Weather Based Pest Prediction

AI IN AGRICULTURE

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Aim of the Lecture

The objective of the lecture is to learn how to develop a system that leverages computer vision, Large Language Model, and the **OpenWeather API** for weather based pest prediction.

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Goal

At the end of the lecture, you will;

- Understand the projects workflow
- Be able to develop a system that helps farmers detect the type of pest affecting a particular plant and also make recommendations.

Introduction

The Weather-Based Pest Prediction application is a seamless integration of a **ReactJS** frontend and a Python-powered backend, bridged by **Flask API.**

The application helps farmers detect the type of pest affecting the particular plant and also make recommendations on the;

- Choice of pesticide
- Weather conditions for application
- Application method

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Introduction

In addition, The system measures the **Growing degree days (GDD):** which is a measurement of heat accumulated over time.

Farmers use GDD to predict both the growth stage of the crop, as well as for predicting the occurrence of pests, and the time when they should begin using pesticides to prevent pest damage. The higher the GDD, the faster the pest will develop.

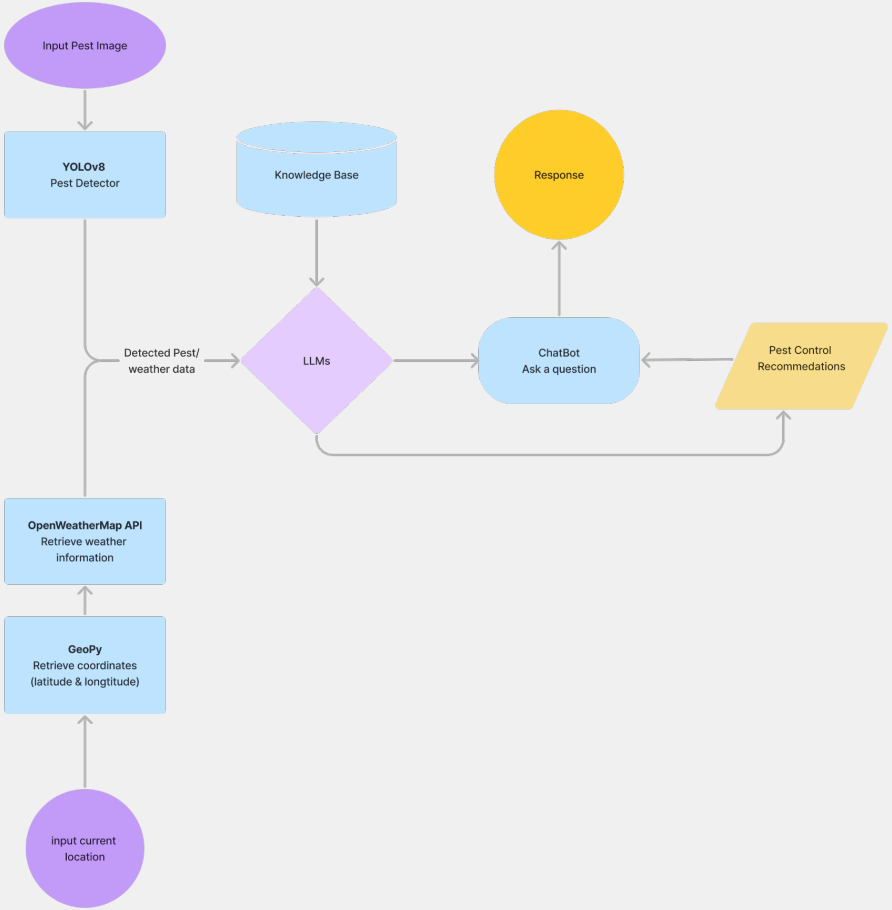
Tech Stacks

- LangChain LLM framework
- OpenWeatherMap API
- ReactJS (Frontend)
- Python (Backend)
- Flask API

Libraries

- GeoPy
- Request

Project Workflow



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GeoPy

Geopy makes it easy to locate the coordinate of addresses, cities, countries and landmarks using the third-party geocoders and other data sources.

The current location of the user is sent as input to the GeoPy API and as a response returns the coordinate **(latitude & longitude)** of the address. This is then passed to the OpenWeatherMap API.

OpenWeatherMap

OpenWeather provides historical, current and forecasted weather data via light-speed APIs.

The coordinates returned by the **GeoPy API** is fed to the **OpenWeather API** which in turn returns the current weather data as well as the forecast up to **5 days**.

Model Training

Dataset

This state-of-the-art application utilizes the prowess of the **YOLOv8** model, fine-tuned using a comprehensive dataset (https://universe.roboflow.com/laktharu/rice-pests-ztbeq)

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Application

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Weather Based Pest Prediction

Preview

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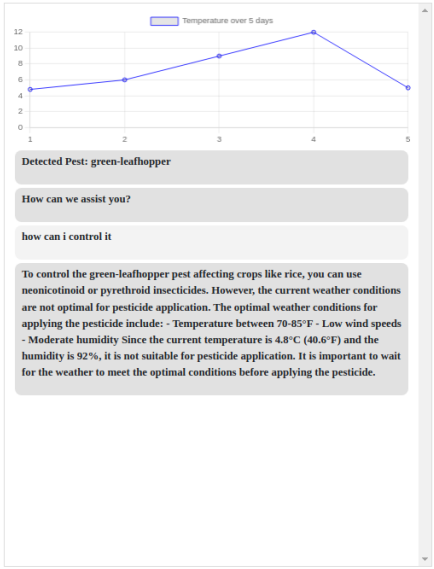
Process

Processed Image



THANK YOU!

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