



Pestora

A Confidence-Aware AI Pest Monitoring System

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Problem:-

- Pest infestation is one of the main reasons for crop loss in Indian agriculture, especially in vegetables, rice, and maize. In many farms, pest detection is still done manually and based on personal experience, which often leads to late identification of pest attacks. Because of this uncertainty, farmers tend to use chemical pesticides as a precaution, even when the pest problem is minor. Incorrect or excessive use of pesticides can harm soil quality, food safety, and the environment.
 - Although some digital and AI-based pest solutions are available, many are generic, not crop-specific, and do not clearly show how confident their predictions are.
 - This creates a need for a reliable, crop-specific, and decision-aware pest monitoring system that supports early detection and promotes organic and government-approved pest control methods.



Impact:-

- The primary users of this solution are **small and medium-scale farmers** growing vegetables, rice, and maize in rural and semi-rural India. These farmers need early pest detection, accurate guidance, and affordable solutions to protect their crops while reducing unnecessary pesticide use.

- The system is also valuable for farmer groups, agri-advisory services, NGOs, and government-supported agricultural programs, who are willing to pay for reliable and scalable digital tools.



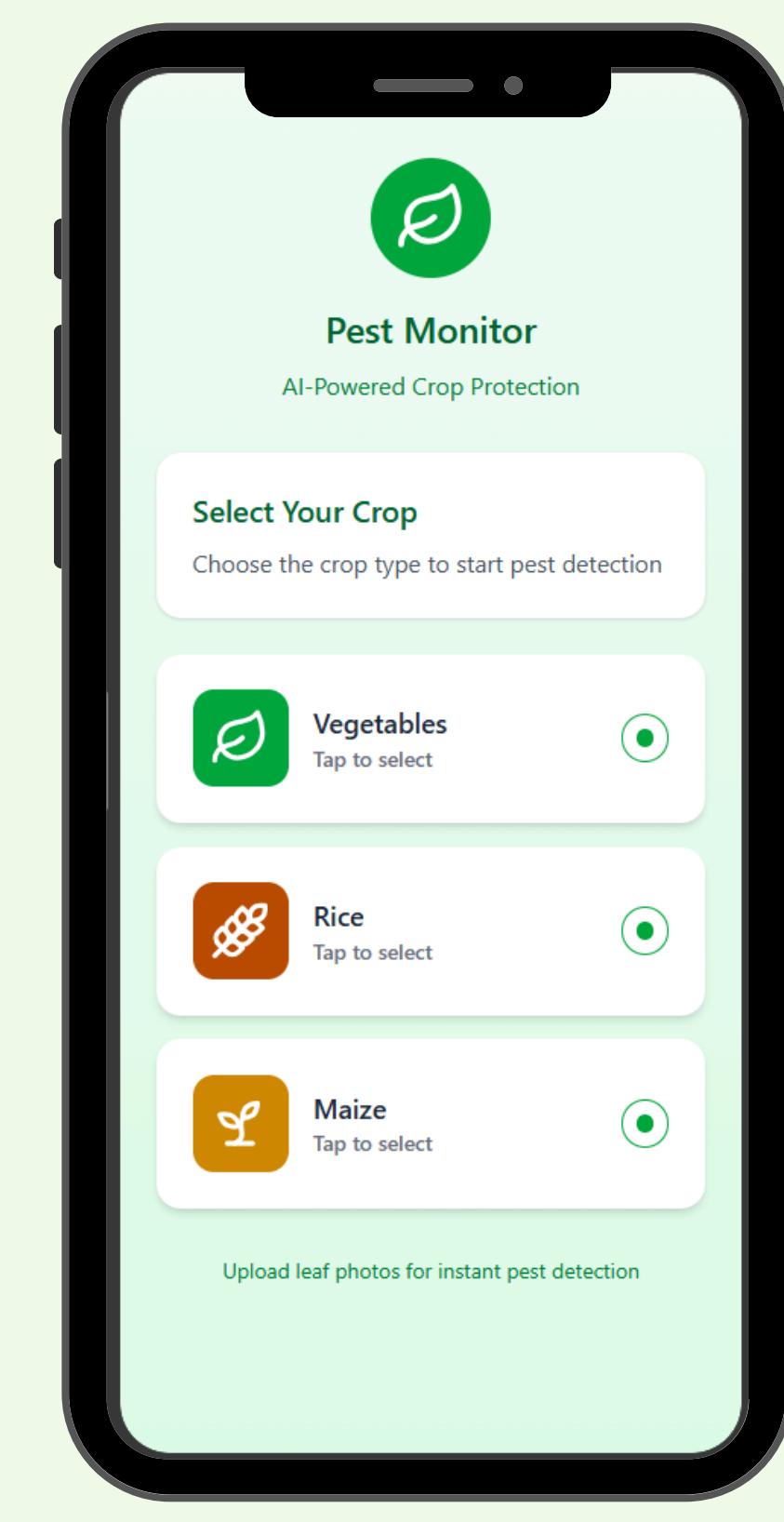
- By supporting informed pest management decisions, the solution helps improve crop health, reduce input costs, and promote safer and more sustainable food production.

Process:-

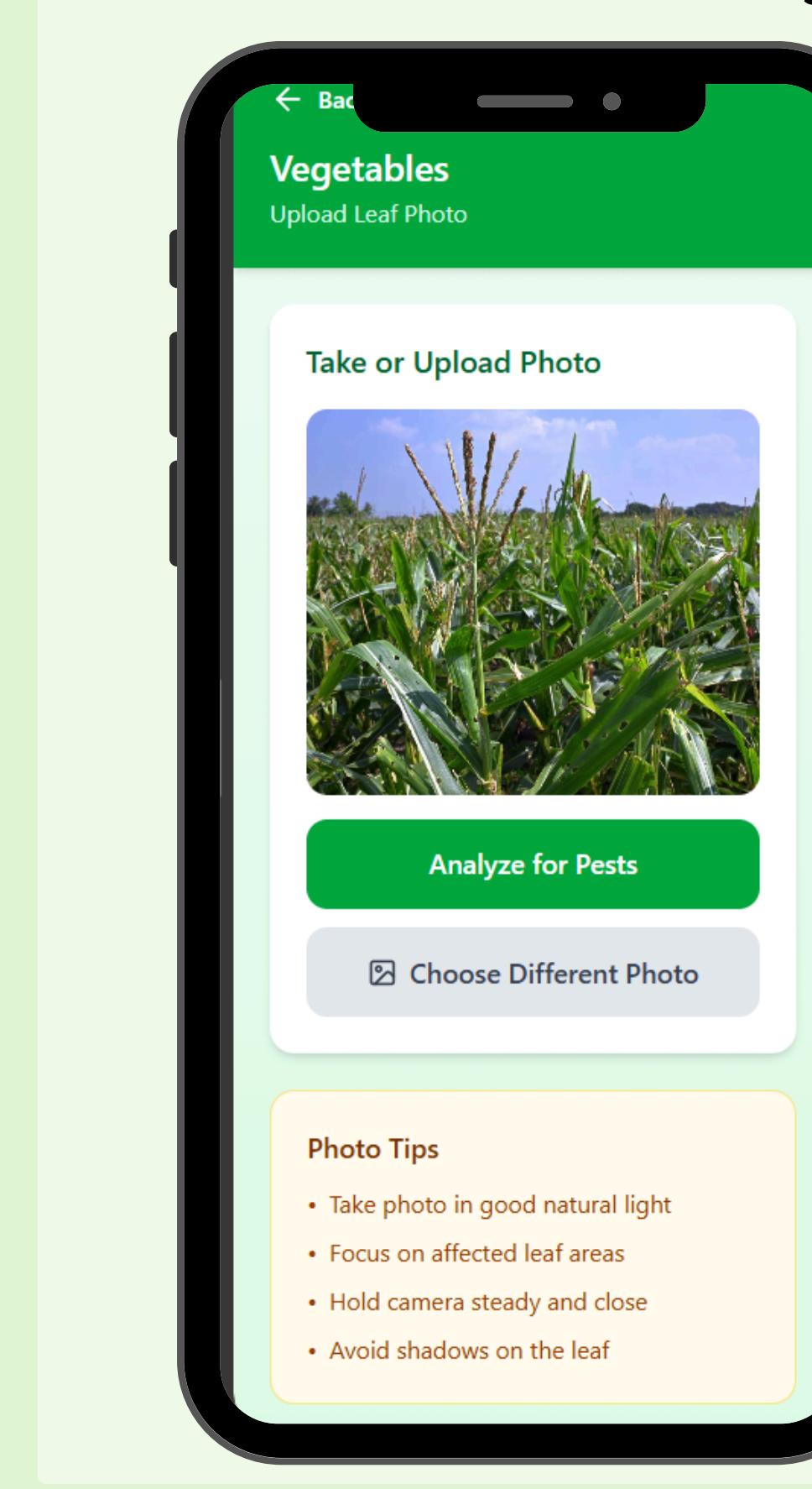
- This project aims to develop an AI-based pest monitoring and advisory system through a step-by-step approach. Crop-specific image data for vegetables, rice, and maize is collected and cleaned to train separate machine learning models.
 - Farmers upload crop images and select the crop type, after which the system analyzes the image and provides a prediction with a confidence score. Based on pest type and severity, the system suggests organic solutions first and government-approved chemical options only when required. The system is designed to improve continuously through testing and feedback.

Solutions

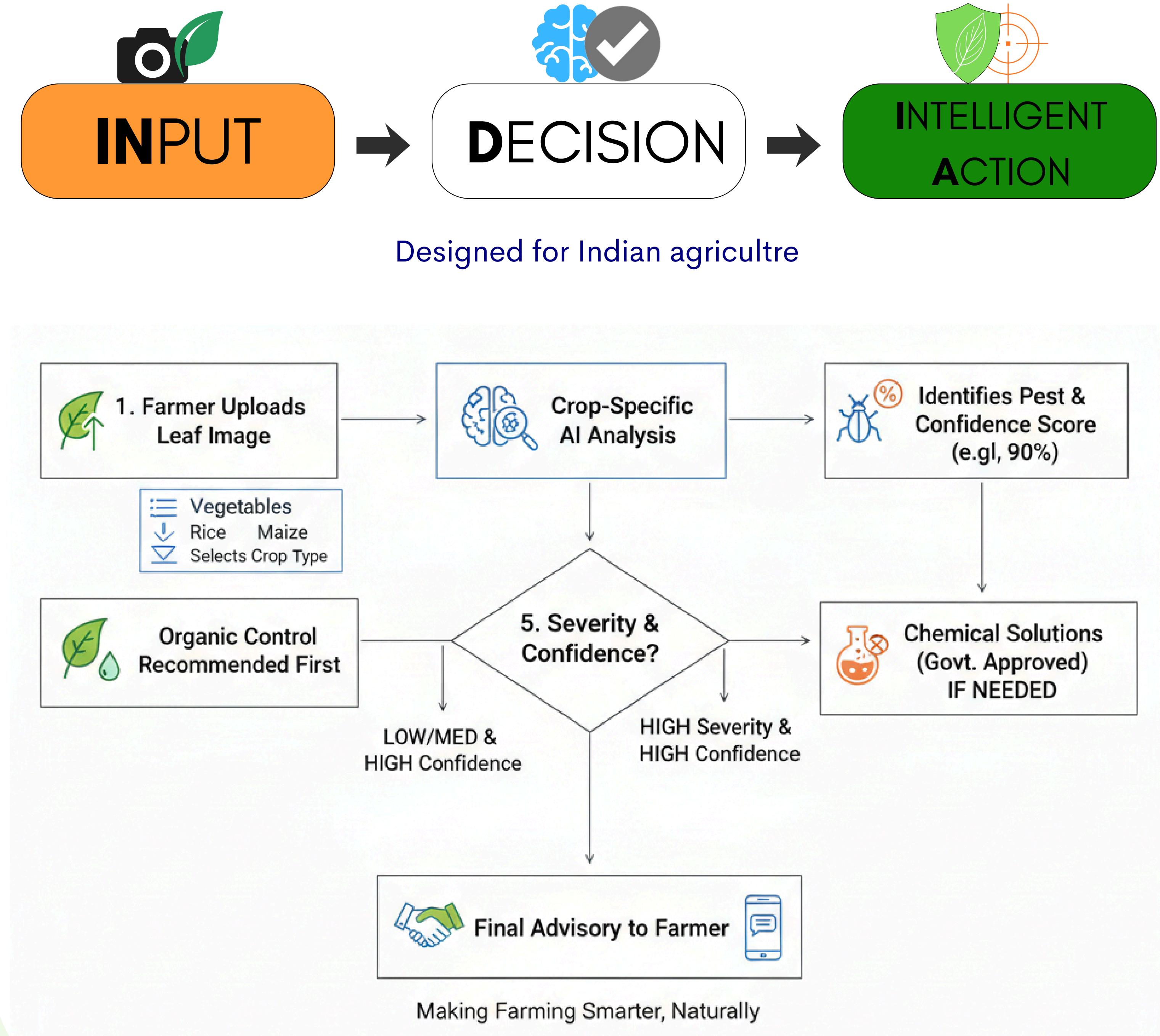
- We propose a ***crop-specific AI-based pest monitoring system*** for vegetables, rice, and maize. The system uses machine learning models trained separately for each crop to identify pest damage from leaf images. Each prediction includes a confidence score, helping users understand how reliable the result is. Based on the type of pest and the level of damage, the system first suggests organic and eco-friendly solutions.



- Chemical pesticides are recommended only when needed, and only those approved by government authorities.
 - This approach enables early pest detection, reduces unnecessary chemical use, and supports safer and more sustainable farming practices — because we should know what we are eating by understanding what we are cultivating.



Flow chart:-



Revenue model:-

- The core pest detection system is kept free or very low-cost so that small and medium farmers can easily use it.
 - Revenue comes from institutions such as agricultural colleges, NGOs, and government-supported digital farming programs that adopt the system.
 - This approach allows wide adoption while keeping the solution affordable and sustainable without putting pressure on farmers.

Unique Selling Proposition (USP):-

- Crop-specific AI models trained separately for vegetables, rice, and maize instead of a one-size-fits-all approach.
 - Leaf-image-based pest detection focused on what farmers actually observe in the field.
 - Confidence-aware predictions that help users judge reliability before taking action.
 - Organic-first pest management, promoting eco-friendly solutions whenever possible.
 - Only government-approved pesticides suggested, and only when truly required.
 - Farmer-friendly and low-cost design, proposed to suit real Indian farming conditions and encourage adoption.

About my team :-

We are students from SSSIHLS, Nandigiri Campus, pursuing careers in Data Science and driven by a passion for solving real-world problems through sustainable solutions.

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