AMMI CV project

Cassava Disease Classification

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Team members

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Objective

Classify pictures of cassava leaves into 1 of 4 disease categories or healthy (5 classes).

Applied techniques

1. **Data pre-processing**:
   - Data augmentation: cropping, resizing, horizontal flipping, and increasing the input size from (3, 224, 224) to (3, 448, 448), this done to avoid the overfitting.
   - Normalization: transform the data in a way that they are either dimensionless and/or have similar distributions. And this is because normalization dramatically improves the model accuracy.
2. **Model selection**:
   - Transfer learning: We used pre-trained models on the ImageNet dataset and fine-tuned the models, which takes the pre-trained parameters as the network initialization, then train the whole network.
   - We tried ResNet50, ResNet101, ResNext50, ResNext101, and tuned the hyperparameters, we end-up with the following settings such that giving the best possible results:
     (a) Model: RestNext50
     (b) Optimizer: Adam
     (c) Batch size: 16
     (d) Learning rate: To determine the learning rate value, we started with a large value, and decay over time(learning rate), and then we applied learning rate scheduling technique to choose a mechanism to change the learning rate over the process of training. We used CosineAnnealingLR schedular.
     (e) number of epochs: 7; this is set using early stopping technique to avoid the overfitting, which means during training, keeps track of the validation accuracy, when the validation accuracy stops increasing, the model halts its training.
     (f) Validation split: 0.2
3. **Regularization**: To avoid the overfitting; We applied l2 regularization with a weight decay of 0.003.

Results and Conclusion

- The test accuracy we got is 90.901%
- The following figures illustrate the train and validation accuracy and the train loss respectively, we observed that the validation accuracy is higher than the training at the beginning of the training: