This proposal still on going and here just the basic introduction of details. I choose to optimise self-checking process for customers who shopping in supermarket like Paknsave Or Countdown.

**Fruit and Vegetables recognition and classification Application for self-checking machine**

**Background**: Since early 2020, Covid-19 spread all over the world and changed people’s lifestyle. When people shopping in supermarket, it is very often to see that customers ask help when they use self-checking machine to process check-out but can not find out the correct loosen items like fruits and vegetables to calculate the weight. There is no barcode or category tag attached on fruits and vegetables and some items are looks like very similar. It is very hard for customers to identify the correct items to measure the weight and staffs have to answer these help requests very often.

**Problem**:

1. Help requests assigned to staffs are overwhelming and staffs are under pressure.

2. Increase the risk of infecting COVID-19 due to close contact (even keep 2 meters distance, but the virus still appeal on the surface of touched items, display screen of self-checking machine as example).

**Solution**: To design a Machine Learning based add-on and installed on self-checking machine, to provide item recognition and classification function for customer when they want to find out the correct items and measure the weight in order to pay for the right items with right price calculation.

**Application**: Camera on self-checking machine will capture the loosen items customer picked, then based on Image recognition and Classification Model, the captured image will be processed and automatically be recognised as most possible category and specific item for customer to confirm.

**Approach**:

Hardware layer: Camera installed on self-checking machine to capture items which customer picked and require to correctly identify and measure the weight.

Software layer: Use specific library/package (**tensorflow and Keras**)/algorithm (**CNN**) in Python to train and test Image Classification Model.

Data layer: Data/Images may get from existed database (mostly downloaded from online) or manually take by staff on supermarket.

Training a Image Classification Model: See Fruit\_recognition\_with\_CNN\_Original.ipynb

Prototype: see st.py