Capstone Project 2

Sava Dashev

Fruit Classifier

Problem

We want to identify the fruits in an image. We would like to identify the type of fruits in the image.

Client and motivation

The task is useful for supermarkets. One, it can be used to identify fruits with low quantity. The camera captures the image and it recognizes what type of fruits are in certain area. The recognition of fruits can be used by “smart” that will automatically recognize type of fruit without tag or scanning barcode. This will make scanning and weighting products easier, by cashiers and by customers themselves in self-serving area.

The data set

<https://www.kaggle.com/chrisfilo/fruit-recognition#Carambola%20001003.png>

The dataset contains about 44, 000 images of 15 types of fruits. The dataset was collected using unconstrained conditions. Some images are with the room light on and room lights off. Some images were taken near windows of our lab, with curtains on and off. The dataset tries to simulate conditions in store. In real application, there may be illuminations, artifacts captured by camera and other objects. Some of the changed conditions below, as described in the original kaggle dataset:

* Pose Variations with different categories of fruits
* Variability on the number of elements of fruits
* Used HD camera with 5-megapixel snapshots
* Same color but different Category fruits images with illumination variation
* Cropping and partial occlusion
* Different color same category fruit images
* Different lighting conditions (e.g. fluorescent, natural light some of the fruits shops  
   and supermarkets are without sunshine so it can easily affect the recognition system
* Six different kind of apple fruit images
* Three categories of mango fruit with specular reflecting shading and shadows
* Three categories of Kiwi fruit images
* Natural and artificial lighting effect on images
* Partial occlusion with hand

Proposed solution

To solve the problem, we will build two classifiers: one Convolutional Neural Network (CNN) from scratch, and the other will be pre-trained CNN model and transfer learning.

Workflow:

1. Develop baseline model structure.
2. Build training and testing generators using keras.
3. Compile the model.
4. Manually calibrate the model.

Deliverables

We will write a final report and slide deck showing exploratory analysis, model development and performance. We will compare the two models.