Machine Learning Engineer Nanodegree

Capstone Proposal

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Proposal

Domain Background

Classification of fruits is traditionally done using manual resources due to which the time and economic involvements increase adversely with number of fruit types and items per class. In recent times computer based automated techniques have been used to alleviate this problem to a certain extent.

These techniques utilize image analysis and pattern recognition methodologies to automatically classify fruits based on their visual features like color, texture, and shape. However, challenges of such techniques include the fact that fruit appearances differ due to natural environments, geographical locations, stages of growth, size, orientations and imaging equipment

Problem Statement

Fruits have certain categories that is hard to differentiate, so the artificial intelligence is used to complete this hard mission which takes a lot of time and work

the problem is to Classify number of fruits up to 10 classes and the output will be the accuracy of our classification model

Datasets and Inputs

Data link from kaggle :

https://www.kaggle.com/moltean/fruits/download

Dataset properties

Total number of images: 82213.

Training set size: 61488 images (one fruit or vegetable per image).

Test set size: 20622 images (one fruit or vegetable per image).

Multi-fruits set size: 103 images (more than one fruit (or fruit class) per image)

Number of classes: 120 (fruits and vegetables).

Image size: 100x100 pixels.

Note : I will use no. of classes from 3 up to 10 due to make training on my laptop

Solution Statement

Using CNN, Stacked layers of conv, maxpooling, dropout to be used for pre-processing or feature generation. Then fit the model and validate the results.

Benchmark Model

The benchmark model will be a simple CNN classifier trained on the train data. Then I will try to improve the model performance by adding more layers and use this model as a benchmark to test performance of new model and compare it with some paper results on the same dataset if it is available

Evaluation Metrics

Accuracy score :

the number of correct predictions to all the number of predictions made by the model

loss function :

categorical loss function due to use multi-classification

Project Design

1. Read data
2. Data per-processing
3. Model Implementation
4. Model Evaluation
5. Try to use image augmentation
6. Create a CNN using Transfer Learning
7. Model Evaluation