CV: Assignment 4

Anubhav Jain

2015129

Q1: Senior Researchers:

Abhinav Gupta (CMU): His work has been focused on object detection and recognition. He has also worked on using these for robotic systems.

Martial hebert: 3D object detection and putting them in perspective, using spin images for efficient object recognition in cluttered 3D scenes.

James M. Rehg: Context based learning, Skin colour segmentation, activity recognition. Proposed statistical color modelling based segmentation of skin.

Irfan Essa: Video and Image synthesis, Graph based video segmentation

Silvio Savarese: Recognizing human actions by attributes, Human trajectory prediction, action recognition.

Li Fei-Fei: Founded the imagenet database and the imagenet challenge.

Larry Davis: Real-time surveillance of people and their activities, background subtraction to improve face recognition.

Rama Chellappa: Face recognition, activity recognition and human identification, biometrics.

David Forsyth: Matching words and pictures, Describing objects by their attributes

Young Researchers:

Srinivasa Narasimhan (CMU): His major contributions include vision in bad weather and unclear situations. And how to deal with image quality in these situations.

Simon Lucey: Correlation filters, face alignment, landmark mean shift algorithm

Deva Ramanan: Object detection with discriminatively trained part-based models, face recognition and object segmentation.

Katerina Fragkiadaki: Stories that videos portray, and, inversely, in using videos to teach machines about the world.

Devi Parikh: Her major contribution was proposing the Visual question answering.

Dhruv Batra: Visual explanations from deep networks via gradient-based localization. Hierarchical question-image co-attention for visual question answering.

Judy Hoffman: A deep convolutional activation feature for generic visual recognition, Simultaneous deep transfer across domains and tasks.

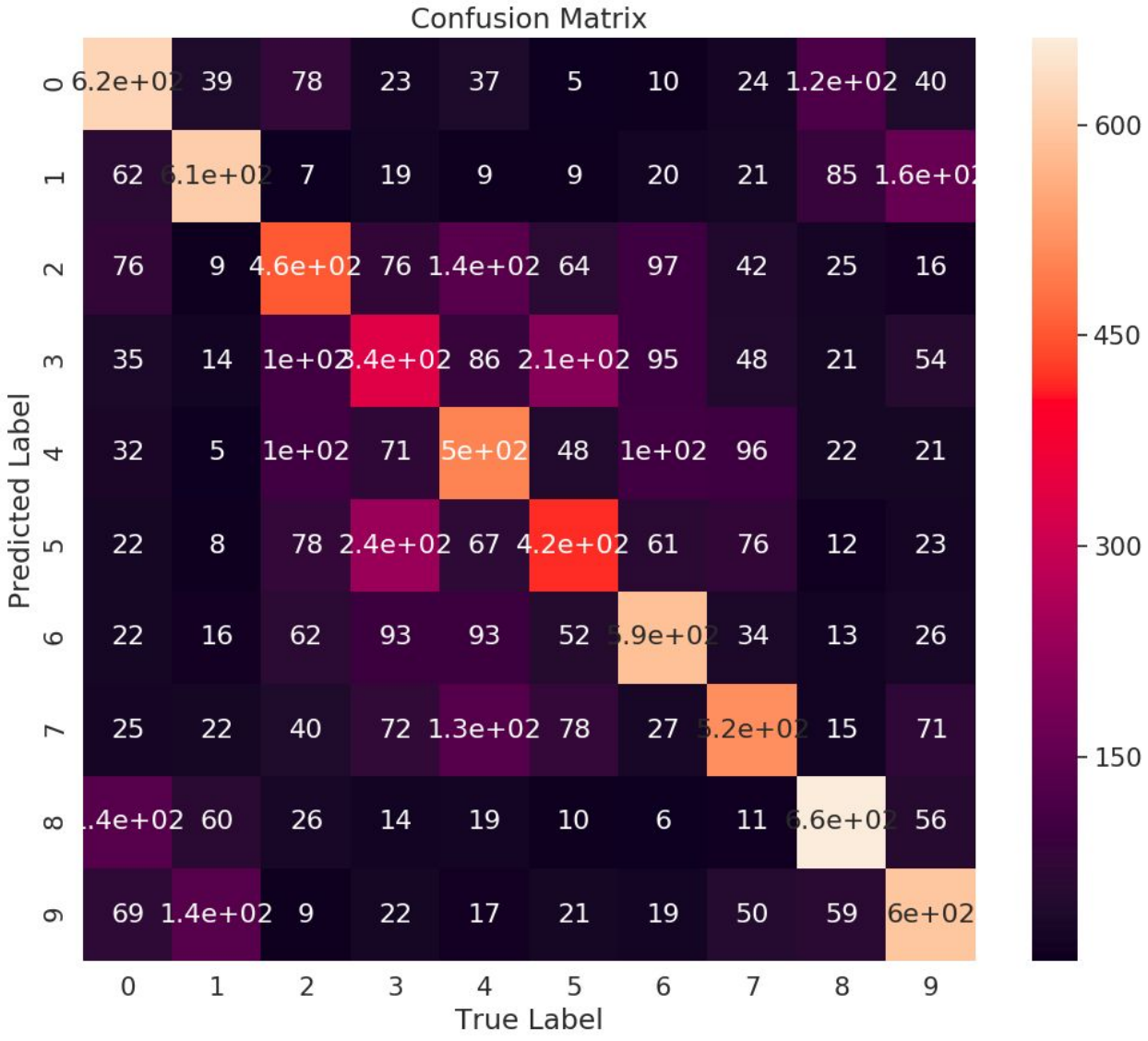
David W. Jacobs: Shape classification using the inner-distance, A search engine for 3D models.

Abhinav Shrivastava: Extracting Visual Knowledge from Web Data, Data-driven visual similarity for cross-domain image matching.

Tom Goldstein: Generative models. Variational Autoencoders for various tasks.

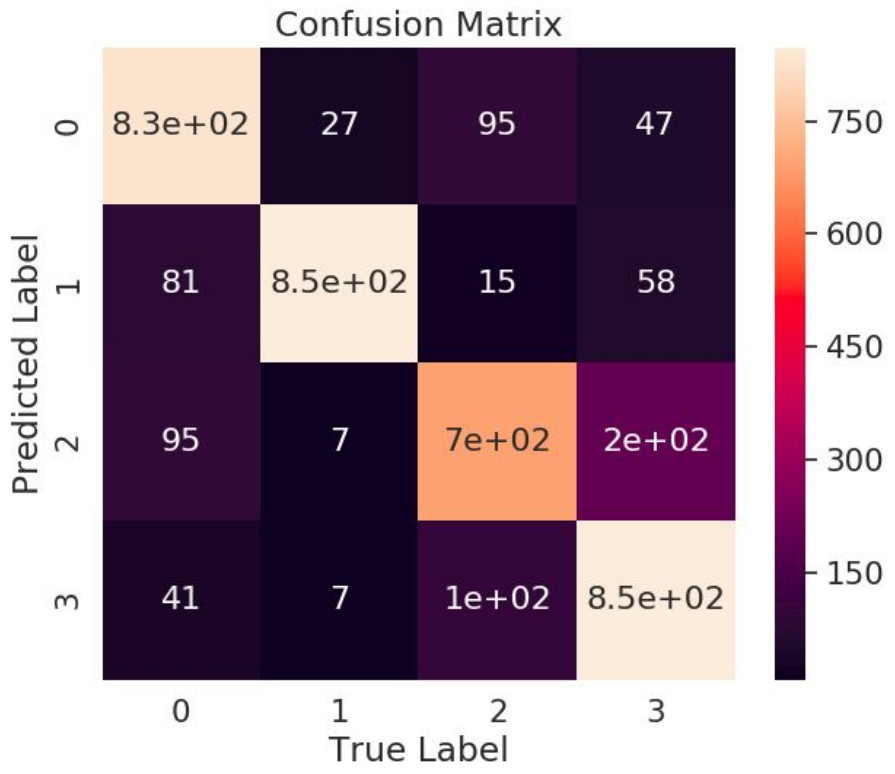
Q2. Part A

Accuracy = 57.11% using SVM as the classifier.



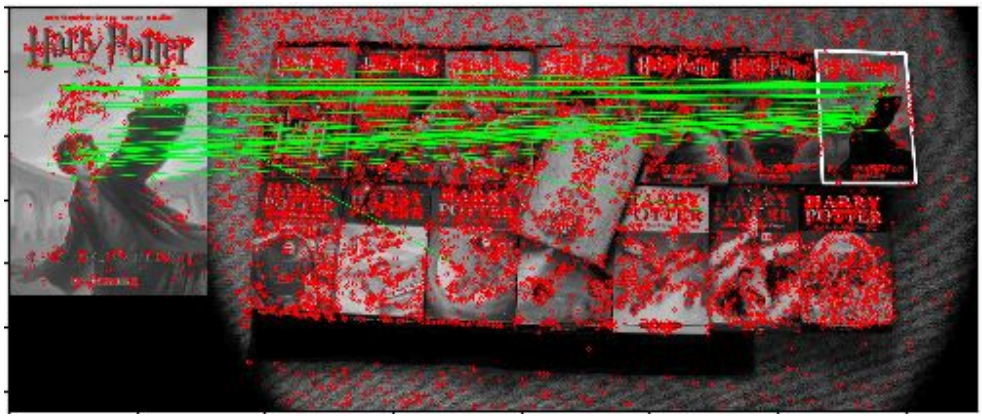
Part B:

Accuracy : 81.525%



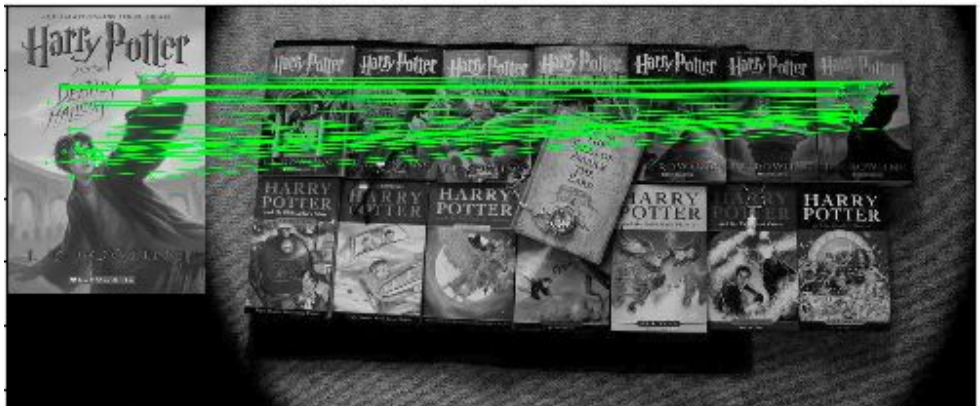
Q3.

Using test Image 1:



Predicted Region:

SIFT Feature Matching:



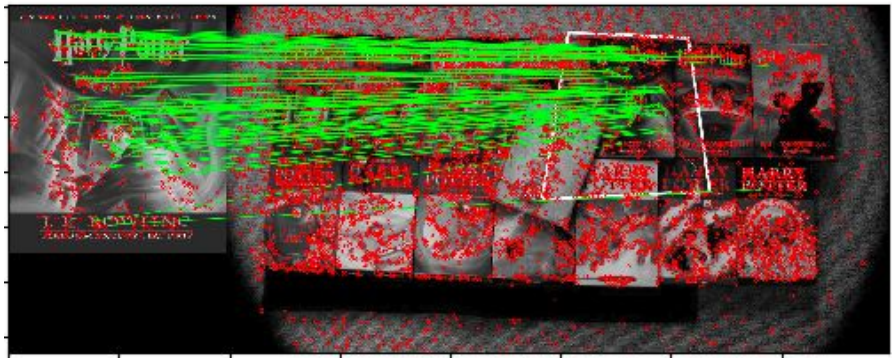
Homography Matrix:

[[5.30447233e-01 -9.24923672e-02 9.50469461e+02]

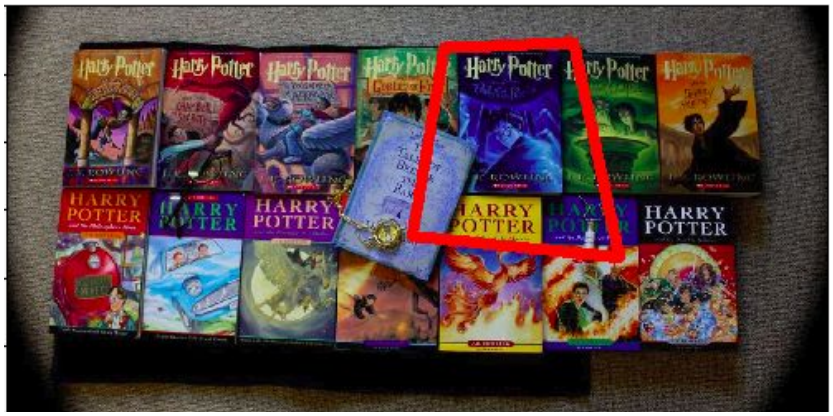
 [2.09271701e-02 4.27665320e-01 6.89778304e+01]

 [7.47970824e-05 -1.19256754e-04 1.00000000e+00]]

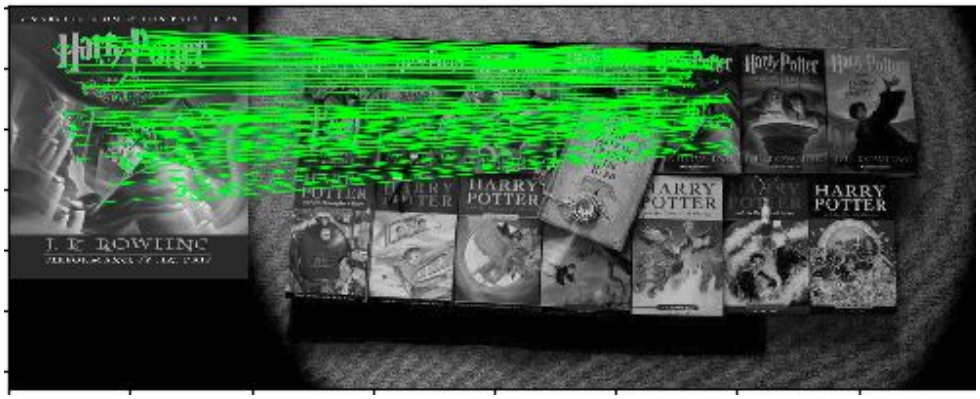
Using test image 2:



Predicted Region:



SIFT feature matching:



Homography Matrix:

[[7.10651213e-01 -4.79109555e-01 6.20072391e+02]

 [3.73519618e-02 4.43151353e-01 5.05552039e+01]

 [1.88485219e-04 -6.51421330e-04 1.00000000e+00]]

Reference: FOR SIFT:
https://opencv-python-tutroals.readthedocs.io/en/latest/py_tutorials/py_feature2d/py_feature_homography/py_feature_homography.html

For DLT: https://github.com/tvogels/MathematicaComputerVision

Github Library with whole code:
https://github.com/pulkit15158/SIFT-Matching/blob/master/A2.py

Q4.

Used SIFT to find the keypoint matches between the images. Using these keypoint matches, the homography was calculated. And the images were added together using this homography matrix through which both the images were stitched together to the first one by converting it to the first.

Output Image

Reference:
https://www.pyimagesearch.com/2018/12/17/image-stitching-with-opencv-and-python/