**Fresh or rotten fruits**

For this machine learning model we used the dataset from kaggle (https://www.kaggle.com/sriramr/fruits-fresh-and-rotten-for-classification), this dataset contains a total of 6 class which are photos of bananas (rotten and fresh), orange (rotten and fresh) and apple (rotten or fresh). It has 2 directories, train which contains a total number of 10901 photos of the classes, and test directory which contains 2698 photos of the classes. With that said we created a CNNs model using tensorflow and keras library. The model contains three layers of convolutional and max pooling layers and after the 3 layers we applied a flattening layer followed by a dropout layer, after that we applied a dense layer followed by dropout layer and lastly an output layer. We compiled the model using the "adam" optimizer and used "categorical_crossentropy" since the model was classifying 6 classes and trained it with 15 epochs. In this model, we applied only one form of data augmentation techniques, we applied only pixel scaling.

In the end, the model has achieved quite high accuracy both on the training and validation set (acc: 0.9922, val_acc: 0.9789), we believe the model could still improve with the help of broader dataset, further data augmentation techniques and or applying transfer learning techniques for much better results.

**Leaf classification**

For this machine learning model we used the dataset from UCI (https://archive.ics.uci.edu/ml/datasets/leaf), this dataset contains a total of 100 classes of various leaf images, which each class has 16 images, so the dataset has 1600 total images.

With that said we created a CNNs model using tensorflow and keras library. The model contains three layers of convolutional and max pooling layers and after the 3 layers we applied a flattening layer followed by a dropout layer, after that we applied a dense layer followed by an output layer. We compiled the model using the "adam" optimizer and used "categorical_crossentropy" since the model was classifying 100 classes and trained it with 50 epochs. In this model, we applied a few forms of data augmentation techniques in the training set, we applied pixel scaling, horizontal flips, zooming in on images and shear ranging.

In the end, the model has achieved quite high accuracy both on the training and validation set (acc: 0.9054, val_acc: 0.8333) . We can say there is a little bit of overfitting going on but since the data is limited there isn't much which can be done. We believe the model could still improve with the help of a broader dataset, further data augmentation techniques and or applying transfer learning techniques for much better results.

**Conclusion:**

Both of the models are made with quite high accuracy but further testing is required for validating those numbers. For leaf classification models, it is important to increase the number of images in each class in the dataset and the size of data and also we need more classes for making the application much better for public use. Final words, apply various data augmentation techniques for improving the model and or apply transfer learning for improving the model.