An AI and IoT-Based Model for the Detection and Treatment of Sweet Potato Pests and Diseases in Precision Farming

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Motivation and Problem

▪Goal:

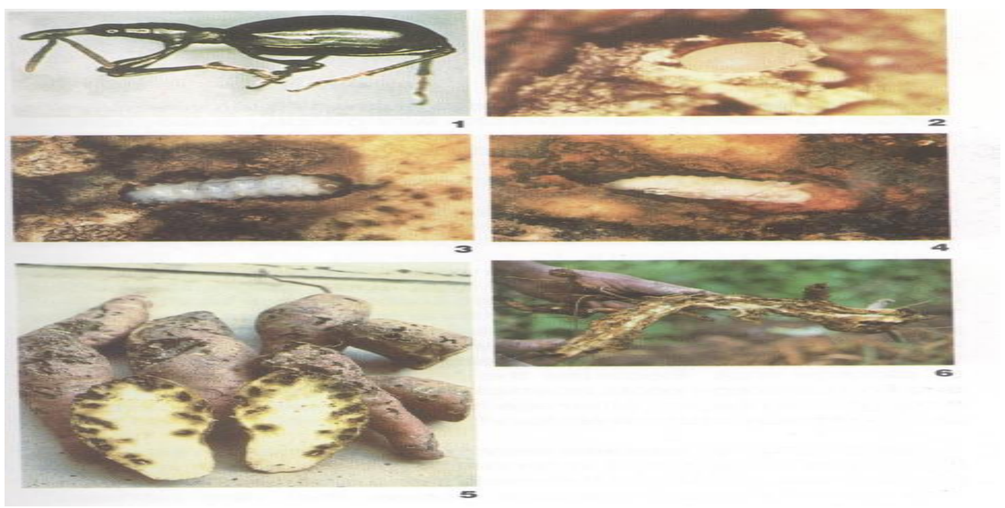
- **To develop an AI-based model for the detection and control of sweet potato pests and diseases in precision farming.**

Motivation:

- **Farmer's Challenges during cultivation of crops.**
- **Poor yields of crops**

Problem:

- **Soil deficiencies**
- **Weather, and climate change**
- **Pests Infestation and Diseases.**



Objectives

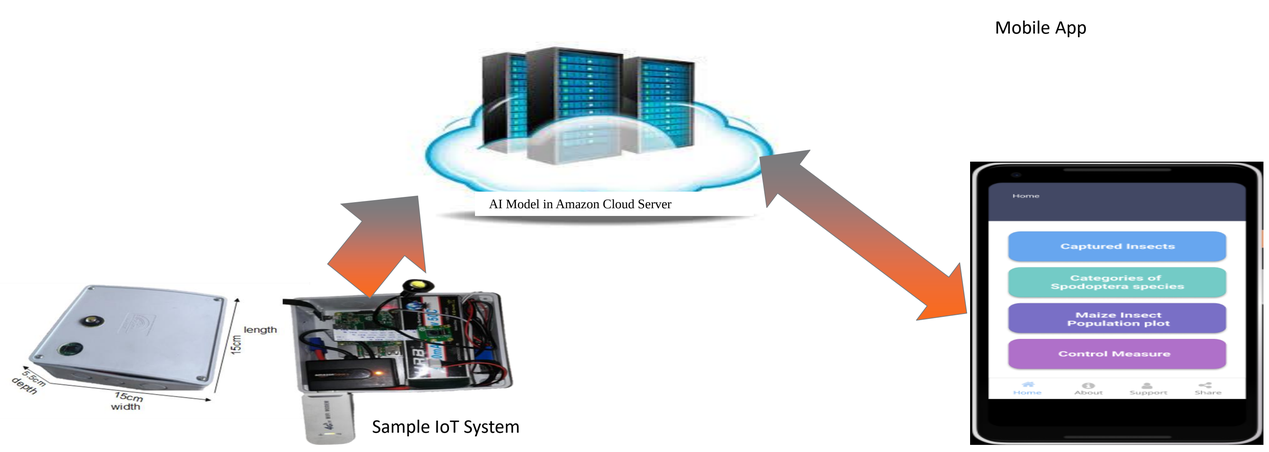
- ✓ **Develop a predictive model to prevent food scarcity, support local economy, and improve sustainable agricultural practices.**
- ✓ **Design, develop and deploy AI model using Deep learning to detect and control pest and diseases.**
- ✓ **Use built IoT system for weather, soil, and pest monitoring.**
- ✓ **Evaluate model performance using appropriate metrics.**
- ✓ **Develop mobile APP for crops' visualization.**

Objectives

Abad, J. C. M. M. J., 1992. Comparison of the capsid protein cistron from serologically distinct strains of sweetpotato feathery mottle virus (SPFMV). Archives of Virology, p. 147–57.
Afonso, M. et al., 2019. Blackleg detection in potato plants using convolutional neural networks. IFAC-PapersOnLine, 52(30), pp. 6-11.

Methodology

AI Model Training using Deep Learning approach.
Infrastructure as a service (IaaS) will be deployed, to store predicted values.
Edge device and integrated into IoT system built using Raspberry to perform offline prediction when network fails.
IoT system sends prediction to the cloud when network is restored.
Mobile App using Android studio. Farmers download and visualize via Mobile App.



Outputs

- ✓ **IoT Monitors Weather and soil parameters, Pest Infestation and diseases.**
- ✓ **AI System Fertility Status Determined - In-Situ**
- ✓ **Invasion detected - economic injury levels.**
- ✓ **Control measures - farmers/end users**
- ✓ **Increased crop yields.**

Outcome

Less Insecticide/Synthetic Fertilizers - Healthy Soil and Environment
Farmers' Economic/Consumption Index - Improved
Improve sustainable agricultural practices in Africa