Industrial Engineering Journal
ISSN: 0970-2555
Volume : 53, Issue 9, September : 2024

"SOLAR OPERATED IOT BASED FARM INSECT KILLER"

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ABSTRACT:-

Insect pests pose a significant threat to agricultural productivity, causing substantial crop losses and economic damage. Conventional pest control methods, such as the use of chemical insecticides, can have harmful environmental and human health impacts. This project proposes a sustainable and environmentally friendly alternative: a solar-operated IoT-based farm insect killer.

The proposed system utilizes ultraviolet (UV) light to attract and trap insects, eliminating the need for chemical pesticides. A solar panel harnesses solar energy to power the UV light, ensuring continuous operation even in remote areas without access to grid electricity. The IoT component enables real-time monitoring and control of the system, Allowing farmers to remotely adjust UV light intensity and trap emptying schedule.

KEYWORDS:

Sustainable pest control, IoT-enabled insect killer, Solar-powered farm insect trap, Eco-friendly insect control, Smart agriculture insect management INTRODUCTION:

In the realm of agriculture, insect pests pose a severe threat to crop production, leading to significant crop losses and economic damage. Conventional pest control

methods, such as the application of chemical insecticides, can have detrimental effects on the environment and human health. In light of these concerns, a sustainable and environmentally friendly alternative is proposed: a solar-operated IoT-based farm insect killer.

The proposed system utilizes ultraviolet (UV) light to attract and trap insects, eliminating the need for chemical pesticides. A solar panel harnesses solar energy to power the UV light, ensuring continuous operation even in remote areas without access to grid electricity. The IoT component enables real-time monitoring and control of the system, allowing farmers to remotely adjust UV light intensity and trap emptying schedules.

LITERATURE SURVEY:

Insect Pests and Their Impact on Agriculture Insects are a major threat to crop production worldwide, causing anestimated 20-40% yield loss annually. Insect pests can transmit diseases to crops, reducing their quality and marketability. Conventional pest control methods, such as the use of chemical insecticides, can have harmful environmental and human health impacts.[1]

Solar-powered pest control systems offer a sustainable and environmentally friendly alternative to conventional methods. These systems utilize solar energy to power various pest control mechanisms, such as UV light traps, pheromone traps, and sound traps.[2]

UV light traps are widely used in agricultural settings to attract and trap insects. These traps emit UV light, which insects perceive as a light source andare attracted. Once insects approach the light source, they are trapped using sticky glueor fans.[3]

Pheromone traps utilize pheromones, natural insect attractants, to lureinsects into traps. These traps are particularly effective for targeting specific pest species.[4]

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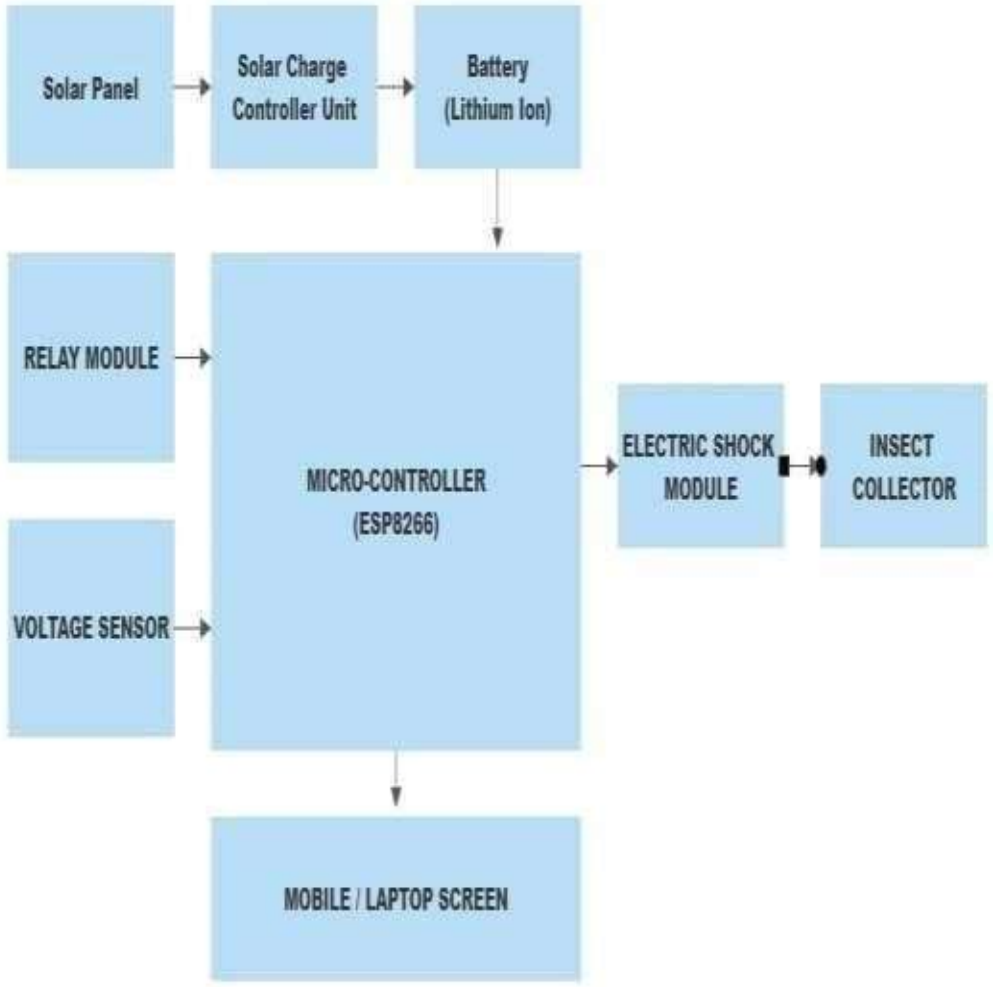
BLOCK DIAGRAM**:-**



COMPONENTS:-

1. Solar Panel

A solar panel is a critical component of the system, as it converts solar energy into electricity to power the UV light traps. Solar panels aretypically made of photovoltaic cells, which absorb sunlight and generate an electric current. For this project, a solar panel with sufficient power output to run the UV light traps continuously is required.

2. UV Light Traps

UV light traps are the primary insect control mechanism of the system. These traps emit UV light, which is attractive to insects. Once insects approach the light source, they are trapped using sticky glue or fans. For this project, UV light traps with appropriate wavelength and intensity for the target insect species are necessary.

3. Microcontroller Unit (MCU)

An MCU is the brain of the system, responsible for controlling and coordinating the operation of various components. It receives sensor data, processes it, and sends commands to actuators to adjust UV light intensity, trap operation, and data transmission. For this project, an MCU with sufficient processing power and communication capabilities is required.

4. Sensors:

Sensors are used to collect environmental data, such as temperature,humidity, and insect activity, which is crucial for optimizing pest control strategies. For this project, sensors that can accurately measure relevant environmental parameters are necessary.

5. Communication Module

A communication module enables the system to connect to the IoT network, allowing real-time data transmission and remote control capabilities. This module can be a Wi-Fi, cellular, or LoRa module depending on the network availability and connectivity requirements.

6. Actuators

Actuators are responsible for executing the commands from the MCU. They can control UV light intensity, trap operation, and data transmission based on the MCU's instructions. For this project, actuators with appropriate power handling capabilities are required.

7. Power Management Unit (PMU)

A PMU efficiently manages the power supply for the system, ensuring optimal operation of all components. It regulates the voltage and current from the solar panel, providing a stable power source for the MCU, sensors, actuators, and communication module. For this project, a PMU with sufficient power handling capabilities and protection features is necessary.

8. Enclosure:

An enclosure protects the electronic components from the harshagricultural environment, including dust, moisture, and extreme temperatures. It should be durable, weatherproof, and designed to facilitate easy access for maintenance and repair.

9. Data Storage and Analytics

A data storage and analytics platform is essential for storing and analyzing the insect activity and environmental data collected by the system. This data can be used to

identify pest hotspots, track population trends, and optimize pest control strategies.

10. User Interface

A user-friendly interface allows farmers to monitor the system's status, adjust settings, and receive pest alerts remotely. This interface can be a web-based application or a mobile app accessible through smartphones ortablets.

CONCLUSION:-

- The solar-operated IoT-based farm insect killer project presents a promising solution for sustainable and environmentally friendly pest control in agricultural settings. By combining the benefits of solar energy with the capabilities of IoT technology, this system offers an effective and efficient approach to insect management. The implementation of this system can contribute to reducing reliance on harmful chemical insecticides, promoting sustainable agricultural practices, and improving crop yields.

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