Tropical Fruit Identifier

Project Proposal

Advanced SoFTWare Solutions

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# Project Scope Statement

The project involves creating a machine learning model which recognizes images of four tropical fruits, Lemon, Papaya, Guava and Cocoa. Two methods for creating the model, metric learning and image classification, will be used and compared. The project should result in the creation of a model for the fruits and a new dataset for tropical fruits. The fruits were chosen based on seasonal availability and it is assumed that they will be available for the duration of the dataset creation period. The resulting model should be able to recognize whole or halved unprocessed fruits in different environments.

# Project Objectives

Create a dataset of tropical fruits that can be utilized for other projects.

Use a neural network to create a machine learning model using the tropical fruit dataset.

Compare the effectiveness of different deep learning paradigms for this model creation.

# Project Description

This project focusses on the process of creating a machine learning model and dataset for four tropical fruits, lemons, papayas, guavas and cocoa. It involves firstly the gathering of images of the fruits. Next the images will be prepared for use to train the model. Then neural networks will be created using a deep metric learning and image classification. The model will be created using both neural network method and analyzed to see which method was more effective for this case.

The project should span the entire semester given that research and preparation is needed to create the model and that a formal report is to be created with it. The result will be useful for further creation of tools using the model, for example software for use in agriculture in the Caribbean.

This project is limited to the identification of four fruits due to the seasonal nature of tropical fruits and the lack of availability of previously captured images. It be would trained using unprocessed fruits and thus would only be able to identify such due to the limited nature of the dataset being created within the time constraints.

# Project Benefits

This project will result in the creation of a dataset of tropical fruits, something that is not easily sourced now. It will also result in the creation of a model that can be applied to further research and development. The analysis of methods used can also help with the future development of these types of models.

# Project Beneficiaries

Anybody who would like to use the model and/or dataset in the future or is interested in classifying tropical fruits.

# Project Deliverables

A Tropical fruit Dataset

The Tropical Fruit Identifier Model

An Analysis of different model creation methods used.

# Estimate Project Duration

This project has a predicted duration of four months, from December 2019 to April 2020.

It consists of 4 stages: Dataset creation and preparation, Neural Network architecture, Model training, Model Analysis

Hyper

Sensitivity analysis

Focus on the problem faced with identifying the different fruits

Focus on neural network architecture

2 version classification, metric learning

Compare and contrast how both paradigms work for identifying the dfferent fruits

Focus on the design of the neural network

500 images of each fruit

Fine grained image classification

Decide on image size and resolution

Image augmentation pipeline

Pytorch vs Tensor flow