DEVELOPMENT OF DEEP LEARNING MODEL USING CONVOLUTIONAL NEURAL NETWORK FOR FOOD RECOGNITION

การพัฒนาโมเดลการเรียนรู้เชิงลึกโดยใช้โครงข่ายประสาทแบบคอนโวลูชันในการจดจำประเภทของอาหาร

นักศึกษา

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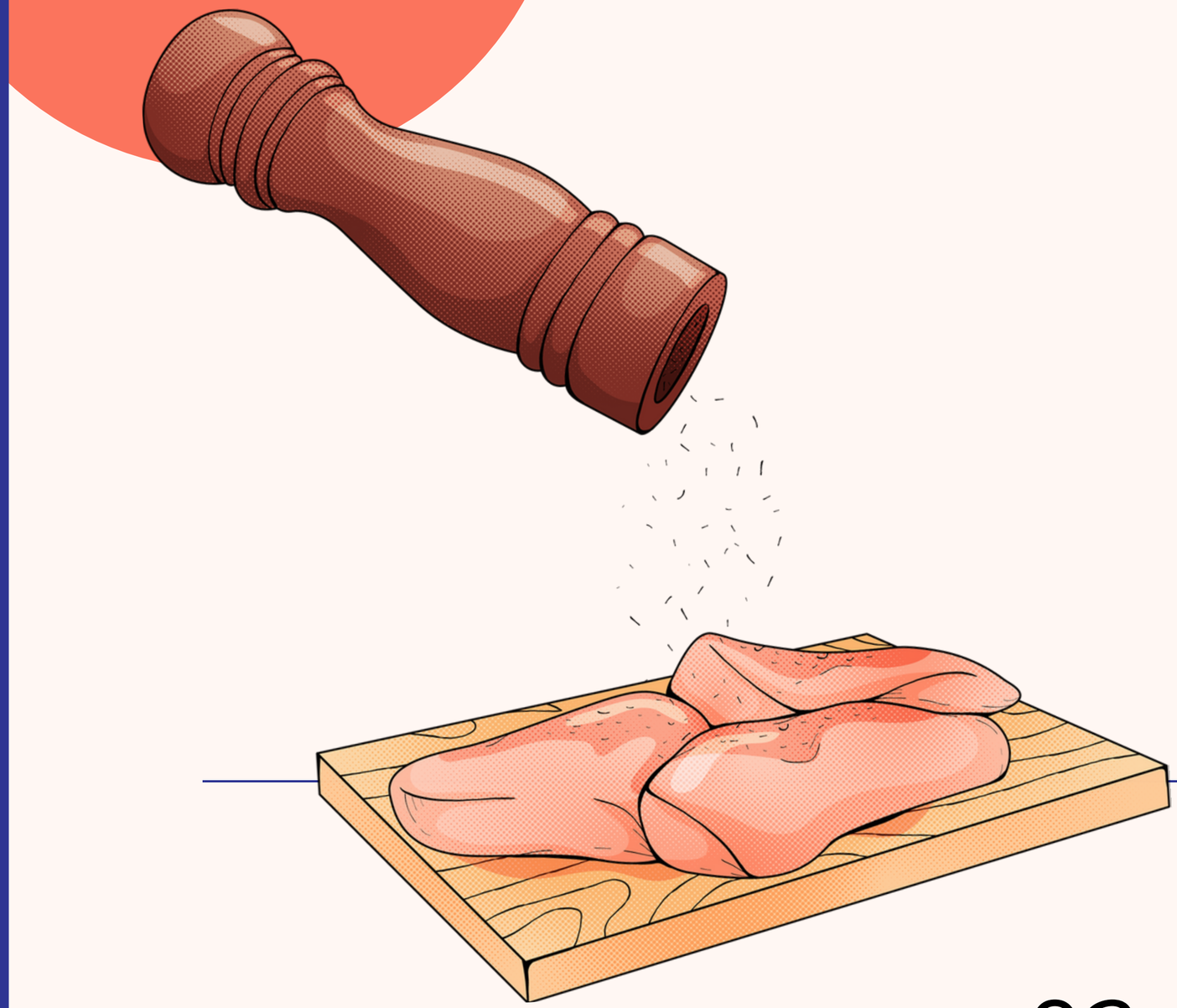
AGENDAS

- Introduction
- Method
- Result
- Conclusion



Introduction

Motivation

- Nutrition problems in elderly
- Health promotion with technology

Objective

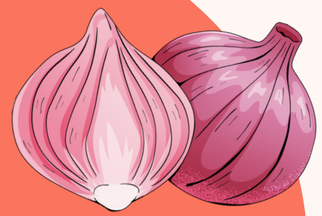
- To design and develop CNN model that estimate food volume
- To design and develop Artificial Intelligence algorithms for food data processing to interpret nutritional values.

Method

Preparing data for object detection training

Train object detection model with TensorFlow Lite Model Maker library

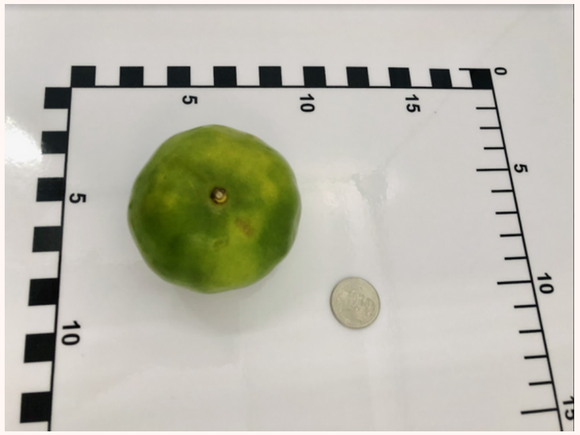
Deploy on mobile

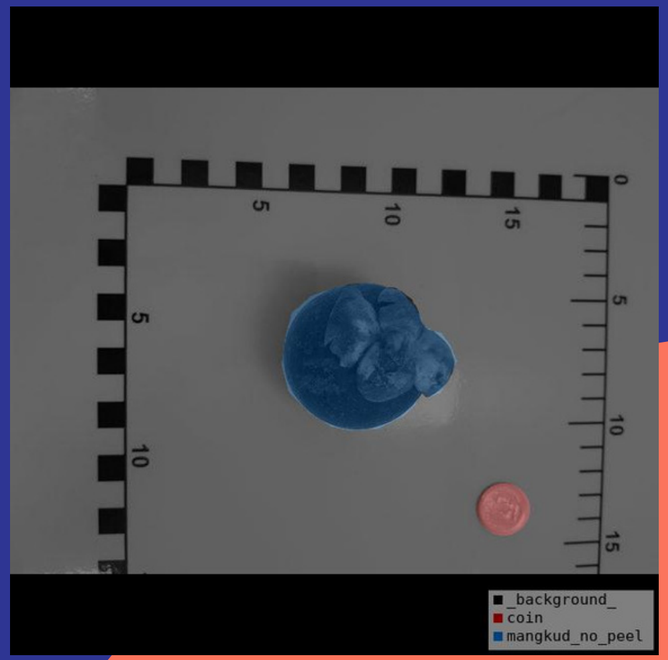


Collecting datasets

Datasets were provided by Department of Nutrition,
Faculty of Public Health, Mahidol University.

Example





kl2.py - project - Visual Studio Code [Administrator]

kl.py | kl2.py

kl2.py

```python
# Python program to read json file
# From https://www.geeksforgeeks.org/read-json-file-using-python/

import glob
import json
import math
import re
from pascal_voc_writer import Writer

# path edit in path for all example --> 'D:/Desktop/project/chompoo/'
path_for_all = 'D:/Desktop/project/mangkud/'
path = path_for_all + '*.json'

for filename in glob.glob(path):
    filename = filename.replace('\\', '/')
    print(filename)

    # Opening JSON file
    f = open(filename)

    # returns JSON object as a dictionary
    data = json.load(f)

    bboxa = []  # list for receive json dictionary
    labelstr = []
    xval1 = []
    xval2 = []
    yval1 = []
    yval2 = []

    # Iterating through the json list
```

Preparing data for object detection training

Labeling dataset & convert it to Pascal VOC format for training

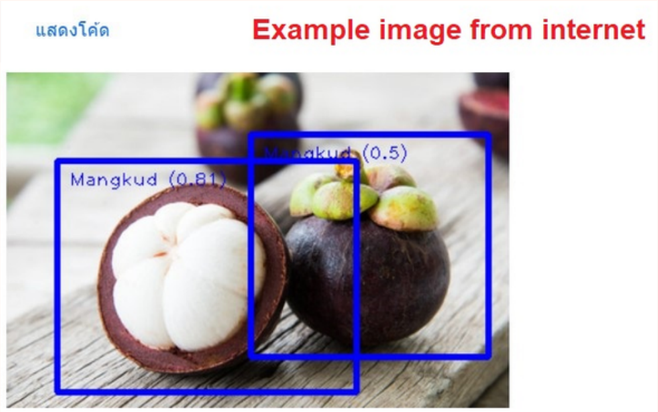
Total class: 7

- Coin
- Farang
- Chompoo
- Longong
- Lumyai
- Mangkud
- Orange

Train object detection model using TensorFlow Lite Model Maker library

Model architecture: efficientdet-lite2

Mean Average Precision (mAP): 0.7548603



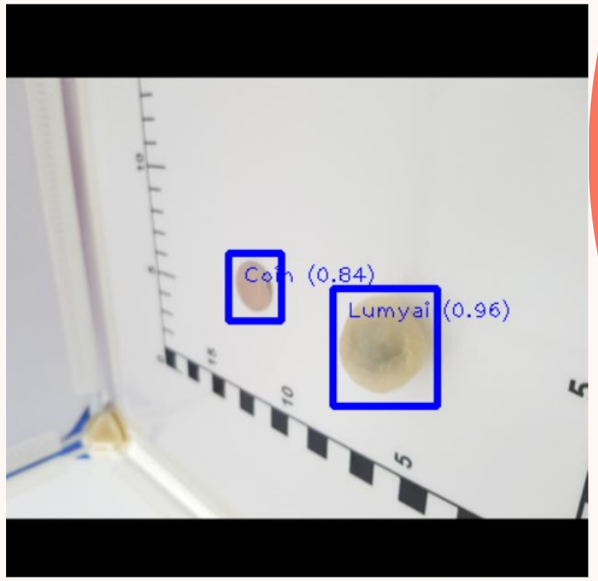
mAP	0.7548603
AP Coin	0.6019163
AP Farang	0.81222296
AP Chompoo	0.7998368
AP Longong	0.7456985
AP Lumyai	0.7570465
AP Mangkud	0.81058097
AP Orange	0.7567197

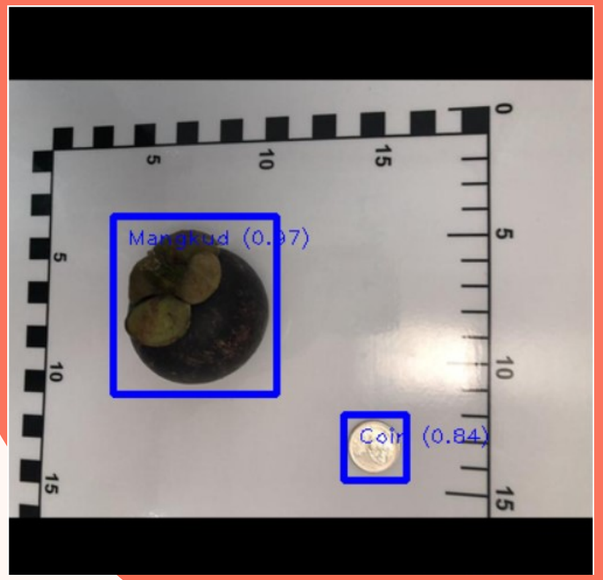
```
[14] model.evaluate(val_data)

5/5 [==============================

{'AP': 0.7548603,
 'AP50': 0.99427366,
 'AP75': 0.9521453,
 'APs': -1.0,
 'APm': 0.6076802,
 'APl': 0.74990517,
 'ARmax1': 0.7935428,
 'ARmax10': 0.8140485,
 'ARmax100': 0.8147725,
 'ARs': -1.0,
 'ARm': 0.65028167,
 'ARl': 0.815715,
 'AP_/Coin': 0.6019163,
 'AP_/Farang': 0.81222296,
 'AP_/Chompoo': 0.7998368,
 'AP_/Longong': 0.7456985,
 'AP_/Lumyai': 0.7570465,
 'AP_/Mangkud': 0.81058097,
 'AP_/Orange': 0.7567197}
```

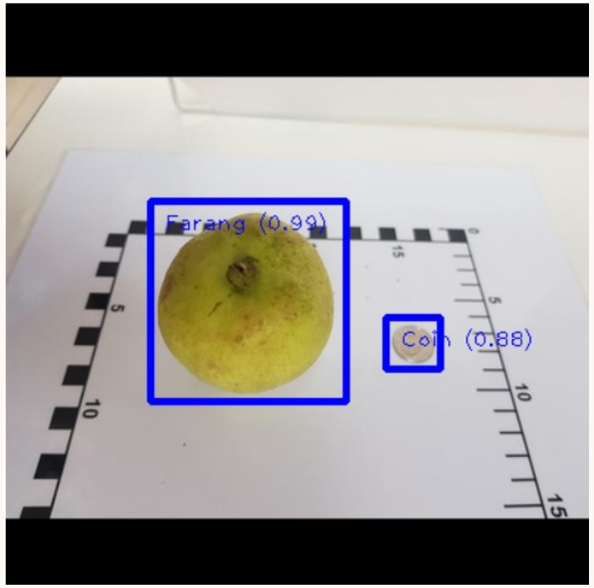
https://www.tensorflow.org/lite/models/modify/model_maker/object_detection

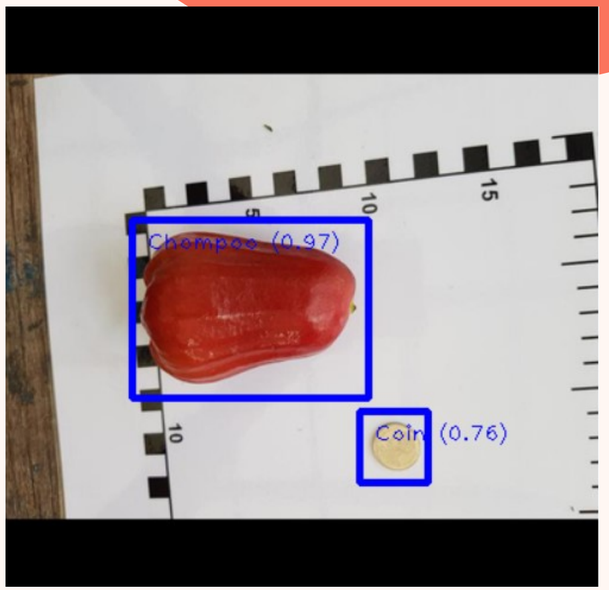
Train object detection model using TensorFlow Lite Model Maker library

Result example



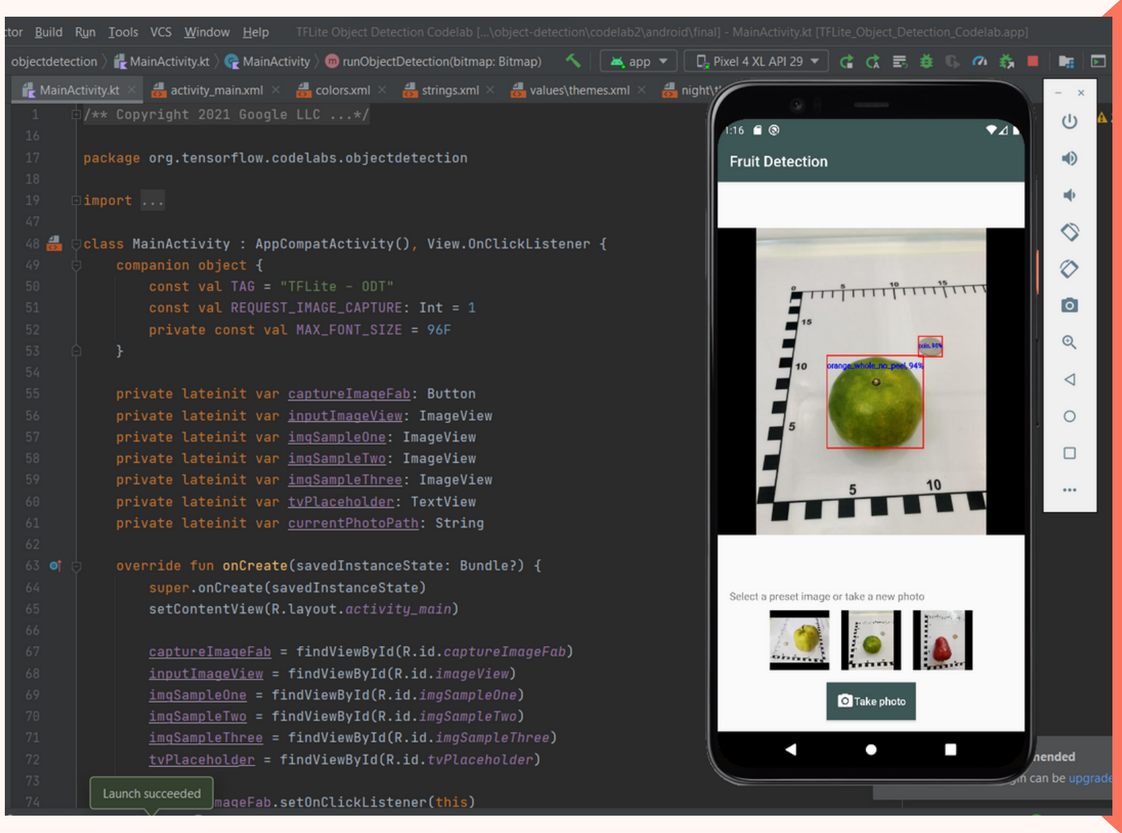






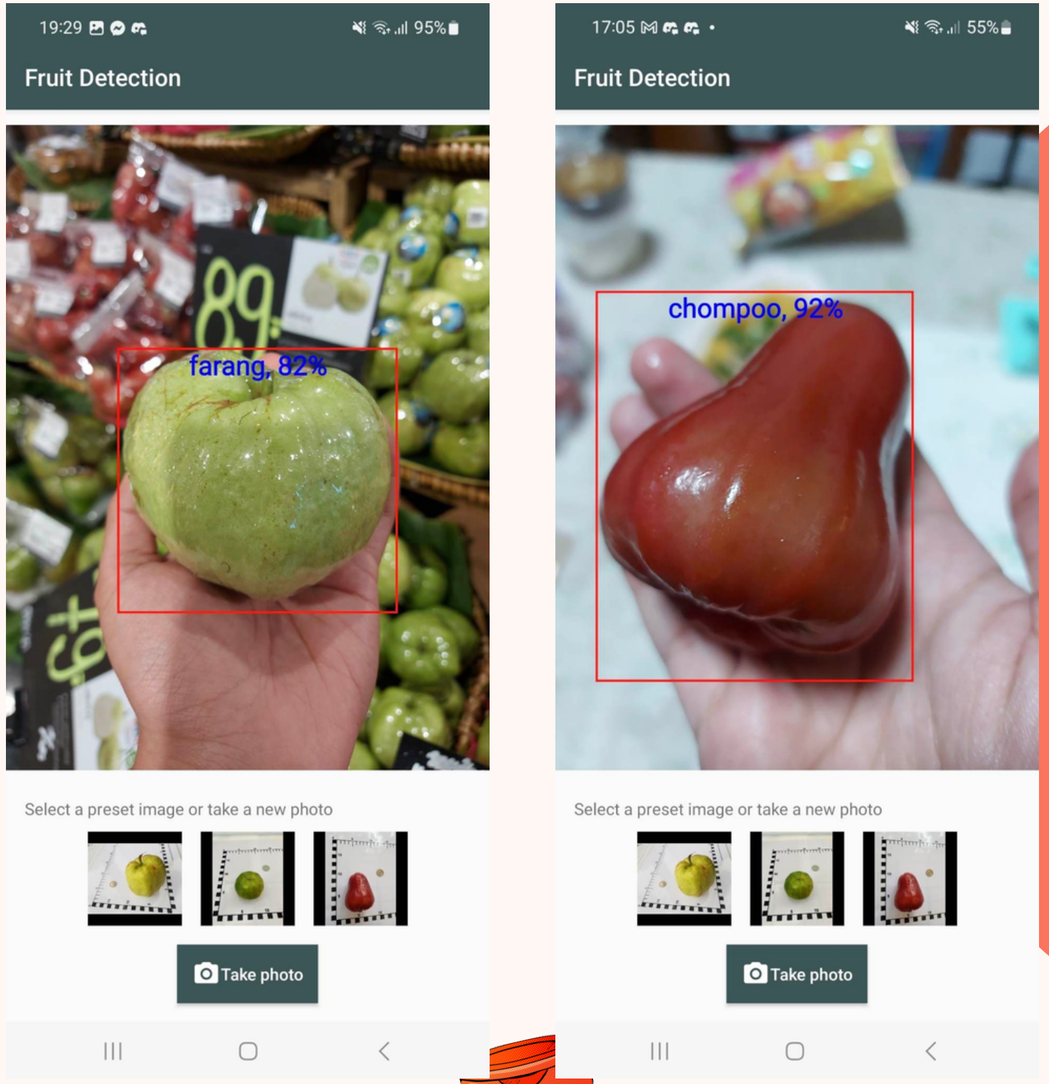
Deploy on mobile

- Developed with Kotlin language on Android Studio.
- Can take a picture and reply with the name of a fruit.



Deploy on mobile

- More example



Conclusion

Our objective is to develop CNN model for food data processing to interpret nutritional values.

We have trained the object detection model with TensorFlow Lite Model Maker library and deploy it on mobile application

Thank you for your attention

Feel free to asked any question.