

Project Progress of Smart Trash Bin

Update Function

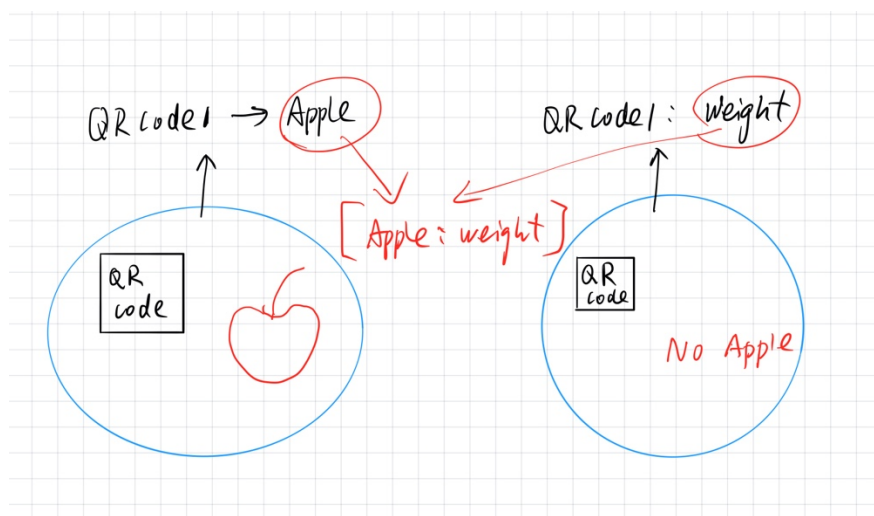
1. System execution process :

- The signal of the **weight sensor** as a **switch**, the weight beyond the threshold, the camera **automatically** takes a **capture** and record **weight**
- PC **automatically** **downloads** all captures from Raspberry Pi
- Then, The PC begin to **analyzes all photos**, **predict the categories** and record **weight** of each photo, and **stores them** in a dictionary.
- The PC **calculates** the corresponding **carbon dioxide emissions** based on the **accumulated weight** and **type**
- We designed a GUI, an .exe file, which can display a variety of statistical data (quantity, weight, carbon dioxide emissions, etc.) in the form of a pie chart

Change of target

Through communication with Paul, in order to make the neural network work better, Paul changed the use of the project.

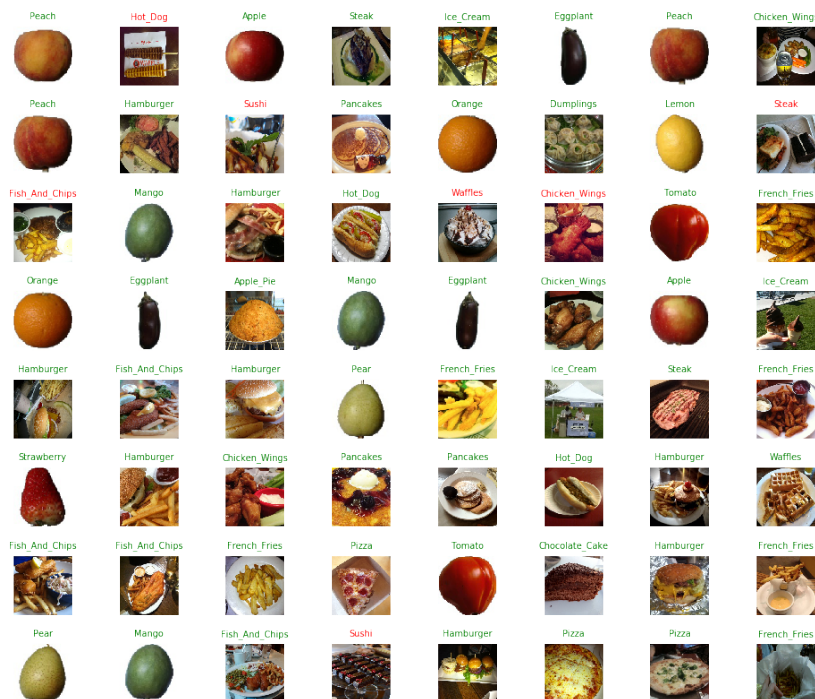
- The **food passes** through the **device** when it is **complete**(haven't been eaten), at which time the device **records** the predicted **categories** and the corresponding **QR code** on the plate
- When the **food is finished**, **return to the device**. At this time, only the **QR code** and **weighed** are recognized.
- According to the QR code** on the empty plate, find the **categories** of food. Through the connection of the QR code, at this point we have **obtained** both the **label and weight**



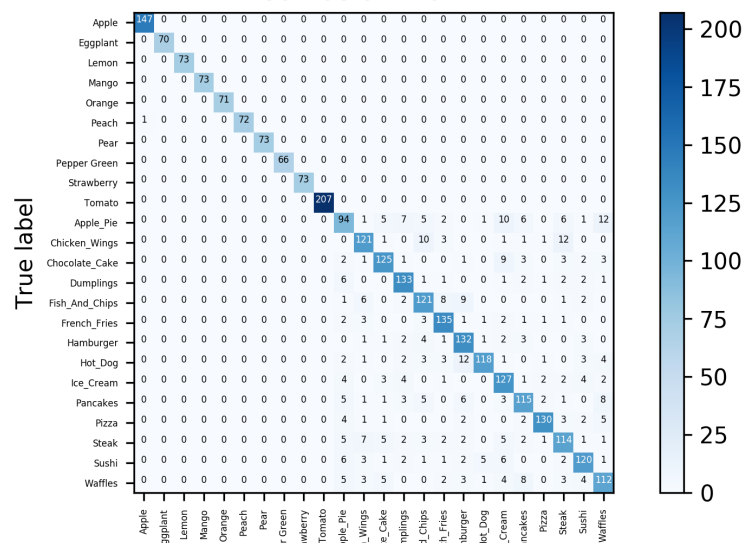
CNN training

We have trained the accuracy of CNN to 98% for classifying 24 categories

MobileNet Model predictions
(green: correct, red: incorrect)

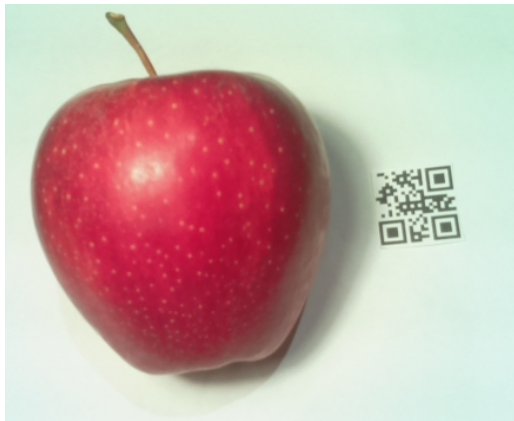


Confusion matrix



Confusion matrix

Experimental test



Capture of Rasp PI

```
analysis -> MobileNetAnalysis0
Run: Main (1) x
/Users/allen/anaconda3/python.app/Contents/MacOS/python /Users/
2020-03-03 21:59:33.710131: I tensorflow/core/platform/cpu_feat
WARNING: Logging before flag parsing goes to stderr.
W0303 21:59:36.704638 4598197696 deprecation.py:323] From /User:
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.wh
{'Apple': [1, 88, 96.8]}
Process finished with exit code 0
```

analysis of picture above

label: Apple: [count: 1 time, weight 88g, CO2 emission 96.8g]

Here we just took two pictures with Raspberry Pi, but the program can process many pictures in batches.