REQUIRED TO CHOOSE THE MENTIONED WAY:

Execution of Internet of Things in Agriculture sector, working and behavior of sensors.

1. DOMAIN IT FALLS INTO:

Internet of Things.

1. <https://internetofthingsagenda.techtarget.com/blog/IoT-Agenda/Fighting-pests-with-the-internet-of-things>

PROPOSED SYSTEM:

1. Pest monitoring
2. Weather monitoring
3. Chemical automation
4. Crop health monitoring
5. IPM automation (Integrated pest monitoring)

* List of modules mentioned in the project:

**. Hardware**: Low-power, high-performance sensors and other hardware are becoming less expensive

**Networks**: Specialized networking protocols like [LPWAN](https://internetofthingsagenda.techtarget.com/definition/LPWAN-low-power-wide-area-network) have emerged for low-coverage areas like farms

**. Cloud**: The power of cloud computing has enabled people to take big data and transform it into meaningful insights that help users make educated decisions to improve operational efficiencies

**. Platform**: Powerful software platforms have come onto the market as the foundation for full connected solutions from devices to analytics to applications

1. **KNOWLEDGE REQUIRED TO CHOOSE THE MENTIONED WAY:**

**Knowledge regarding the hardware mentioned above, Cloud computing.**

1. DOMAIN IT FALLS INTO:

Internet of Things, cloud computing.

# Conclusions made

After visiting good number of websites, the following conclusions are made:

* The websites and blogs that are sharing the information above the insect detection are mainly concentrating on Internet of Things (or) Computer Vision (or) Internet of Things integrated with Cloud computing.
* Hardware plays a dominant role i.e. sensors and actuators.
* Networking knowledge is required i.e. the data collected through these sensors is instantly transferred to a centralized platform wirelessly.
* Characteristics of several bugs have to be studied specially.

## risks associated

* Several challenges come in way, since diversion of the domain is more likely in this context.
* Research may take a bit long time, since pest management using IoT is inevitable and it involves database collection using various tools from chemical, biological and mechanical fields.
* What after detection?

It is a sensible thought, that what after detection. Killing the insects without having proper knowledge about its behavior may result in biological imbalance.

Advantages and Disadvantages of the sensors for insect detection:

**Low power camera and sensor:**

**Advantages:**

* Low power
* Low cost Rs.200- Rs.2000
* Scalability and Mobility.

**Disadvantages:**

* Problems may arise while installing.
* These cameras only click random images of insects that are visible from the naked eye.
* Cameras need to be installed in traps that captures the images of pests in it, hence may affect the reliability of the device on long run.

**High power Thermal Sensors:**

**Advantages:**

* Detection of insects and their lifecycles stage is possible.

**Disadvantages:**

* Expensive method.
* Sensitive to environmental changes.

**Fluorescence Image sensing:**

**Advantages:**

* Fluorescence parameter changes can be measured based on the amount of chlorophyll present.

**Disadvantages:**

* Scalability issues
* This method is only applicable to crops that contain chlorophyll.

**Acoustic Sensor:**

**Advantages:**

* Wireless acoustic sensors can be placed at random locations in a field.
* They help picking up the sound waves of insects.
* High accuracy in detecting pest infestations and can be used at a wider scale.

**Disadvantages:**

* Accuracy depletes drastically in rainy and windy weather conditions.

**Gas Sensors:**

**Advantages:**

* Plants produce specific volatile chemical compounds, which differ from situation to situation i.e. the compound emanated due to environmental changes is different from compounds produced due to pest infestation hence can be easily detectable.

**Disadvantages:**

* Pre-knowledge of these compounds are to be studied and sampling required to collect volatile compounds for data analysis.