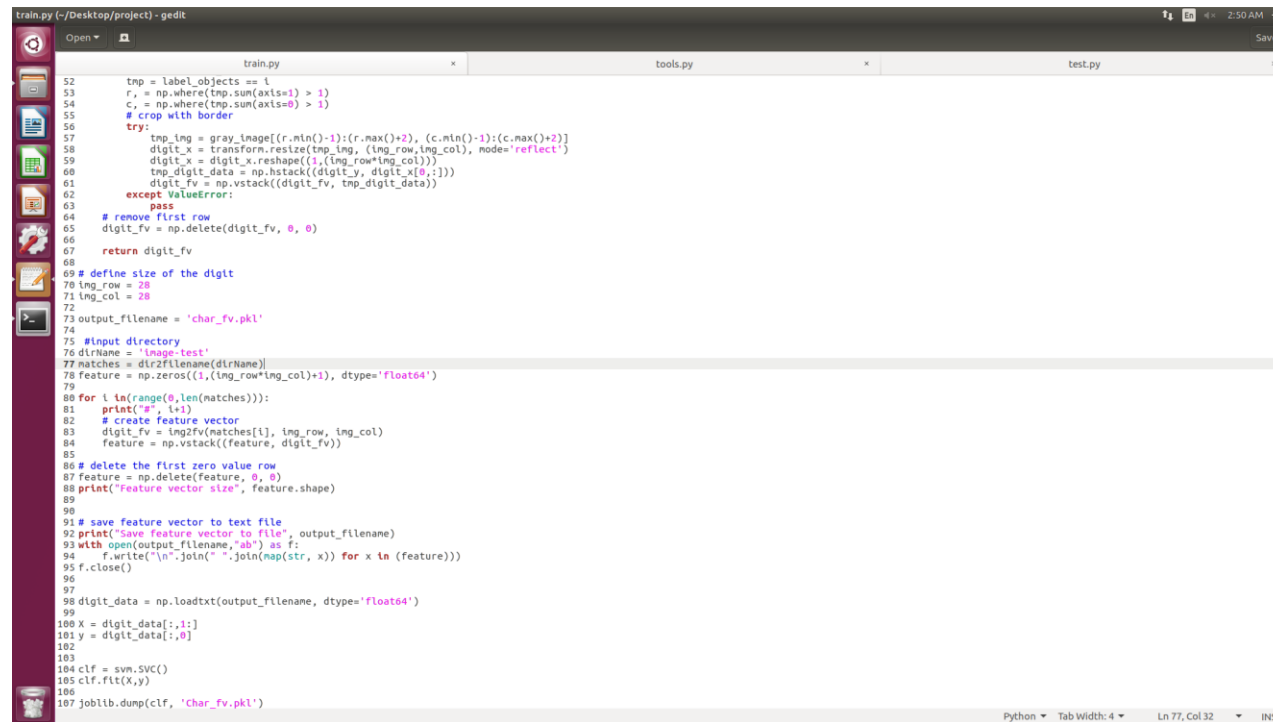


รายงานความคืบหน้าของโปรแกรม 3

ทำการแก้ไขโค้ดไฟล์ train ให้ทำหน้าที่ รู้จำตัวอักษร และ โหลดค่าต่ำเซต

The image shows a Gedit text editor window with a single file named 'train.py' open. The script is a Python program for image classification, likely using the MNIST dataset. It imports libraries such as 'skimage', 'sklearn', 'matplotlib', 'scipy', 'numpy', 'os', 'fnnatch', 'sklearn.neighbors', 'sklearn.tree', 'sklearn.svm', 'sklearn.externals', 'joblib', 'io', 'color', 'filters', and 'ndt'. The script defines two main functions: 'dir2filename' which recursively finds image files in a directory, and 'img2fv' which extracts features from a single image by converting it to grayscale, thresholding, and creating a feature vector. The 'img2fv' function includes a list of character labels from '0' to 'z'. The script also includes logic to find labels for a set of images and to filter out those with low confidence (sum of probabilities > 1). A tooltip is visible over the first few lines of the script, showing the file's name and encoding. The status bar at the bottom indicates the editor is running Python and the window width is 4 columns.

ทำการแก้ไขโค้ดไฟล์ train ให้ทำหน้าที่ รู้จำตัวอักษร และ โหลดค่าตัวเซต

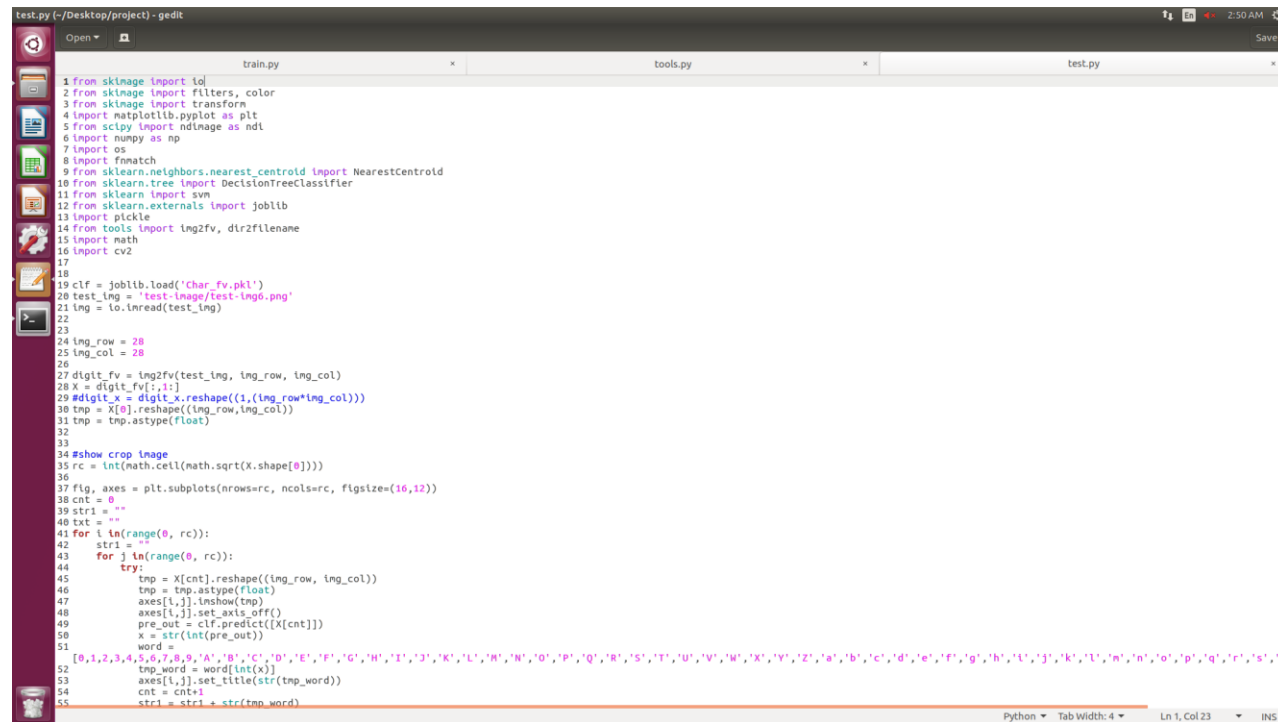


```
train.py (~/Desktop/project) - gedit
Open ▾  train.py  tools.py  test.py  Save

52 tnp = label_objects == 1
53 r, = np.where(tnp.sum(axis=1) > 1)
54 c, = np.where(tnp.sum(axis=0) > 1)
55 # crop with border
56 try:
57     tmp_img = gray_image[(r.min()-1):(r.max()+2), (c.min()-1):(c.max()+2)]
58     digit_x = transform.resize(tmp_img, (img_row, img_col), mode='reflect')
59     digit_x = digit_x.reshape((1, img_row*img_col))
60     tmp_digit_data = np.hstack((digit_y, digit_x[0,:]))
61     digit_fv = np.vstack((digit_fv, tmp_digit_data))
62 except ValueError:
63     pass
64 # remove first row
65 digit_fv = np.delete(digit_fv, 0, 0)
66
67 return digit_fv
68
69 # define size of the digit
70 img_row = 28
71 img_col = 28
72
73 output_filename = 'char_fv.pkl'
74
75 #input directory
76 dirName = 'image-test'
77 matches = dir2filename(dirName)
78 feature = np.zeros((1, (img_row*img_col)+1), dtype='float64')
79
80 for i in range(0, len(matches)):
81     print("#", i+1)
82     # create feature vector
83     digit_fv = img2fv(matches[i], img_row, img_col)
84     feature = np.vstack((feature, digit_fv))
85
86 # delete the first zero value row
87 feature = np.delete(feature, 0, 0)
88 print("Feature vector size", feature.shape)
89
90
91 # save feature vector to text file
92 print("Save feature vector to file", output_filename)
93 with open(output_filename, "ab") as f:
94     f.write("\n".join(" ".join(map(str, x)) for x in feature))
95 f.close()
96
97
98 digit_data = np.loadtxt(output_filename, dtype='float64')
99
100 X = digit_data[:,1:]
101 y = digit_data[:,0]
102
103
104 clf = svm.SVC()
105 clf.fit(X, y)
106
107 joblib.dump(clf, 'Char_fv.pkl')
```

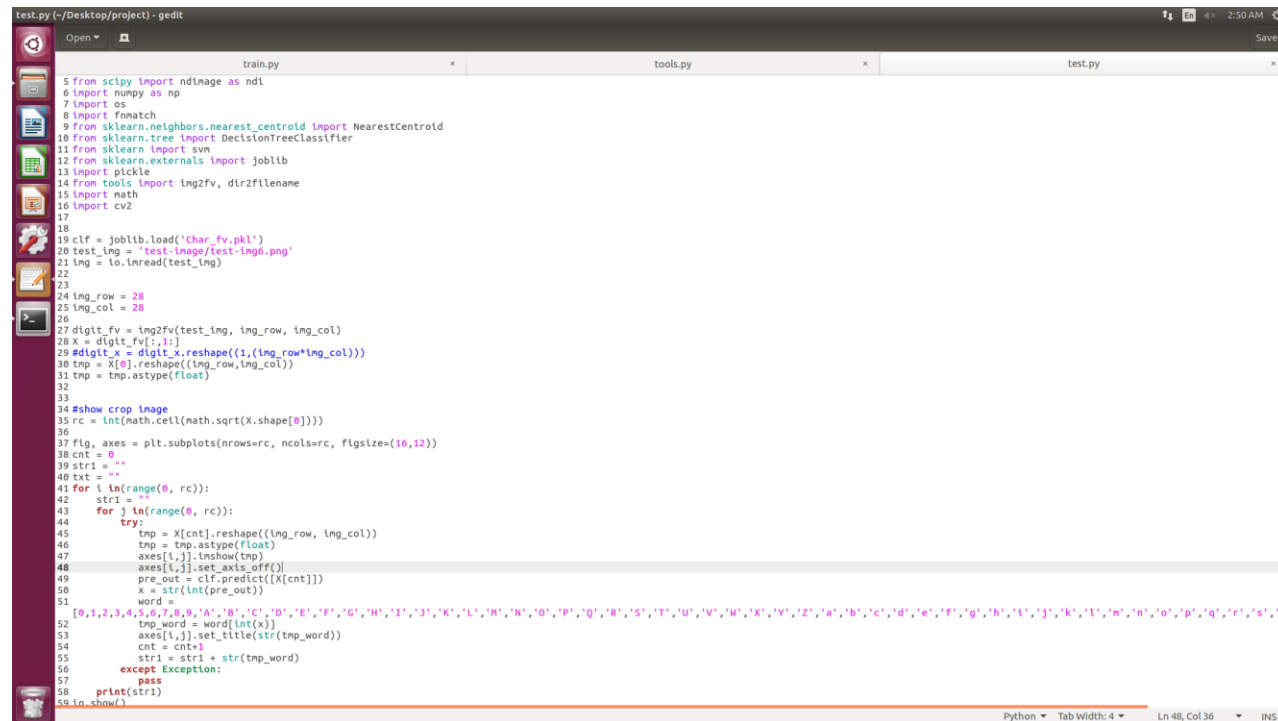
Python ▾ Tab Width: 4 ▾ Ln 77, Col 32 ▾ INS

ทำการแก้ไขโค้ดไฟล์ test ให้ทำหน้าที่ คาดเคา โดยดึงข้อมูลจากไฟล์ .pkl และ tools.py



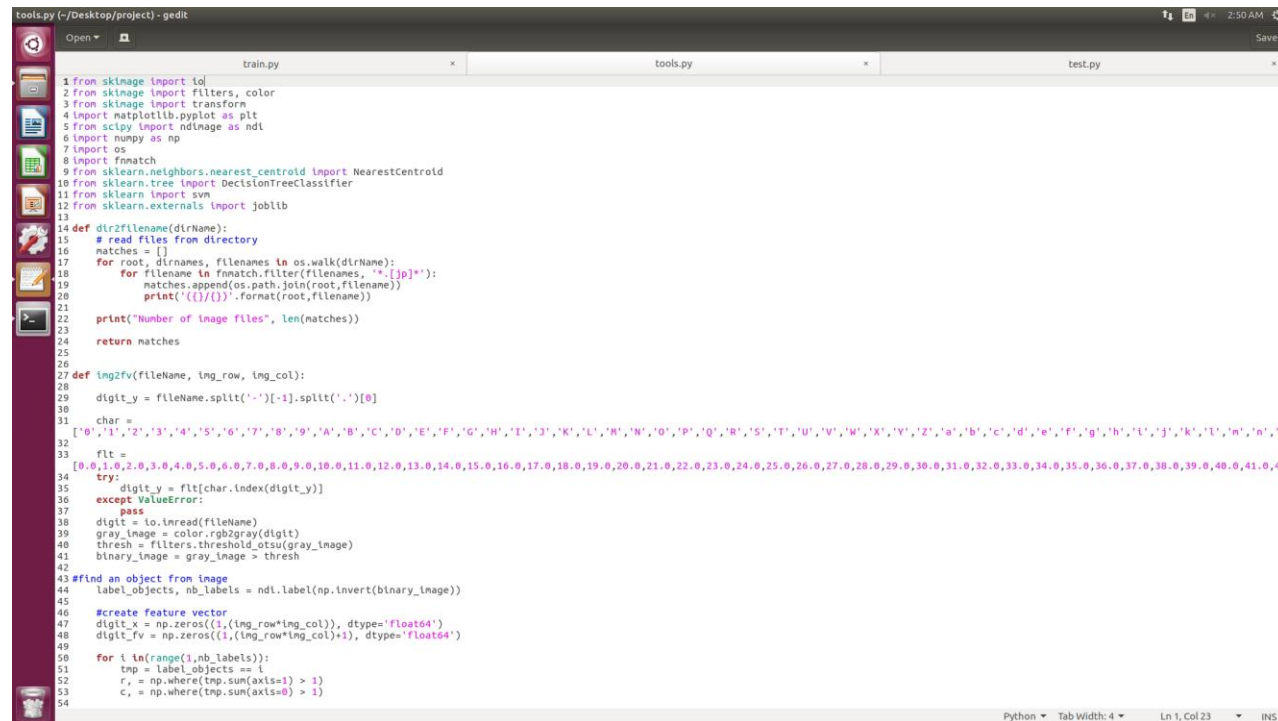
```
test.py (~/Desktop/project) - gedit
Open ▾ Save
train.py x tools.py x test.py x
1 from skimage import io
2 from skimage import filters, color
3 from skimage import transform
4 import matplotlib.pyplot as plt
5 from scipy import ndimage as ndi
6 import numpy as np
7 import os
8 import fnmatch
9 from sklearn.neighbors.nearest_centroid import NearestCentroid
10 from sklearn.tree import DecisionTreeClassifier
11 from sklearn import svm
12 from sklearn.externals import joblib
13 import pickle
14 from tools import img2fv, dir2filename
15 import math
16 import cv2
17
18
19 clf = joblib.load('Char_fv.pkl')
20 test_img = 'test-image/test-img0.png'
21 img = io.imread(test_img)
22
23
24 img_row = 28
25 img_col = 28
26
27 digit_fv = img2fv(test_img, img_row, img_col)
28 x = digit_fv[:,1:]
29 #digit_x = digit_x.reshape((1,(img_row*img_col)))
30 tmp = x[0].reshape((img_row,img_col))
31 tmp = tmp.astype(float)
32
33
34 #show crop image
35 rc = int(math.ceil(math.sqrt(x.shape[0])))
36
37 fig, axes = plt.subplots(nrows=rc, ncols=rc, figsize=(16,12))
38 cnt = 0
39 str1 = ""
40 txt = ""
41 for i in range(0, rc):
42     str1 = ""
43     for j in range(0, rc):
44         try:
45             tmp = x[cnt].reshape((img_row, img_col))
46             tmp = tmp.astype(float)
47             axes[i,j].imshow(tmp)
48             axes[i,j].set_axis_off()
49             pre_out = clf.predict([x[cnt]])
50             x = str(int(pre_out))
51             word =
52             tmp_word = word[int(x)]
53             axes[i,j].set_title(str(tmp_word))
54             cnt = cnt+1
55             str1 = str1 + str(tmp_word)
```

ทำการแก้ไขโค้ดไฟล์ test ให้ทำหน้าที่ คัดเคา โดยดึงข้อมูลจากไฟล์ .pkl และ tools.py



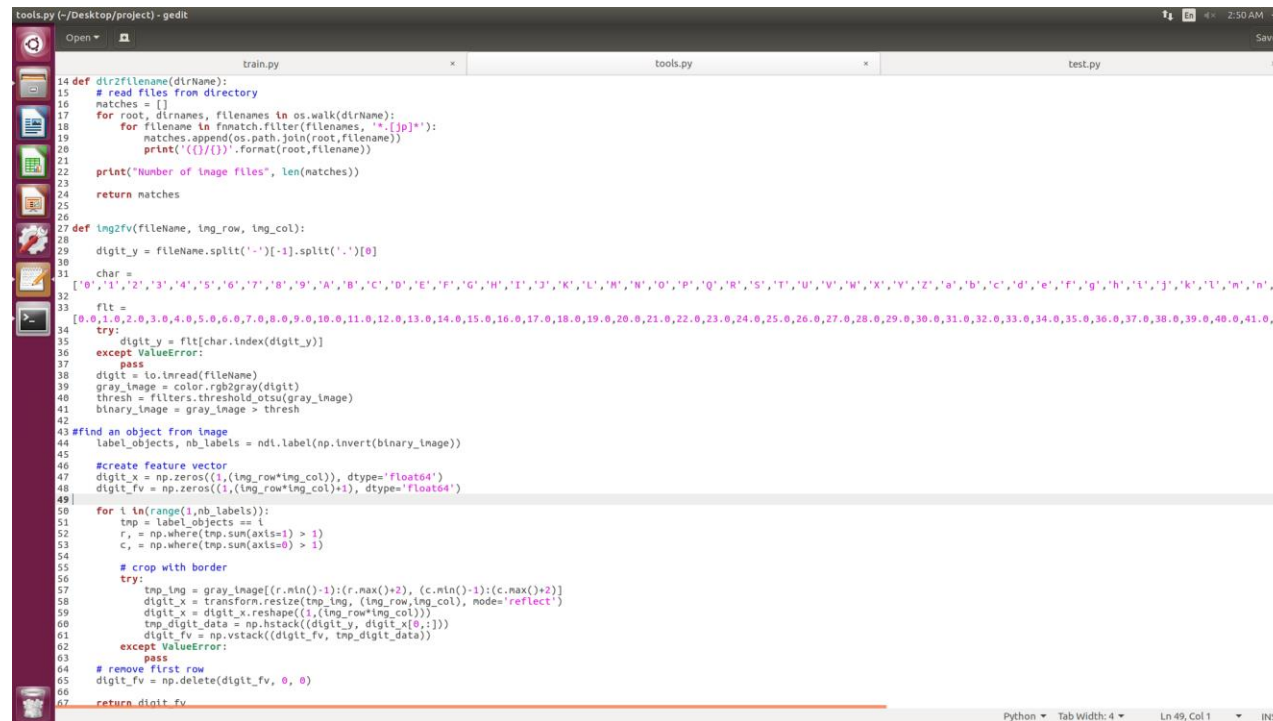
```
test.py (~/Desktop/project) - gedit
5 from scipy import ndimage as ndi
6 import numpy as np
7 import os
8 import fnmatch
9 from sklearn.neighbors.nearest_centroid import NearestCentroid
10 from sklearn.tree import DecisionTreeClassifier
11 from sklearn import svm
12 from sklearn.externals import joblib
13 import pickle
14 from tools import img2fv, dir2filename
15 import math
16 import cv2
17
18
19 clf = joblib.load('char_fv.pkl')
20 test_img = 'test-image/test-img0.png'
21 img = io.imread(test_img)
22
23
24 img_row = 28
25 img_col = 28
26
27 digit_fv = img2fv(test_img, img_row, img_col)
28 X = digit_fv[1:]
29 #digit_x = digit_x.reshape((1,(img_row*img_col)))
30 tmp = X[0].reshape((img_row,img_col))
31 tmp = tmp.astype(float)
32
33
34 #show crop image
35 rc = int(math.ceil(math.sqrt(X.shape[0])))
36
37 fig, axes = plt.subplots(nrows=rc, ncols=rc, figsize=(16,12))
38 cnt = 0
39 str1 = ""
40 txt = ""
41 for i in range(0, rc):
42     str1 = ""
43     for j in range(0, rc):
44         try:
45             tmp = X[cnt].reshape((img_row, img_col))
46             tmp = tmp.astype(float)
47             axes[i,j].imshow(tmp)
48             axes[i,j].set_axis_off()
49             pre_out = clf.predict([X[cnt]])
50             x = str(int(pre_out))
51             word =
52             tmp_word = word[int(x)]
53             axes[i,j].set_title(str(tmp_word))
54             cnt = cnt+1
55             str1 = str1 + str(tmp_word)
56         except Exception:
57             pass
58     print(str1)
59 io.show()
```

ทำการแก้ไขโค้ดไฟล์ tools ให้ทำหน้าที่เก็บ method ให้ Test เรียกใช้



```
tools.py (-/Desktop/project) - gedit
Open ▾ 1
train.py x tools.py x test.py x Save
1 from skimage import io
2 from skimage import filters, color
3 from skimage import transform
4 import matplotlib.pyplot as plt
5 from scipy import ndimage as ndi
6 import numpy as np
7 import os
8 import fnmatch
9 from sklearn.neighbors.nearest_centroid import NearestCentroid
10 from sklearn.tree import DecisionTreeClassifier
11 from sklearn import svm
12 from sklearn.externals import joblib
13
14 def dir2filename(dirname):
15     # read files from directory
16     matches = []
17     for root, dirnames, filenames in os.walk(dirname):
18         for filename in fnmatch.filter(filenames, "*.jpg*"):
19             matches.append(os.path.join(root, filename))
20             print('{}({})'.format(root, filename))
21
22     print("Number of image files", len(matches))
23
24     return matches
25
26
27 def img2fv(filename, img_row, img_col):
28
29     digit_y = filename.split('/')[-1].split('.')[0]
30
31     char =
32     ['0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F','G','H','I','J','K','L','M','N','O','P','Q','R','S','T','U','V','W','X','Y','Z','a','b','c','d','e','f','g','h','i','j','k','l','m','n','o']
33
34     flt =
35     [0.0,1.0,2.0,3.0,4.0,5.0,6.0,7.0,8.0,9.0,10.0,11.0,12.0,13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,21.0,22.0,23.0,24.0,25.0,26.0,27.0,28.0,29.0,30.0,31.0,32.0,33.0,34.0,35.0,36.0,37.0,38.0,39.0,40.0,41.0,42.0]
36
37     try:
38         digit_y = flt[char.index(digit_y)]
39     except ValueError:
40         pass
41
42     digit = io.imread(filename)
43     gray_image = color.rgb2gray(digit)
44     thresh = filters.threshold_otsu(gray_image)
45     binary_image = gray_image > thresh
46
47     #find an object from image
48     label_objects, nb_labels = ndi.label(np.invert(binary_image))
49
50     #create feature vector
51     digit_x = np.zeros((1,(img_row*img_col)), dtype='float64')
52     digit_fv = np.zeros((1,(img_row*img_col)+1), dtype='float64')
53
54     for i in range(1,nb_labels):
55         tmp = label_objects == i
56         r, = np.where(tmp.sum(axis=1) > 1)
57         c, = np.where(tmp.sum(axis=0) > 1)
```

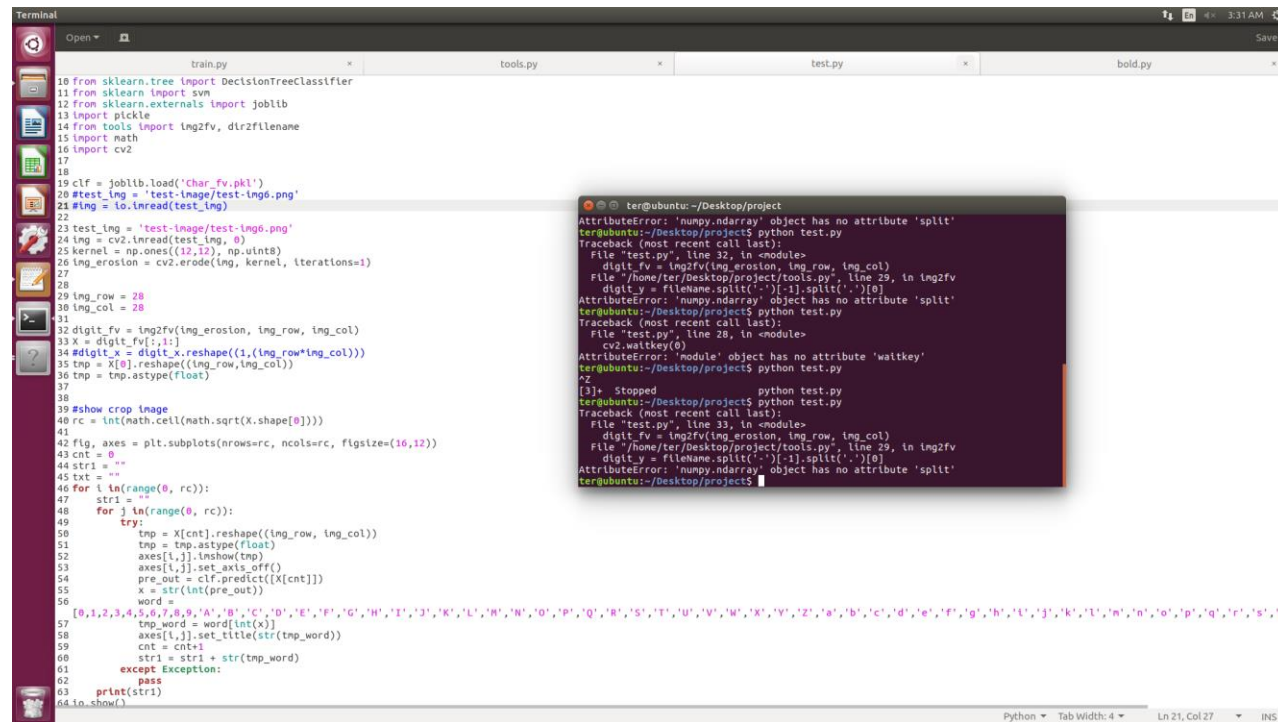
ทำการแก้ไขโค้ดไฟล์ tools ให้ทำหน้าที่เก็บ method ให้ Test เรียกใช้



```
tools.py (-/Desktop/project) - gedit
Open  x  Save
train.py  tools.py  test.py

14 def dir2filename(dirname):
15     # read files from directory
16     matches = []
17     for root, dirnames, filenames in os.walk(dirname):
18         for filename in fnmatch.filter(filenames, '*.jpg*'):
19             matches.append(os.path.join(root, filename))
20             print('{}\n{}'.format(root, filename))
21
22     print("Number of Image files", len(matches))
23     return matches
24
25
26 def img2fv(filename, img_row, img_col):
27     digit_y = filename.split('-')[1].split('.')[0]
28
29     char =
30     ['0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F','G','H','I','J','K','L','M','N','O','P','Q','R','S','T','U','V','W','X','Y','Z','a','b','c','d','e','f','g','h','i','j','k','l','m','n','o']
31
32     flt =
33     [0.0,1.0,2.0,3.0,4.0,5.0,6.0,7.0,8.0,9.0,10.0,11.0,12.0,13.0,14.0,15.0,16.0,17.0,18.0,19.0,20.0,21.0,22.0,23.0,24.0,25.0,26.0,27.0,28.0,29.0,30.0,31.0,32.0,33.0,34.0,35.0,36.0,37.0,38.0,39.0,40.0,41.0,42.0]
34     try:
35         digit_y = flt[char.index(digit_y)]
36     except ValueError:
37         pass
38     digit = io.imread(filename)
39     gray_image = color.rgb2gray(digit)
40     thresh = filters.threshold_otsu(gray_image)
41     binary_image = gray_image > thresh
42
43 #find an object from image
44 label_objects, nb_labels = ndi.label(np.invert(binary_image))
45
46 #create feature vector
47 digit_x = np.zeros((1,(img_row*img_col)), dtype='float64')
48 digit_fv = np.zeros((1,(img_row*img_col)+1), dtype='float64')
49
50 for i in range(1,nb_labels):
51     tmp = label_objects == i
52     r = np.where(tmp.sum(axis=1) > 1)
53     c = np.where(tmp.sum(axis=0) > 1)
54
55     # crop with border
56     try:
57         tmp_img = gray_image[(r.min()-1):(r.max()+2),(c.min()-1):(c.max()+2)]
58         digit_x = transform.resize(tmp_img, (img_row,img_col), mode='reflect')
59         digit_x = digit_x.reshape((1,(img_row*img_col)))
60         tmp_digit_data = np.hstack((digit_y, digit_x[0,:]))
61         digit_fv = np.vstack((digit_fv, tmp_digit_data))
62     except ValueError:
63         pass
64 # remove first row
65 digit_fv = np.delete(digit_fv, 0, 0)
66
67 return digit_fv
```

ปัญหาที่พบ



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