**FOODGRAIN QUALITY CLASSIFIER**

**Problem Statement:**

* In the Indian market, to stop farmer exploitation, the government decides Minimum Support Price for all major food grains, which restrict any trader to purchase food grains from a farmer below that price-just like minimum wages in USA.
* But there is one price for an entire food type-every quality of peanut has same MSP.
* But the quality of peanut could be from $0.5/ lbs. to $2/ lbs.
* It would be better if different quality of peanuts has different MSPs. It would be highly unfair for a farmer to sell peanuts at an MSP of $1/ lbs. if his product is worth of $ 2/lbs.
* But the main issue here with the government is there isn’t any quantified method to measure the quality of food grains and its usually dependent on the people by visual inspection, which could lead to corruption in the system.
* It would be really useful to make a tool which classifies different types of peanuts according to their quality, size, texture, color, purity etc. and thus certifies its type.
* This tool can even be used by supermarket giants or small traders to purchase their raw materials.

**Solution Description:**

* We collected around 2000 images of a food grain called Pigeon pea manually from the wholesale market as any online open source data distribution did not have this particular data. Sample images in the folder. These were segregated into different categories by an expert in this domain.
* We created a convolutional neural network for this and passed the grayscale images through the network to train it. The network did well and gave an accuracy of 98.2 % but when tested on new data, it failed. It basically was overfitted to the data. This demands more data collection which is under process.
* The skepticism about this was from the beginning because, when the Conv filters passes through the original image, the filters capture the sub-set of images but fail to capture the texture of it. In the test image, the same food grain could be perpendicular in a particular region and thus this situation.
* The solution here could be to capture each food-grain as a different entity as in contours with the help of OpenCV and apply the problem decomposition techniques. Please check the Jupyter notebook for this.

This is being tested with different techniques. Any help or collaboration on this would be much appreciated.

Note: The TensorFlow code is inspired by the Edureka YouTube video https://www.youtube.com/watch?v=yX8KuPZCAMo