The goal of this project is to classify fruits and vegetables using the Fruits-360 dataset [1], which includes classes of fruits and vegetables. The project consists of multiple phases, incorporating traditional machine learning and deep learning.

Use Principal Component Analysis (PCA) to reduce the dimensionality of the dataset and represent the fruits effectively, as described in [2]. Then, implement at least four traditional machine learning algorithms for classification (At least one ensemble learning method, such as Random Forest and at least two boosting algorithms, such as XGBoost and LightGBM) [2]. Then, develop an Artificial Neural Network (ANN) with appropriate number of layers and neurons to maximize the test accuracy [3]. Similar to ANN, create a custom Convolutional Neural Network (CNN) architecture [4]. Consider all of the approaches explained during the course such as preventing overfitting.

Prepare a detailed report. Draw a table of precision, recall, F1 results of each class for all implemented solutions. Represent the confusion matrix, training/validation loss and training/validation accuracy values. Show the validation and test results by commenting on them, as in [5].

[1] https://www.kaggle.com/datasets/moltean/fruits/data

[2] https://www.kaggle.com/code/navabhaarathi20003/fruit-classification-pca-svm-knn-decision-tree

[3] https://towardsdatascience.com/artificial-neural-network-implementation-using-numpy-and-classification-of-the-fruits360-image-3c56affa4491

[4] https://www.kaggle.com/code/endofnight17j03/fruit-classification-cnn

[5] https://ieeexplore.ieee.org/document/10601062