

# PLANT DISEASE DETECTION





# OUR TEAM

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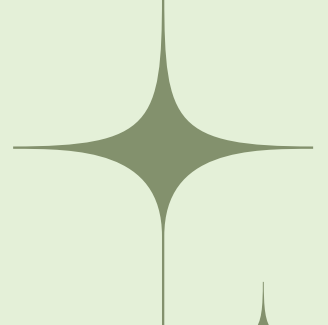


# PROBLEM STATEMENT

- **Global Food Security at Risk:** Plant diseases cause an estimated US\$220 billion in annual economic losses, threatening agricultural productivity and global food supply chains.
- **Inefficiency of Traditional Methods:** Current disease identification methods are often slow, reliant on manual scouting by experts, and prone to human error. This leads to delayed interventions and the unchecked spread of pathogens.
- **The Scalability Challenge:** Providing timely and accurate plant disease diagnostics to every farmer, especially in remote areas, is a significant logistical and economic hurdle.


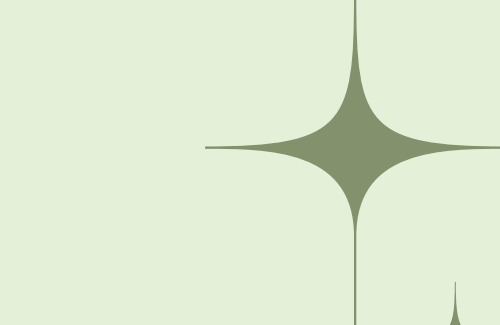


# PROPOSED SOLUTION

- **An AI-Powered Disease Classifier:** Develop a scalable and accessible web/mobile application that uses a Convolutional Neural Network (CNN) to identify plant diseases directly from leaf images.
  - **How It Works:**
    - a. **User Uploads** a photo of a plant leaf via a simple interface.
    - b. **AI Model Analyzes** the image in real-time, leveraging transfer learning for high accuracy.
    - c. **Instant Diagnosis** is provided, indicating the likely disease (or health status) along with confidence level and management advice.
  - **Core Value:** Democratizes expert-level plant pathology knowledge, enabling early detection and precise action for farmers and gardeners.
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# GOALS AND OBJECTIVES

- **Primary Goal:** To create an accurate, user-friendly, and reliable tool for automated plant disease detection.
  - **Objectives:**
    - **Accuracy:** Achieve >90% model accuracy on a held-out test set for targeted diseases.
    - **Usability:** Develop an intuitive interface that requires no technical expertise.
    - **Performance:** Ensure a rapid prediction time (<5 seconds per image).
    - **Accessibility:** Build a solution that is cost-effective and deployable on common platforms (web/mobile).
    - **Scalability:** Design a system that can be easily expanded to include new plant species and diseases.
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# TECHNOLOGY USED

- **Core AI & Framework:**

- **Python:** Primary programming language.
- **TensorFlow & Keras:** Deep learning framework for building and training the CNN model.
- **PyTorch:** (Alternative framework).


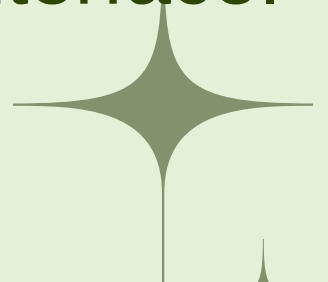
- **Pre-trained Models (Transfer Learning):**

- **VGG16, ResNet50, or EfficientNet:** For robust feature extraction and high baseline accuracy.

- **Image Processing:**


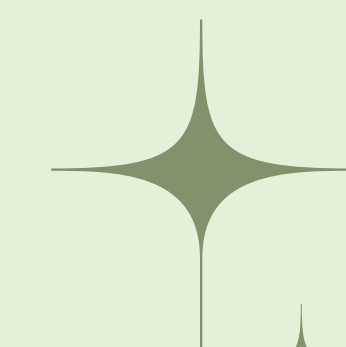
- **OpenCV & scikit-image:** For image preprocessing, augmentation, and transformation.

- **Development & Deployment:**

- **NumPy & Pandas:** For data manipulation.
  - **Streamlit / Flask / FastAPI:** For building the web application backend and interface.
  - **Google Colab / Kaggle:** For cloud-based GPU training.
  - **Hugging Face / Heroku / AWS:** For model deployment and hosting.
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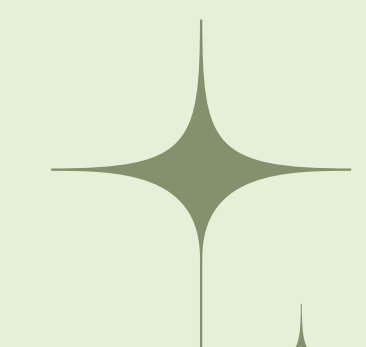
# KEY FEATURES

- **Real-Time Image Analysis:** Instant diagnosis upon image upload.
  - **Comprehensive Disease Database:** Covers multiple common crops and their major diseases (e.g., Tomato Blight, Apple Scab, Corn Rust).
  - **User-Friendly Interface:** Simple, clean design for easy navigation by non-technical users.
  - **Detailed Results & Insights:** Provides the disease name, confidence score, and potential treatment/prevention recommendations.
  - **Data Augmentation Pipeline:** Ensures model robustness by training on a varied dataset of rotated, flipped, and altered images.
  - **Cloud-Based Deployment:** Accessible from anywhere, on any device with a browser.
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# FUTURE PROSPECTS

- **Expanded Scope:** Incorporate more plant species, diseases, and pest damage identification.
  - **Multimodal Input:** Integrate data beyond images, such as soil conditions, weather data, and location for more holistic crop health assessment.
  - **Mobile-First & Offline Capability:** Develop a dedicated mobile app with lightweight models that can function in areas with poor internet connectivity.
  - **Large-Scale Agri-Tech Integration:** Partner with agricultural firms to integrate the model into drone and satellite imagery analysis for monitoring large fields.
  - **Community & Expert Network:** Build a platform for users to share findings and connect with agricultural experts for verified advice.
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**THANK  
YOU**