Daily Waste Classifier

Zhang Bo, Chen Linfeng --group 8
Department of Electrical and Computer Engineering, Boston University, Boston, MA

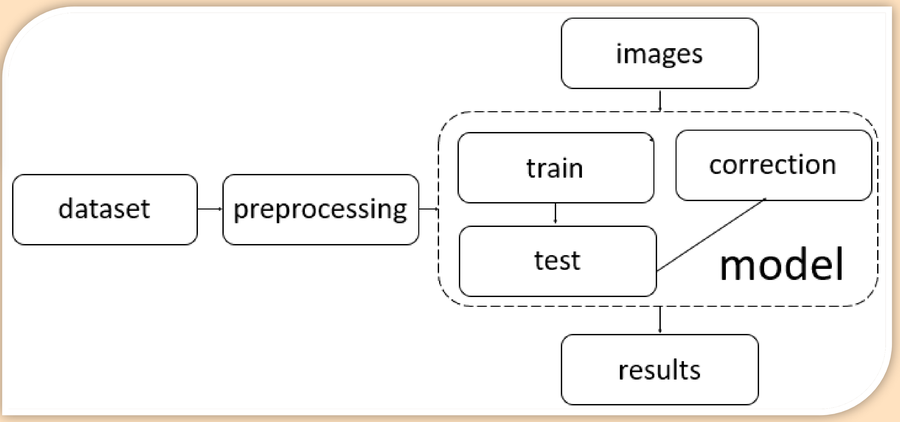
Purpose:

Help people classify daily trash, sorting them into 5 categories.

Help city cleaning department to deal with city trash efficiently.

Frame:

```
epochs = 16
batch_size = 200
IMG_HEIGHT = 100
IMG_WIDTH = 150
```



Algorithms & Environment:

~SVM in MATLAB

*cannot distinguish metal and glass clearly

*hard to detect objects in noisy background

~CNN in Tensorflow(python)

*achieves high accuracy and efficiency

*can detect objects in noisy background!

```
model = Sequential([
    Conv2D(16, 3, padding='same', activation='relu', input_shape=(IMG_HEIGHT, IMG_WIDTH ,3)),
    MaxPooling2D(),
    Conv2D(32, 3, padding='same', activation='relu'),
    MaxPooling2D(),
    Conv2D(64, 3, padding='same', activation='relu'),
    MaxPooling2D(),
    Flatten(),
    Dense(256, activation='relu'),
    Dense(5, activation='sigmoid')
])
```

```
Epoch 14/16
11/11 [==============================] - 37s 3s/step - loss: 0.1826 - accuracy: 0.9291 - val_loss: 0.2013 -
val_accuracy: 0.9130
Epoch 15/16
11/11 [==============================] - 38s 3s/step - loss: 0.1665 - accuracy: 0.9388 - val_loss: 0.1429 -
val_accuracy: 0.9470
Epoch 16/16
11/11 [==============================] - 37s 3s/step - loss: 0.1502 - accuracy: 0.9449 - val_loss: 0.1234 -
val_accuracy: 0.9609
```


```
In [143]: #showing the results
    font = cv2.FONT_HERSHEY_SIMPLEX
    img= cv2.imread(img_path)
    plt.imshow(img)
    img3 = cv2.putText(img, classes_types[i], (10,
    plt.imshow(img3)
    plt.show()
```