Project Proposal: Pest Detection with Image Processing

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Objective

This project aims to develop a device capable of detecting pests or crop diseases using camera-based image analysis. Upon detection, the device will alert farmers, enabling timely intervention and minimising crop damage.

Implementation

The implementation of this project will involve the following key components and steps:

- **Hardware Setup:** A low-cost camera will be attached to a Shakti-based board. This ensures an economical yet powerful platform for image acquisition and processing.
- **Image Processing Algorithm:** A lightweight image processing algorithm will be developed. This algorithm will be specifically designed to identify pest patterns or leaf discoloration indicative of crop diseases.
- **Output and Alerts:** The detection results will be communicated to farmers through various alert mechanisms. This could include a buzzer, a local display, or IoT notifications for remote monitoring.

RISC-V/Shakti Integration

The integration of RISC-V/Shakti architecture is crucial for the efficient and optimised operation of the pest detection system:

- **Image Processing Pipeline Optimisation:** The image processing pipeline will be optimised by leveraging RISC-V's parallel processing capabilities. Additionally, custom instructions will be explored to accelerate specific image analysis tasks.
- **Efficient Image Data Handling:** Cache memory techniques will be employed to handle image data efficiently on the Shakti processor. This will reduce latency and improve the overall processing speed.