COMPARATIVE STUDY BETWEEN DIFFERENT ARCHITECTURE OF CNN FOR POTATO DISEASES CLASSIFICATION

TEAM 4
RESEARCH PAPER EXPLANATION

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DEPARTMENT OF MATHEMATICS
MARCH,4,2023

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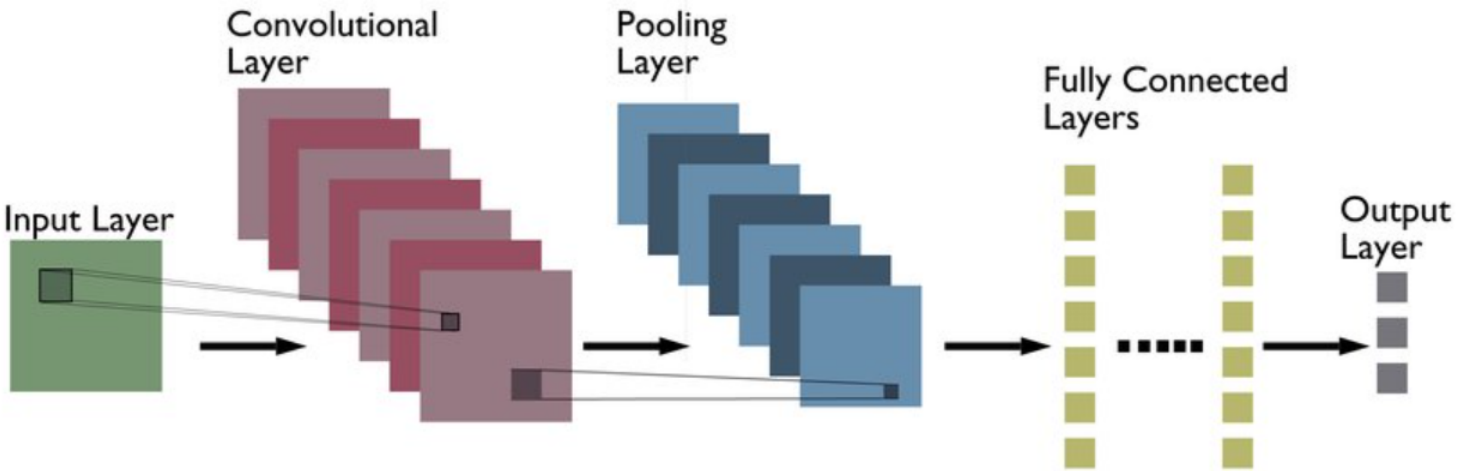
COMPARATIVE ANALYSIS OF CONVOLUTIONAL NEURAL NETWORK ARCHITECTURES FOR CLASSIFICATION OF PLANT LEAF DISEASES

SUMMARIZATION

- This scientific paper compares the performance of three convolutional neural network architectures for the classification of plant leaf diseases.
- The authors used transfer learning to train Vgg-16, MobileNet, and ConvNext models on a dataset containing 20,639 images divided into 15 classes of different diseases.
- They found that Vgg-16 had the highest accuracy of 0.97 during the training process, while MobileNet was faster in terms of time, taking only 62 seconds.
- Overall, this study demonstrates the potential of artificial intelligence in detecting and treating diseases in plants.

VGG16, MOBILENET, AND CONVNET

- All convolutional neural network (CNN) architectures used in deep learning for image classification tasks. However, they differ in terms of their architecture and performance.
- VGG16 is a deep and powerful CNN architecture, MobileNet is a lightweight architecture optimized for mobile and embedded devices, and ConvNet is a general term used for any CNN architecture that can vary in architecture and performance depending on the specific task and dataset.



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COMPARISON OF PRE-TRAINED MODELS USING TRANSFER LEARNING FOR DETECTING PLANT DISEASE

SUMMARIZATION

- The research paper by B. Chellapandi and S. Chopra compares different pre-trained models using transfer learning for the detection of plant diseases.
- The study utilized five pre-trained models - Inception-v3, ResNet50, VGG16, DenseNet121, and Xception - to classify images of healthy and diseased plants.
- The dataset used was the PlantVillage dataset, which consists of over 54,000 images of plant leaves with 38 different classes of diseases. .
- The results showed that Inception-v3 and DenseNet121 models performed better than the other models in terms of accuracy and F1-score.
- The study concludes that transfer learning using pre-trained models can be an effective approach for plant disease detection.

INCEPTION-V3, RESNET50, VGG16, DENSENET121, AND XCEPTION

- All deep convolutional neural network architectures that have been widely used in image recognition and classification tasks.
- Inception-v3: It is an architecture developed by Google that uses a combination of convolutions of different sizes to capture features at different scales.
- ResNet50: It is a residual neural network architecture developed by Microsoft Research. It introduces the concept of residual learning.
- DenseNet121: It is a densely connected convolutional network architecture developed by researchers at Facebook AI Research.
- Xception: It is an architecture developed by Google that uses depthwise separable convolutions, which separate the spatial and channel-wise filtering operations in a convolution.

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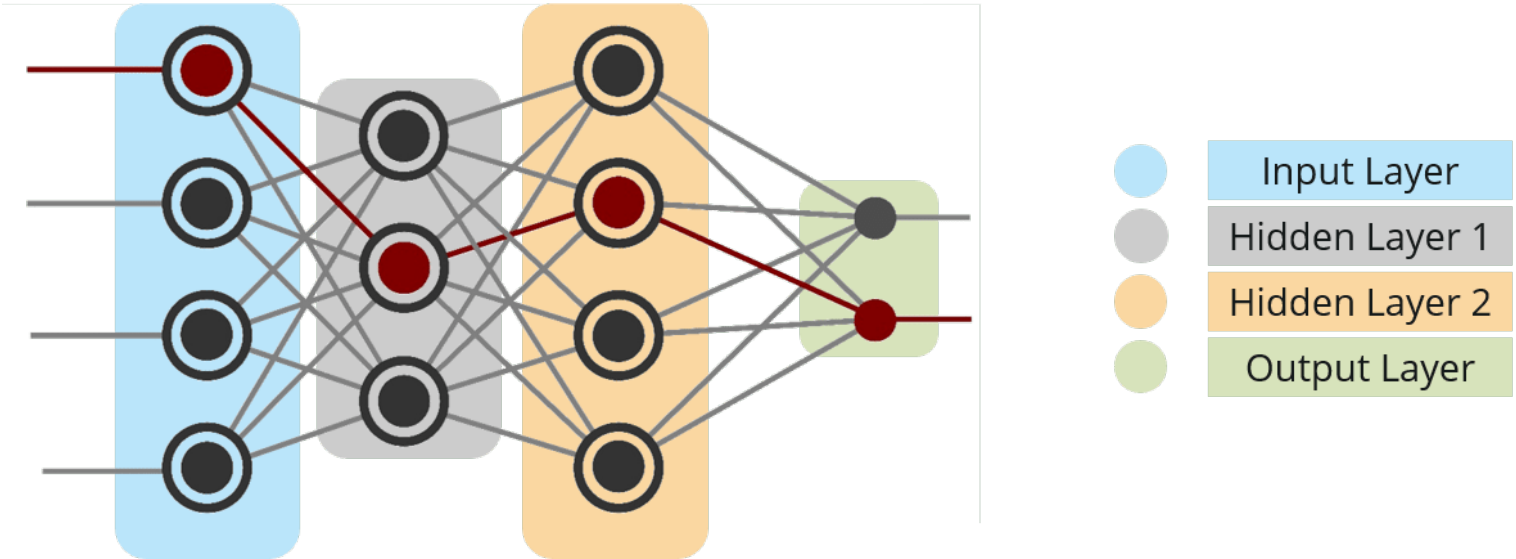
DETECTION OF BANANA LEAF AND FRUIT DISEASES

SUMMARIZATION

- The research paper by M. N. Saranya, discusses the use of neural networks for detecting diseases in banana leaves and fruits.
- The study utilized a multilayer perceptron neural network and input images of banana leaves and fruits with different diseases to achieve an overall accuracy of 95 in detecting the diseases
- this discuss about importance of disease detection in agriculture, the proposed system's components and steps, and the advantages of using image processing techniques with artificial neural networks for disease classification.

MULTILAYER PERCEPTRON NEURAL NETWORK

- A multilayer perceptron (MLP) neural network is a type of artificial neural network used in supervised learning tasks.
- It consists of multiple layers of interconnected perceptron units with each layer learning increasingly complex representations of the input data.
- MLPs use backpropagation algorithm for training and can be used for both classification and regression tasks.
- They have been successfully applied in various fields such as image recognition, speech recognition, and natural language processing.



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A STUDY ON OBJECT DETECTION METHOD FROM MANGA IMAGES USING CNN

SUMMARIZATION

- In traditional object detection techniques, the entire image is scanned at multiple scales and positions to detect objects, which can be computationally expensive. ROI pooling and RPN scans, on the other hand, allow for selective scanning of regions of interest in an image, reducing the number of regions that need to be processed.
- RPN scans are used to generate potential object bounding boxes in an image. The RPN takes the input image and generates a set of region proposals, each of which represents a potential object in the image. These region proposals are then refined by a subsequent stage in the object detection pipeline to generate more accurate bounding boxes.
- ROI pooling, on the other hand, is used to extract features from specific regions of an image. It takes as input the feature map generated by the CNN and the proposed object bounding boxes generated by the RPN.

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IMAGE PROCESSING TECHNIQUE FOR AUTOMATIC DETECTION OF PLANT DISEASES AND ALERTING SYSTEM IN AGRICULTURAL FARMS

SUMMARIZATION

- Our system uses K-Means Clustering Method as existing systems but it has a new added feature which is alerting, after the disease is detected our system informs the farmer as soon as possible to take care of the disease
- and try to minimizes the disease spreading and to do this a buzzer is connected to existing system thereby the spreading of diseases is controlled as early as possible, which saves the time and improves the yield production of the crop and thereby suicides in India will go down. This can help farmers very Effectively in India.

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PLANT LEAF DISEASE DETECTION AND CLASSIFICATION BASED ON CNN WITH LVQ ALGORITHM

SUMMARIZATION

- Learning Vector Quantization, proposed by Kohonen, is a neural network that combines competitive learning with supervised learning. It is a powerful and heuristic algorithm for solving classification problems. Due to its simple topology and adaptive model. It classifies data in a fixed number of classes
- It consists of three layers with input, Kohonen (competition) and output layer. Input layer neurons collect the values of the input variables. Each neuron in the output layer represents a class of input. The input and Kohonen layers are fully connected, while the Kohonen and output layers are partially connected. The learning occurs in Kohonen layer.

PLANT LEAF DISEASE DETECTION AND CLASSIFICATION BASED ON CNN WITH LVQ ALGORITHM

- The classified results are passed to the linear output layer.Only one of the output takes the value 1 and the others take the value 0. The reference vector that receives the value 1 gives the class of the input vector. LVQ model works according to the "winner-takes-all" approach and only the weights of the winning reference vector which is closest to the input vector are updated at every iteration. The winning reference vector is found via calculating the Euclidean distance

THANK YOU