



Assignment of
Computer Vision
Topic

Image features Detection and Matching
Image Classification

Submitted to
Dr. Mohammed Moazzam Fraz

Submitted By
Asmat Zahra
CMS ID: 322287
PhD-CS

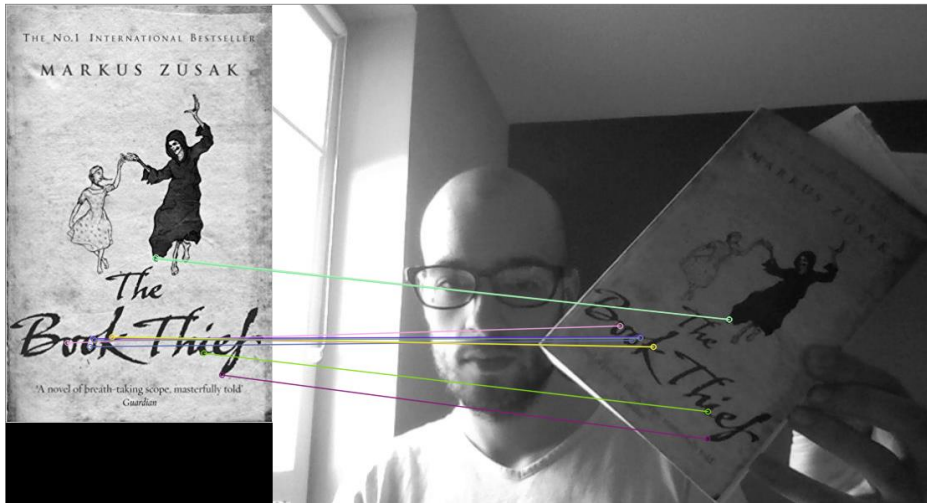
Dated: 25th Oct, 2019

School of Electrical Engineering and Computer Science
National University of Science and Technology
Islamabad

Task-1: Image Feature Extraction and Matching

- Oriented FAST and Rotated BRIEF (ORB)

- Set 1



- Set 2

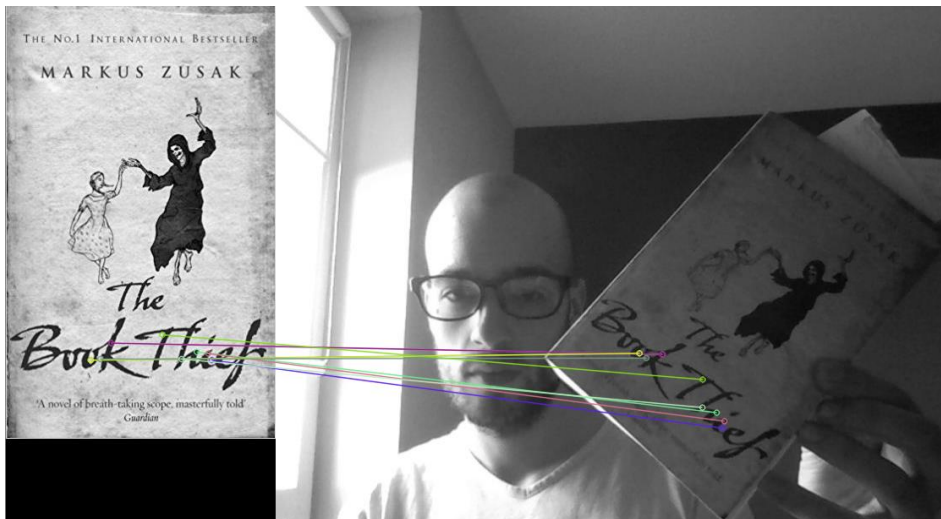


- Set 3

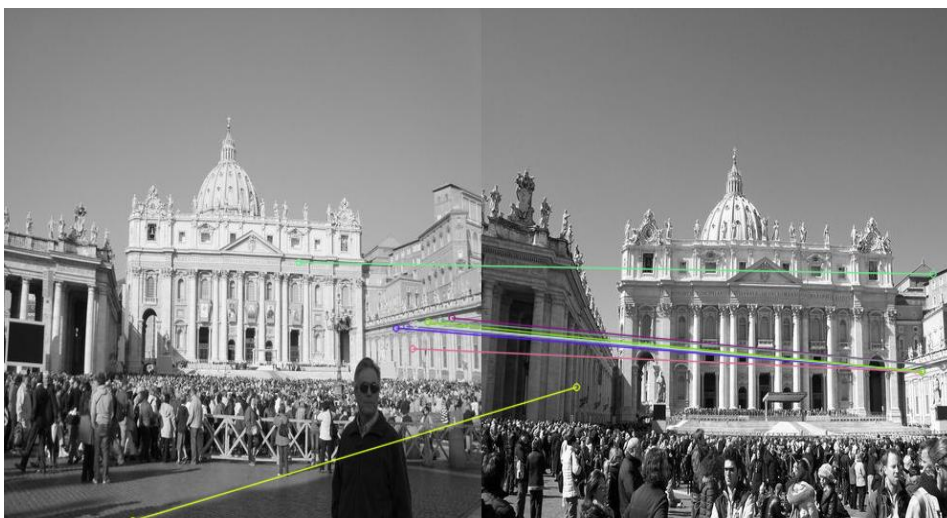


- **Scale Invariant Feature Transform(SIFT)**

- **Set 1**



- **Set 2**

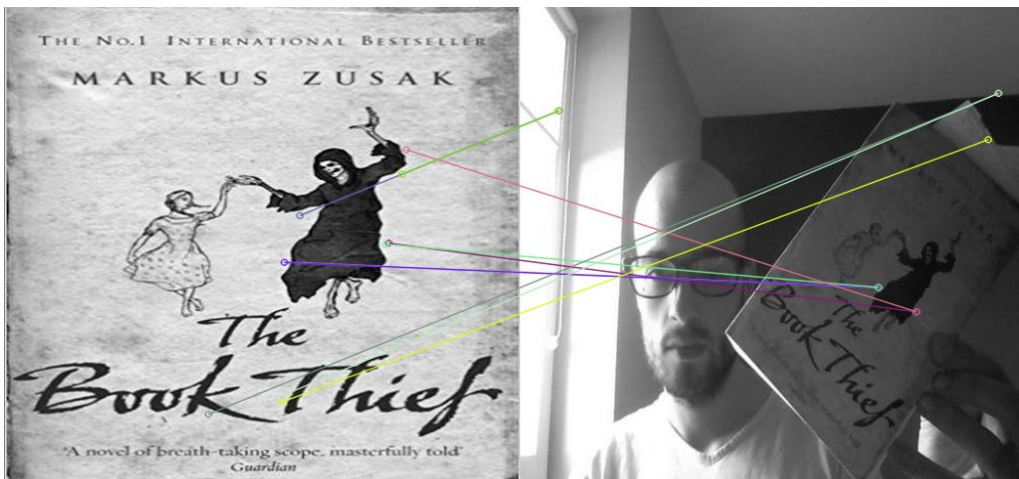


- Set 3



- Speeded-Up Robust Features (SURF)

- Set 1



- Set 2



- **Set 3**



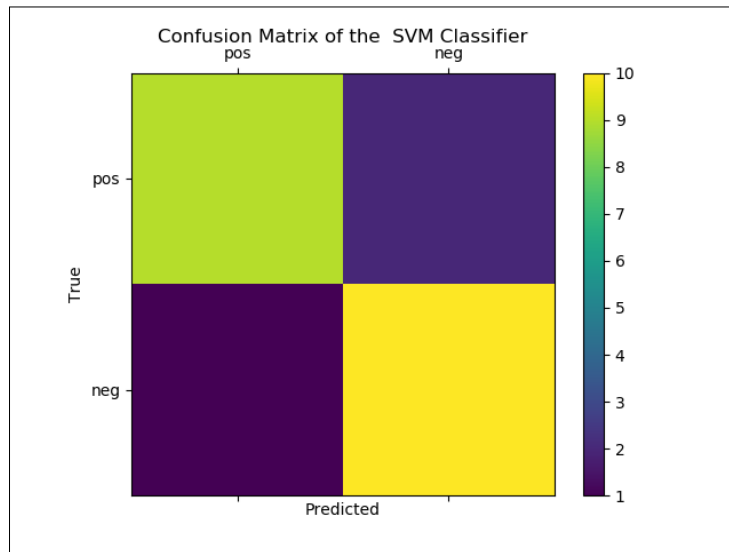
Task 2: Human Classification / Detection

i. Quantitative performance measures i.e. F1 Score, Accuracy, True Positive Rate, and False Positive Rates of both classifiers.

Results for smaller dataset

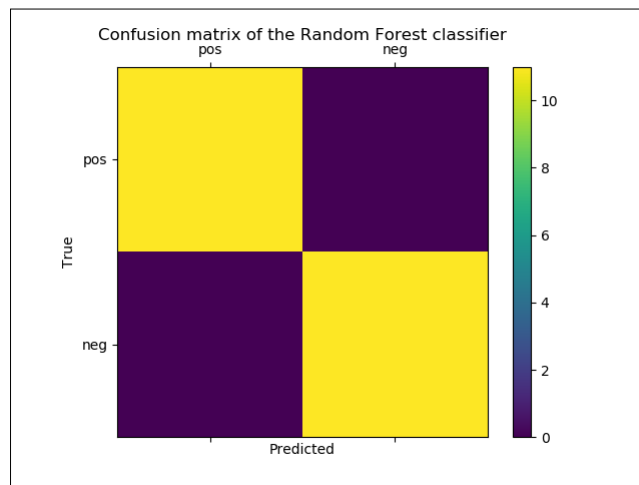
SVM Classifier

- **F1 score**
 - 0.8633540372670807
- **Accuracy**
 - 0.8636363636363636
- **Confusion Matrix (True positive rate , True negative rate, False positive rate, False negative rate)**
 - $\begin{bmatrix} 9 & 2 \\ 1 & 10 \end{bmatrix}$



Random Forest Classifier

- **F1 score**
 - 1.0
- **Accuracy**
 - 1.0
- **Confusion Matrix (True positive rate , True negative rate, False positive rate, False negative rate)**
 - $\begin{bmatrix} 11 & 0 \\ 0 & 11 \end{bmatrix}$



- **Classifier IDE snippet of obtained results**

```

Debug: loadData
Debugger Console
--client 127.0.0.1 --port 57522 --file C:/Users/ASHMAT/PycharmProjects/untitled/loadData.py
pydev debugger: process 6884 is connecting

Connected to pydev debugger (build 192.6603.34)
neg
pos
neg
pos
Accuracy of SVM
Accuracy: 0.8636363636363636
Confusion matrix for SVM classifier
[[ 9  2]
 [ 1 10]]
F1 score of SVM classifier
0.8633540372670807
Accuracy of Random Forest: 1.0
Confusion matrix for Random Forest classifier
[[11  0]
 [ 0 11]]
F1 score of Random Forest classifier
1.0

Process finished with exit code -1

```

ii. Qualitative results i.e. a few of the correctly classified images

Training Images



Corresponding Training Labels

Training label: ['neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg']

Testing Images



Corresponding Testing labels

Test label: ['neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg']

IDE run results

```

118     for i in range(10):
119         plt.subplot(1,10,i+1)
120         plt.imshow(img_array[i], cmap='Greys_r') # train_img
121         plt.axis('off')
122     plt.show()
123     print('Training label: %s' % (getLabel[0:10],))
124
125     for i in range(10):
126         plt.subplot(1,10,i+1)
127         plt.imshow(img_arrayTest[i], cmap='Greys_r')
128         plt.axis('off')
129     plt.show()
130     print('Test label: %s' % (get_label_test[0:10],))
131
132
133     qualitative_results()
134
135
136     ...

```

Run: loadData

```

C:\Users\ASMAT.1694484\PycharmProjects\untitled\venv\Scripts\python.exe C:\Users\ASMAT.1694484\PycharmProjects\untitled/loadData.py
neg
pos
neg
pos
Training label: ['neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg']
Test label: ['neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg', 'neg']
Process finished with exit code 0

```

Search the web and Windows

10:1 CRLF UTF-8 4 spaces Python 3.7 (untitled) 03:12 PM 25/10/2019