# New Plants Diseases Project

Team Members :

- Ahmed Nasser Emam Ibrahim (Section 1)
- Amgad Mohamed Salem Tayel (Section 2)
- Asem Saber Mohamed Iraqi (Section 3)
- Abdelrahman Ayman Dessoky (Section 3)
- Abdelrahman Mohamed Ali Dessoky Badr (Section 4)

Supervised by :

**Dr. / Ibrahim Zaghloul**

**Eng. / Sara Abd-Elmohsen**

# Introduction

- In This Project we make a classify for New Plants diseases **Using CNN model**
- Plant diseases can have a devastating impact on agriculture and food production.
- Early detection and accurate diagnosis are crucial in effectively managing plant diseases and preventing significant crop losses.
- we will explore a cutting-edge approach to plant disease identification using Convolutional Neural Networks (CNNs)

# Introduction

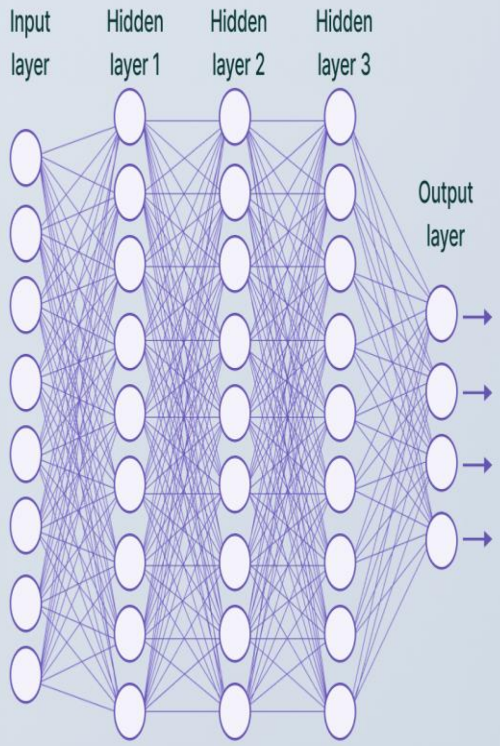
- CNNs have emerged as powerful tools in image classification and have shown great potential in accurately identifying plant diseases
- By leveraging CNNs, we can process large amounts of data quickly and potentially achieve real-time disease detection..
- Our focus will be on presenting our work on the development and performance of a CNN model for plant disease identification.

# Objective of this project :

- The primary objective of our project is to develop and deploy an accurate and efficient plant disease identification system using Convolutional Neural Networks (CNNs).
- Our aim is to provide a reliable and automated solution for early detection and diagnosis of plant diseases, enabling prompt interventions and mitigating crop losses.
- By leveraging the power of CNNs, we seek to improve the speed and accuracy of plant disease identification compared to traditional manual methods.

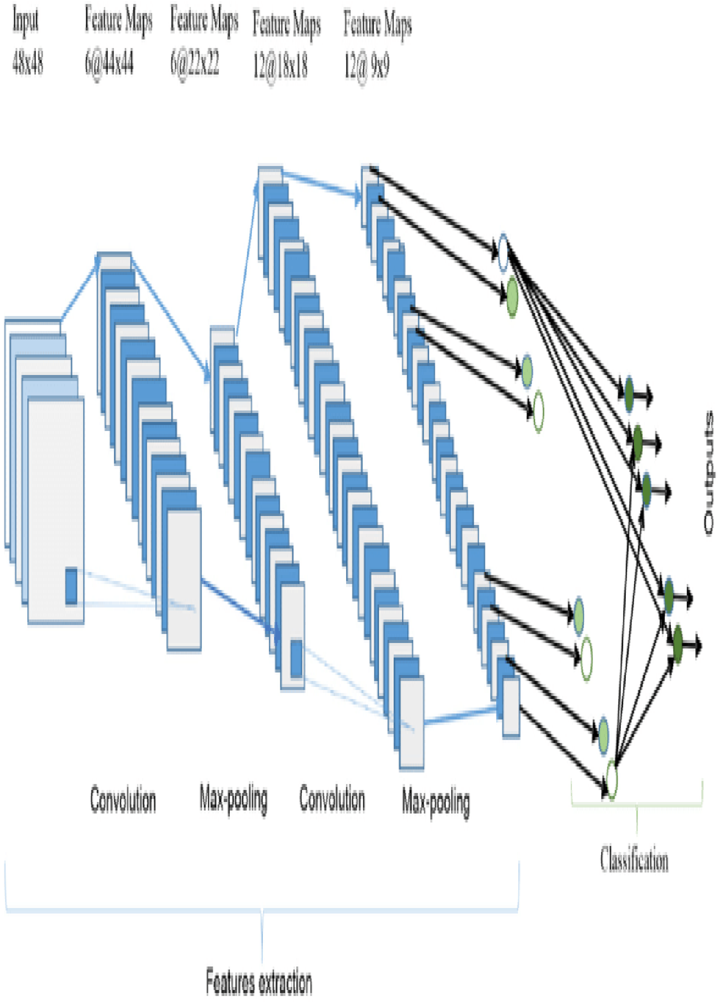
# Overview of Convolution Neural Network CNN

- Convolutional Neural Networks (CNNs) are a class of deep learning algorithms widely used for image classification tasks.
- The architecture of CNNs consists of multiple layers, including convolutional layers, pooling layers, and fully connected layers.
- Convolutional layers extract local patterns or features from input images through convolution operations.
- Pooling layers down sample the feature maps, reducing spatial dimensions while retaining important information.



# Why We Use CNN In This Project?

- The ability of CNNs to learn complex patterns and generalize from limited data makes them valuable tools in automated disease diagnosis.
- CNNs have demonstrated remarkable performance in various domains, including medical imaging, object recognition, and now, plant disease identification.
- By leveraging CNNs, we can automate and enhance the accuracy of plant disease identification, enabling early intervention and effective management strategies.



# Our Dataset and Preprocessing

- For our plant disease identification project, we utilized a carefully curated dataset consisting of images of healthy plants and plants affected by various diseases.
- We download this Dataset from Kaggle Website from this link : https://www.kaggle.com/datasets/vipoooool/new-plant-diseases-dataset
- The dataset encompasses a diverse range of plant species and includes multiple instances of different diseases.
- The dataset was preprocessed to ensure consistency and compatibility for CNN model training
- Image resizing was performed to standardize the image dimensions (100,100,3), facilitating efficient processing and memory usage.
- Normalization techniques, such as scaling pixel values between 0 and 1, were applied to enhance convergence during training and improve model performance.
- The preprocessed dataset was then split into training, validation, and testing subsets to evaluate the performance of our CNN model accurately.

# Model Architecture

- Our CNN model for plant disease identification is based on a well-established architecture commonly used in image classification tasks.
- The architecture we adopted includes convolutional layers, pooling layers, and fully connected layers.
- The convolutional layers perform feature extraction by applying convolution operations to the input images.
- These layers use learnable filters to detect various patterns and features at different spatial scales
- This helps to reduce computational complexity and capture the most salient features.
- Activation functions, such as ReLU (Rectified Linear Unit), are applied after each layer to introduce non-linearity and enhance model performance.
- The final output layer employs a Softmax activation function to produce the probability distribution of plant disease classes

# Training and Testing

- The training phase of our CNN model involved optimizing the model's parameters to learn the patterns and features necessary for accurate plant disease identification.
- We utilized an appropriate loss function, such as categorical cross-entropy, to measure the discrepancy between predicted and true labels.
- Once training was complete, we evaluated the model using the independent testing set, which the model had not seen during training.
- We measured various evaluation metrics, including accuracy, precision, recall, and F1 score, to assess the model's performance The accuracy of this model is **96.20 %** And The Evaluation **94.22 % .** Thus, this model fits the data which offers great generalization for upcoming new data
- . Additionally, we may have generated a confusion matrix to analyze the model's classification results in more detail.
- The evaluation results provided insights into the model's effectiveness in identifying different plant diseases accurately.

# Conclusion

- Our project focused on developing and implementing a Convolutional Neural Network (CNN) model for accurate plant disease identification.
- By leveraging the power of CNNs, we have demonstrated the potential to revolutionize plant disease identification.
- Our CNN model has shown promising results in accurately classifying plant diseases, enabling early detection and timely intervention.
- The successful implementation of our CNN model showcases the potential of artificial intelligence and machine learning in addressing real-world challenges in agriculture.
- Our work contributes to the growing field of AI-powered agriculture, offering a promising solution to combat plant diseases and ensure global food security.