Optical Character Recognition Report

Enrollment:

- Feature detection was done using SIFT(Scale-invariant Feature Transform)
- To improve SIFT feature detection ,the characters were padded with white space and resized.
- Then using SIFT descriptors were calculated for each candidate character,which then was stored to a json array for future use named features.json

Detection:

- For the detection,first the test image is converted to binary image which has only 0s and 1s.
- Then function get_connected_components() is called which returns the connected components of the test data
- To get connected components,Breadth First Search was done on binary image to get individual bbox separately.
- Bbox contains X start, Y start and width and height of the test image characters to be detected.

Recognition:

- For recognition,the features stored in enrollment are used.
- SIFT didn't give good results without converting all the characters of test image to black.
- Therefore using the labeled image(image created while finding connected components),a new test image containing black pixels for test characters was created.
- Using the connected components labeling different characters from test data were cropped out to do recognition.
- Now SIFT was done on the cropped image after padding and resizing appropriately
- To calculate the threshold for known characters,sum of square difference was performed on all characters and the threshold was calculated for each character individually.

- Now to recognise each character,sum of square difference was performed on descriptor of each character and the descriptor of known character.If it was below 8 * threshold of known character.Then that descriptor is considered to be feature and the count is calculated.
- If the count is greater than 2 then that unknown character is labeled using the known character.`
- Then bounding box coordinates along with the label is stored into a dictionary
- This dictionary is then appended to a result array which is stored as Result.json
- The F1 score obtained for given dataset is approximately 0.84 and testcase_000000 is 0.42 and testcase_000001 is 0.7.