Research Paper 1 (as per Excel Sheet)

Overall Summary:

Title - DiaMOSPlant: A Dataset for Diagnosis and Monitoring Plant Disease
Source - ResearchGate
Type - Journal Paper
Publisher - MDPI
Year of Publication - 2021
Dataset Distribution Ratio - 3006 images of leaves and 499 images of fruits
Dataset Splitting Ratio - 7 : 2 : 1 (training : validation : testing)
Method Applied - EfficientNetB0
Performance Metrics - Training Accuracy - 81.13%, Validation Accuracy - 82.82%, Testing Accuracy - 83.38%, Precision - 81.14%, Recall - 83.38% and F1 Score - 82.23%

This paper introduces a new dataset called DiaMOS Plant which consists of 3505 images of pear fruit and leaves affected by four diseases. The dataset was collected under realistic field conditions to maximize variability. The authors provide a benchmark for classifying diseases using convolutional neural networks and discuss limitations of existing plant disease datasets.

The DiaMOS Plant dataset aims to address some of these recommendations by capturing images throughout the growing season under different lighting conditions to provide a more representative dataset for plant disease classification.

The dataset has 3006 images of leaves alone which are further classified into 43 Healthy Leaves, 884 Spotted Leaves, 54 Curled Leaves, 2025 Leaves with Curls.

The pictures were gathered using different devices including a smartphone (Honor 6x) and DSLR camera (Canon EOS60D), thus the images present two types of resolutions, 2976 X 3968 and 3456 X5184 respectively.

The methodology employed in this research paper to classify the diseases leaves is machine learning and deep learning. The concepts of machine and deep learning are used to develop models that can classify and recognize foliar diseases based on the images of leaves. In particular from the performance stats it can be seen that the three networks EfficientNetB0, InceptionV3, and MobileNetV2 have a better generalization capacity than the VGG19 and ResNet50 networks. In fact CNN algorithms like EfficientNetB0, InceptionV3 and MobileNetV2 obtained an accuracy for the test set of 83.38 %, 82.72 %, 83.06 % respectively, while ResNet50 of 56.67 %, and VGG19 of 71.76 %. It was also seen that MoblileNetV2 tends to converge faster. The f1-score ratio does not show notable differences in performance, reporting a high value for EfficientNetB0, InceptionV3, and MobileNetV2.

The dataset was trained and tested with two different optimisers namely RMSProp and the Adam optimiser.

The RMSProp or the Root Mean Square Propagation optimiser is an adaptive learning rate optimization algorithm designed for training neural networks like in this one. It is particularly well-suited for non-stationary objectives, which are common in deep learning. It is widely used in deep learning due to its ability to adapt learning rates based on the history of gradients and its effectiveness in dealing with the scenarios involving large and complex datasets.

The Adam also known as Adaptive Moment Estimation optimiser is an algorithm for optimizing the training of machine learning models, particularly neural networks. It combines the advantages of two other popular optimization algorithms: AdaGrad and RMSProp. Overtime Adam has become one of the most popular optimization algorithms in the field of machine learning due to its adaptive nature and robust performance across a variety of tasks.

In conclusion, the DiaMOS Plant Dataset offers a valuable resource for the research community, aiding in the development of robust AI models for plant disease diagnosis and monitoring.
This particular research paper also underscores the need for more comprehensive datasets to advance in the field of digital agriculture.

Research Paper 8 (as per Excel Sheet)

Overall Summary:

Title - MFBP-UNet: A Network for Pear Leaf Disease Segmentation in Natural Agricultural Environments
Type - Journal Paper
Publisher - MDPI
Year of Publication - 2023
Dataset Distribution Ratio - 838 leaves with Rust, 421 leaves with Slug, 157 curled leaves, 1590 Healthy leaves and 3006 total leaves
Dataset Splitting Ratio - 8 : 1 : 1 (training : validation : testing)
Method Applied - MFBP-UNet
Performance Metrics - 86.15%

Data augmentation

Various data augmentation techniques are applied to the training dataset to increase its size and variability. This helps reduce overfitting and improve the model's generalization ability.

In summary, the proposed MFBP-UNet method utilizes pyramid feature extraction, deep supervision, hard example mining and data augmentation to achieve promising results for pear leaf disease segmentation. These techniques work together to train a robust and accurate segmentation model.

This paper proposes a new segmentation model called MFBP-UNet for the automatic pixel-level segmentation of pear leaf diseases. The model combines the Masked Feature Block Pooling (MFBP) and U-Net architecture. MFBP is used to extract discriminative features at multiple scales, while U-Net helps generate precise segmentation masks.

The proposed model was tested on a dataset consisting of 3006 pear leaf images with common diseases like curl, rust and slug. The experimental results show that MFBP-UNet achieves better performance compared to clothes

segmentation models like DeepLabV3, HRNet, PSPNet and FCN with MIoU scores of 83.39%, 81.28%, 82.06% and 83.21% respectively.

The main contributions of this work are as follows:

1. A novel segmentation model called MFBP-UNet is proposed by combining MFBP and U-Net.
2. Extensive experiments were conducted on a pear leaf dataset to evaluate the performance of the proposed model.
3. The results show that MFBP-UNet achieves better segmentation accuracy compared to other state-of-the-art methods.

In summary, the proposed MFBP-UNet model is effective in segmenting pear leaf diseases with high accuracy and has the potential to assist farmers and agricultural experts.