🌿 Plant Disease Detection System for Sustainable Agriculture 🌿

WEEK 1: Project Planning and Data Preparation

This presentation outlines the progress made during the first week of my internship at Edunet Foundation, in collaboration with AICTE & Shell. We're developing a plant disease detection system using advanced AI techniques to empower sustainable agriculture.

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Addressing the Challenges of Plant Diseases

THE PROBLEM:

Every year, millions of crops are lost to undetected plant diseases. This loss impacts farmers' food security and economic stability.

THE VISION:

We envision a future where AI empowers agriculture to identify and prevent diseases, leading to greater sustainability and food abundance.

PROJECT AIM:

This project aims to develop a CNN-based model to detect and classify plant diseases in crops like apples, cherries, grapes, and corn. It identifies both healthy and diseased leaves, enabling early detection and effective disease management to support sustainable farming practices.

KEY OBJECTIVES:

1. Ensure reliable disease classification for prompt intervention.
2. Provide farmers with actionable insights for informed decision-making.

DATASET INFORMATION:

Source:

We're using the Kaggle plant disease dataset, containing over 87,000 labeled leaf images.

Diversity:

The dataset encompasses 38 distinct plant disease classes across major crops like apples, grapes, and corn.

Details:

The images are stored in labeled directories with corresponding healthy plants and plant species with disease, ensuring organized access for analysis and training.

Preparing for Model Training

- Data cleaning: We removed corrupted or mislabeled images to ensure a clean dataset.
- Normalisation: We resized all images to 224x224 pixels and scaled pixel values for consistent input.
- Labelling: We verified and refined image labels for accuracy in training and evaluation.

Dataset Insights

- **Class imbalance**

We discovered some diseases dominate the dataset, requiring balancing techniques for fair training.

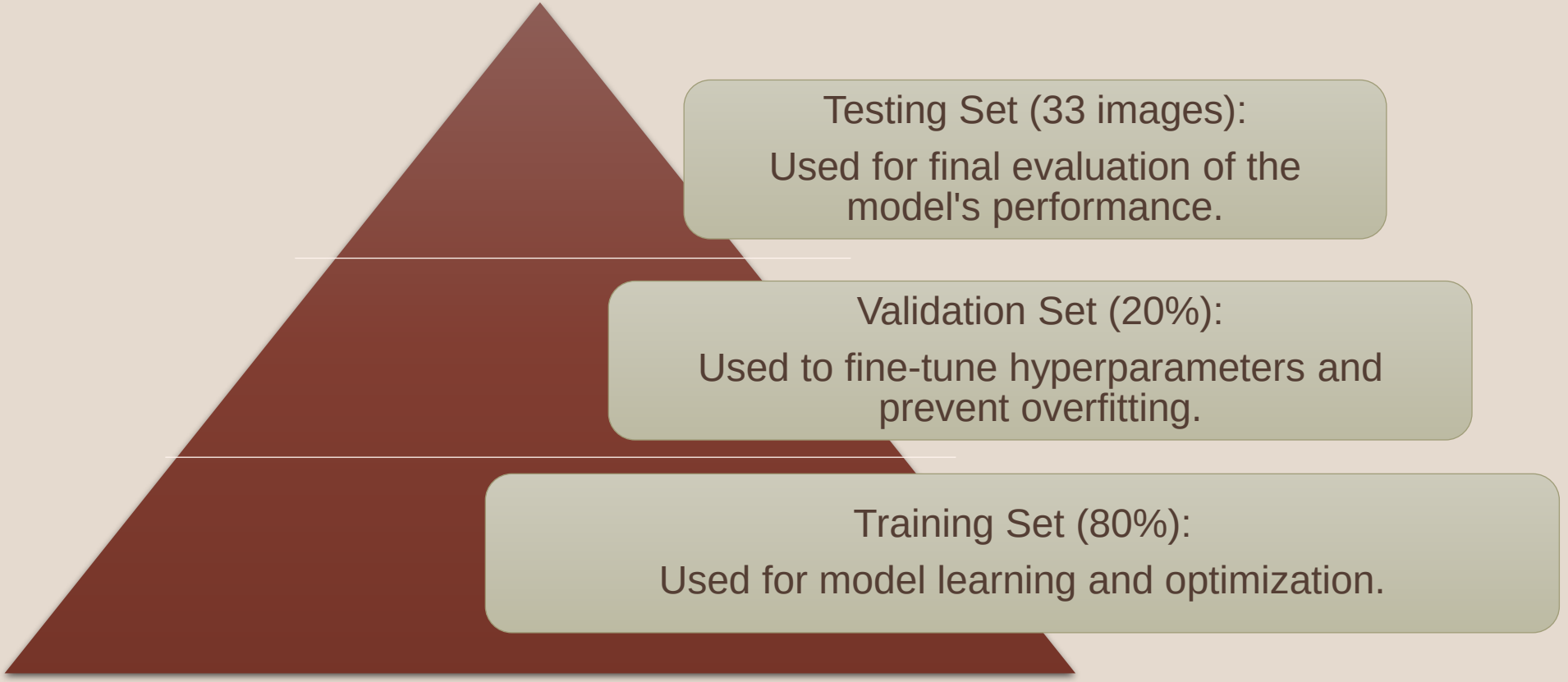
- **Visual patterns**

Each disease exhibits unique visual patterns in leaf characteristics, like spots or discoloration.

- **Color distribution**

Clustering patterns were observed in color and texture distributions, revealing disease-specific features.

Data division:



Building Our AI Toolkit

1. **Hardware**:
   We leveraged GPU- and TPU-enabled systems provided by Google Colab for efficient model training and faster execution of deep learning tasks.
2. **Software**:

- **Python**: TensorFlow and Keras for building and training the CNN model, and tools like Pandas and Matplotlib for data preprocessing and visualization.
- **Streamlit**: Used for developing interactive data applications to present predictions and results in a user-friendly manner.

Key Features:
Google Colab's collaborative environment allowed seamless sharing, real-time execution, and efficient use of hardware resources, enabling faster model training and development.

Week 1 Accomplishments

✓ Project Scope:

Clearly defined the project goals and objectives for effective execution.

✓ Data Preparation:

Preprocessed and cleaned the dataset, ensuring high quality for model training.

✓ Data Visualization:

Explored dataset patterns through visual representations to guide model design.

✓ Strategic Division:

Divided the dataset into training, validation, and testing sets for robust evaluation.

Thank You

PRESENTATION BY-

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