AI Project

Introduction:-

This project aims to build a deep learning-based image classification system capable of identifying plant diseases from leaf images. Using the Plant-Village dataset, a CNN model is trained to recognize patterns associated with various plant diseases across different crop types. The system supports disease classification for select crops like tomato, potato, and pepper. Additionally, a Streamlit-based web application provides a simple graphical interface for end users to upload images and obtain real-time diagnostic feedback.

Abstract:-

Plant diseases significantly impact agricultural productivity and global food security. Early detection and accurate classification of these diseases are essential for timely intervention and effective crop management. This project presents an automated solution for plant disease detection using deep learning techniques. Leveraging the Plant-Village dataset, a Convolutional Neural Network (CNN) is trained to classify leaf images into different disease categories. The model achieves reliable accuracy through preprocessing steps like resizing, normalization, and data augmentation. A user-friendly interface is built using Streamlit to allow users to upload leaf images and receive real-time disease predictions.

Tools Used:-

Python programming language, some libraries for Deep Learning like Tensorflow, Keras, OpenCV, numpy and Pillow (for image manipulation), and finally streamlit for creating web-based GUI to upload images and show predictions.

Steps Involved in Building the Project:-

1. Importing the required libraries and selecting 4-5 classes of diseases from the dataset followed by resizing and normalizing the images.
2. Then trained the model using Convolutional Neural Networks and got an accuracy of 92% on test data initially but then decided to make some changes to the image like rotating by 30 degrees, zooming in etc which made the model generalize more and accuracy increased to 96%.

3. I then saved this model as a HDF5 file to create a web app using Steamlit.
4. Created an app.py and requirements.txt for deployment purposes which allows me to upload an image and it gives me the result.