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# ABSTRACT

The agricultural sector plays a major role in sustaining global food security and tomato plants are crucial components of the agriculture, providing essential nutrients and flavors to a wide range of cuisines. However, they are susceptible to various diseases that can significantly impact yield and quality of the product. Early detection and identification of these diseases are crucial for effective disease management. This project proposes an approach to address this challenge by using deep learning techniques for the prediction of tomato plant leaf diseases.

The primary objective of this project is to develop a robust deep learning model capable of accurately identifying and classifying common tomato plant leaf diseases. Some common tomato leaf diseases are Bacteria Spot, Leaf Mold, Yellow Leaf Curl Vine, Late Bright Mold etc. The methodology involves the collection of a diverse dataset comprising images of healthy and diseased tomato plant leaves. This dataset is then used to train a deep neural network, utilizing architectures such as Convolutional Neural Networks (CNNs) to automatically learn and extract relevant features from the input images.

The project improves the model's performance by using techniques like data augmentation and transfer learning. The model is tested on a separate dataset to check how well it predicts disease presence and absence. The goal is to create a reliable system that detects tomato plant leaf diseases early, helping farmers take quick and effective actions for disease control and healthy crop production.

The outcomes of this project have the potential to revolutionize agricultural practices by providing farmers with a cost-effective and timely tool for disease detection. This will help in reducing crop losses and promoting sustainable farming practices. The application of deep learning in agriculture simplifies the intersection of technology and agriculture, paving the way for smarter and more efficient farming solutions.