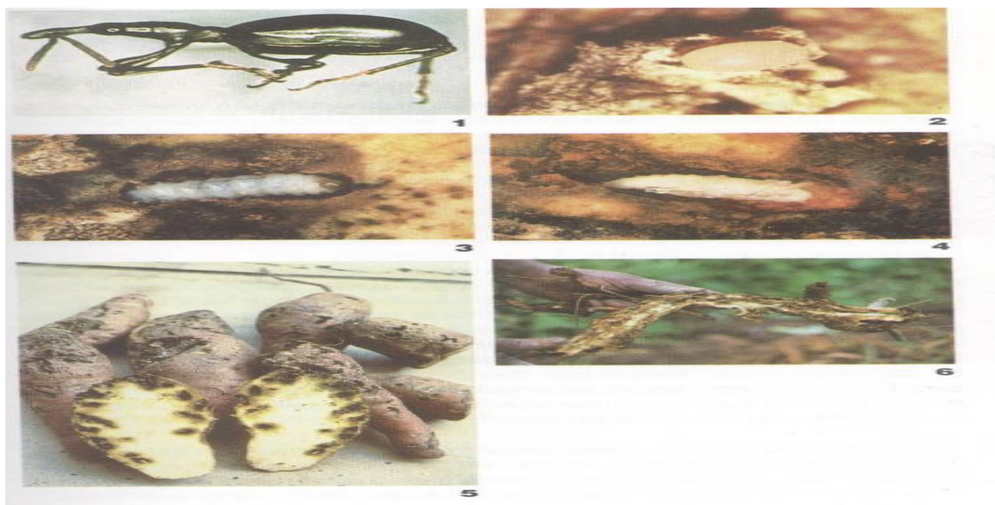
An AI and IoT-Based Model for the Detection and Control of Sweet Potato Pests and Diseases in Nigeria

Onyejegbu L.N. Akojede T. and Ugwu C.
Computer Science Department University of Port Harcourt, Nigeria

Introduction

- Farmers Challenges during cultivation of crops.
- Poor yields of crops
- Contributing Factors
- Soil deficiencies
- Crop species
- Weather, and climate change
- Pest Infestation
- Diseases.



Objectives

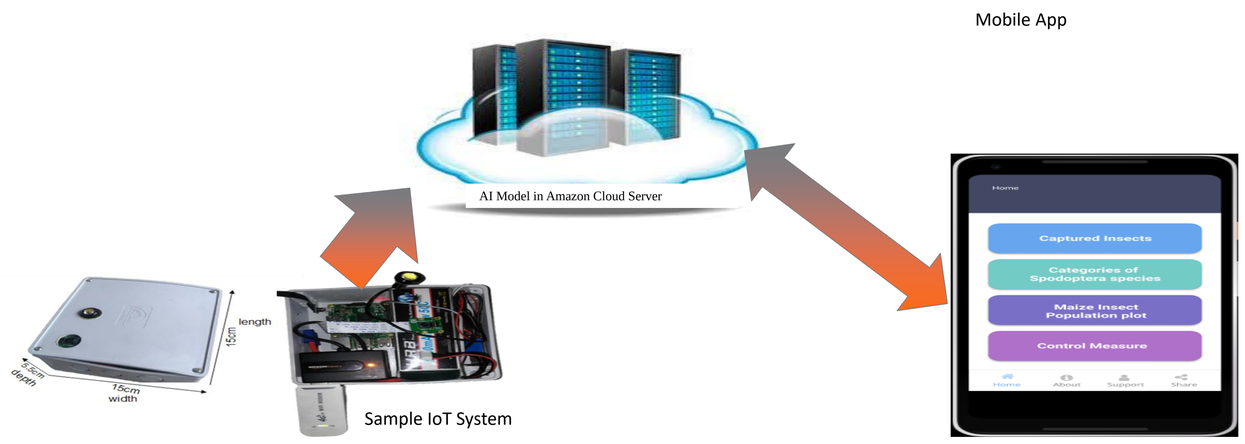
- ✓ Develop a predictive model to prevent food scarcity, support local economy, and improve sustainable agricultural practices.
- ✓ Design, develop and deploy AI model using Deep learning to detect and control pest and diseases.
- ✓ Use built IoT system for weather, soil, and pest monitoring.
- ✓ Evaluate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

References

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.

Method

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.

Outcomes

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