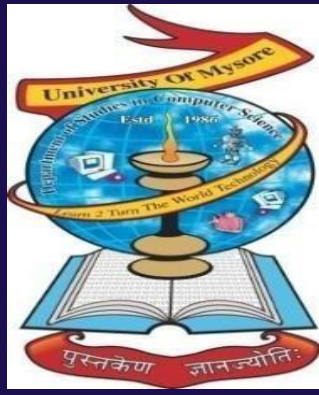# COMPARATIVE ANALYSIS ON MACHINE LEARNING APPROACHES FOR SIGNATURE DETECTION FROM DOCUMENTS.

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Problem Statement

➢ The task of detecting and extracting signatures in the real-time documents poses several challenges. These types of document images have usually very low resolution, which makes them difficult to enhance.

➢ A handwritten signature is a distinct part of printed documents. Signature detection from the document images and retrieving documents using the signature as a query is a challenging task in the area of image processing. Therefore, treating these images in such a way that only handwritten signatures can be extracted for analysis of their characteristics. In order to solve this problem, we present different traditional approaches for signature detection.

Introduction

➢ Signatures are utilized as a means of identity verifier for authentication, attestation, and authorization in different legal transactions.

➢ The background of each document is different and usually not known beforehand. documents are subject to restricted processing time due to the urgency of applications.

➢ Most importantly, the documents often contain auxiliary lines and other handwritten characters that resemble or overlap with signatures.

➢ Therefore in this project, the methodologies we used for detecting and extracting the signatures are the Connected components method, Signature Extraction using Contour Height and Contour width Heuristic, SIFT feature matching, and Template matching.
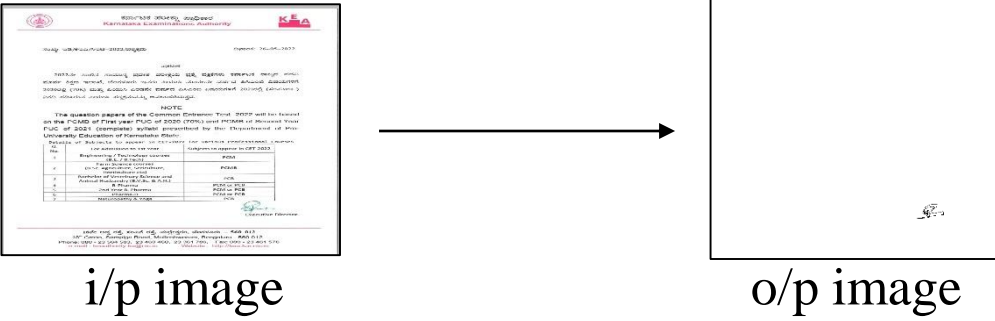
Methodologies

Our proposed model involves 5 methodologies:

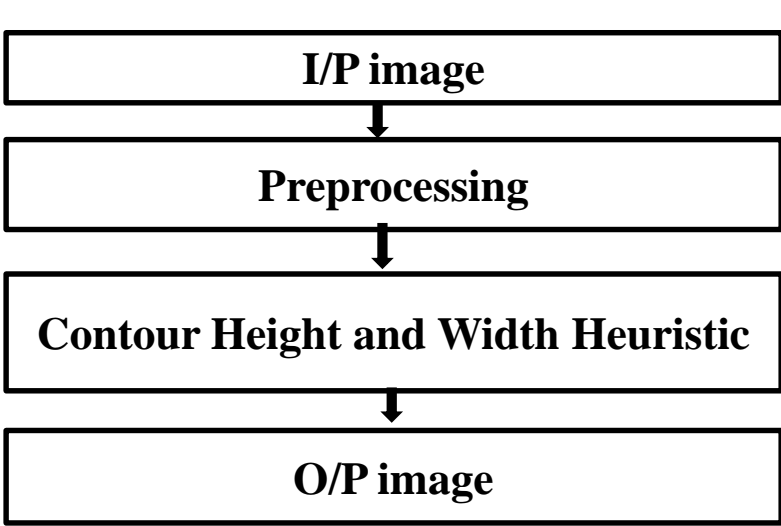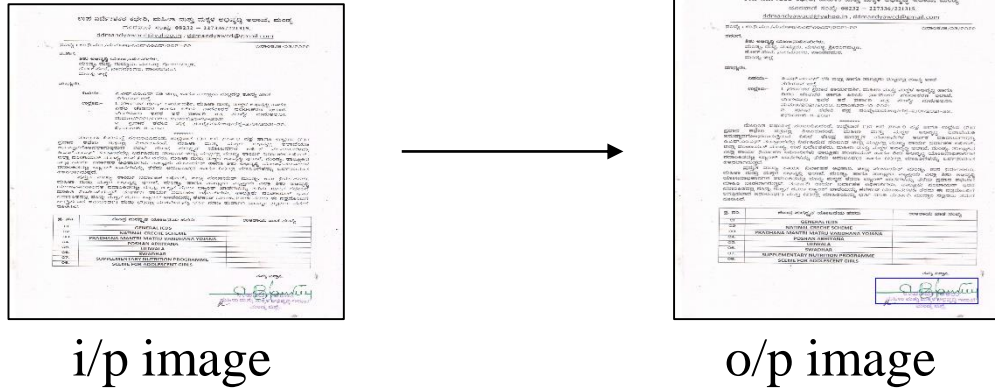**[1] Connected component method:**
i. Workflow:

ii. Result:

i/p image → o/p image
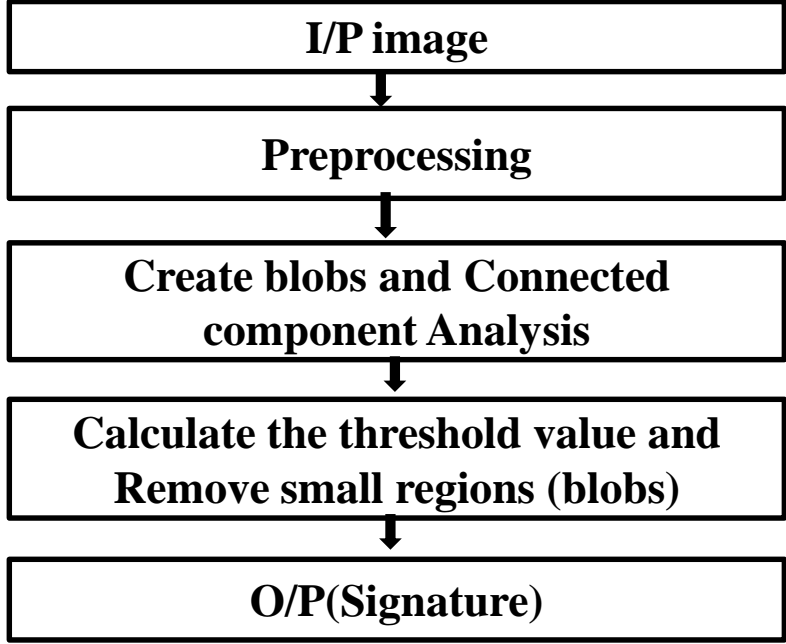
iii. Accuracy: **92%**

[2] Signature extraction using Contour Height and Contour Width Heuristic method:
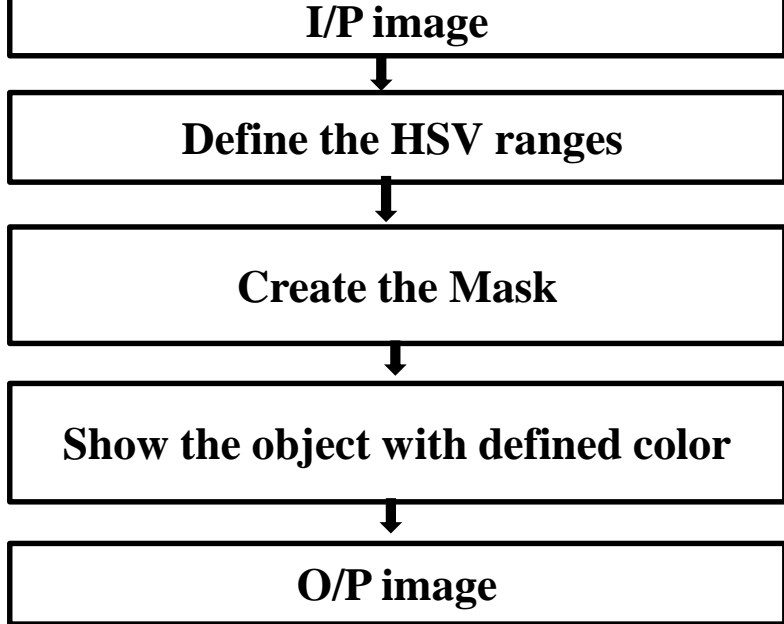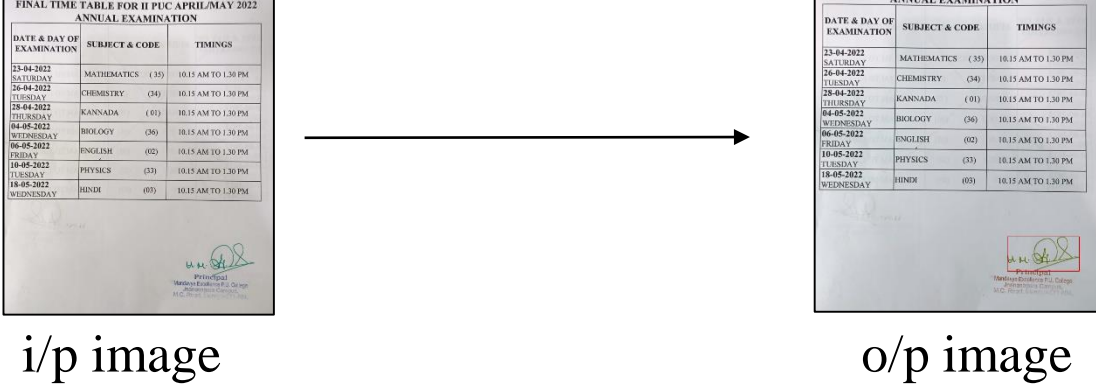*i. Workflow:*

ii. Result:

i/p image → o/p image

iii. Accuracy: 86%

[3] Detecting signatures through HSV color space:
i. Workflow:

ii. Result:

i/p image → o/p image

iii. Accuracy: 76%

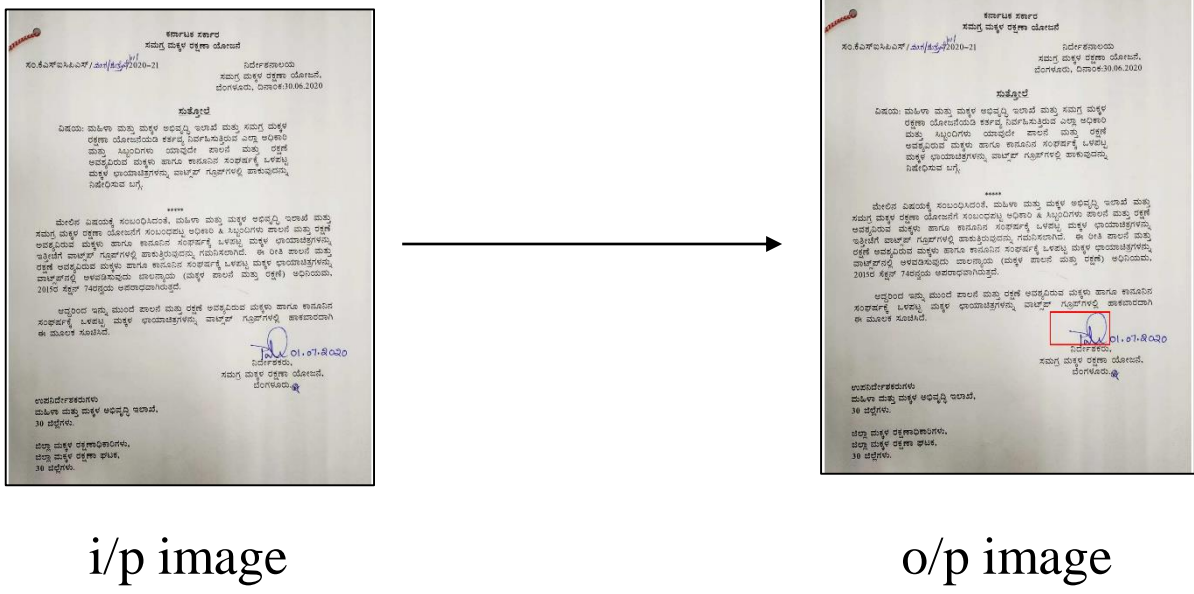**[4] SIFT Feature Matching:**
i. Workflow:

ii. Result:

i/p image → o/p image
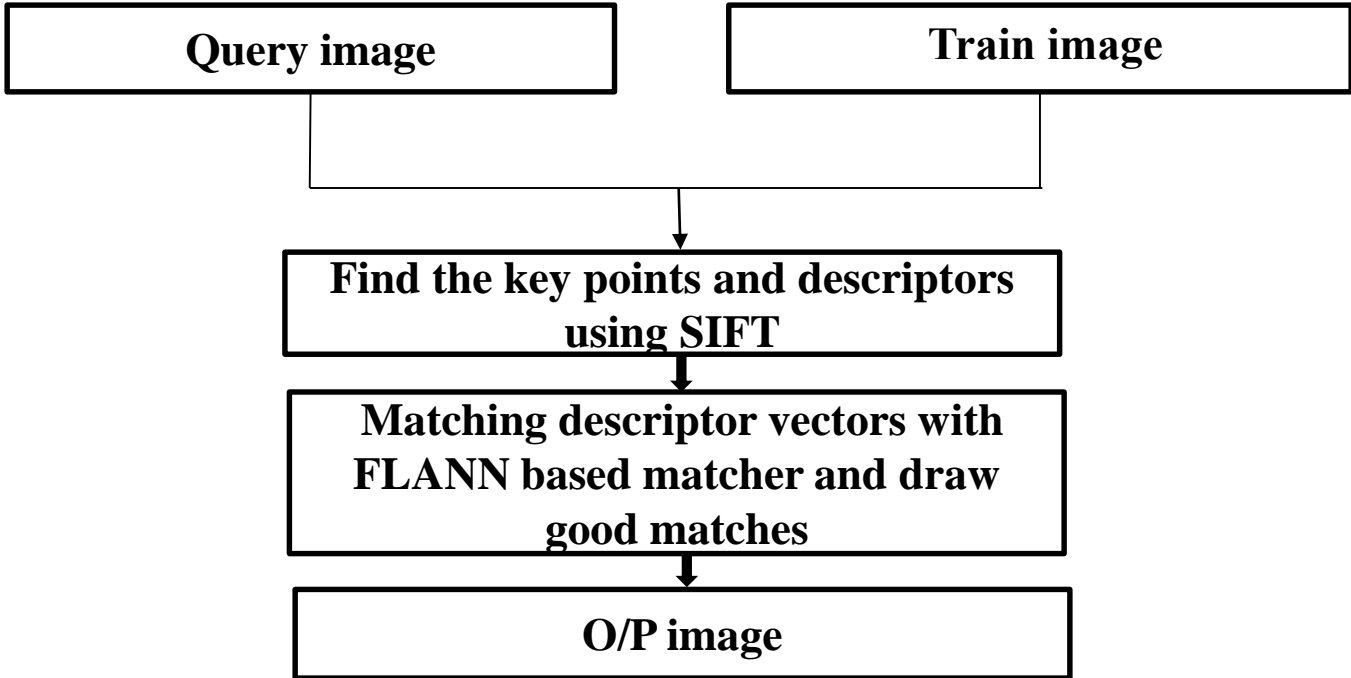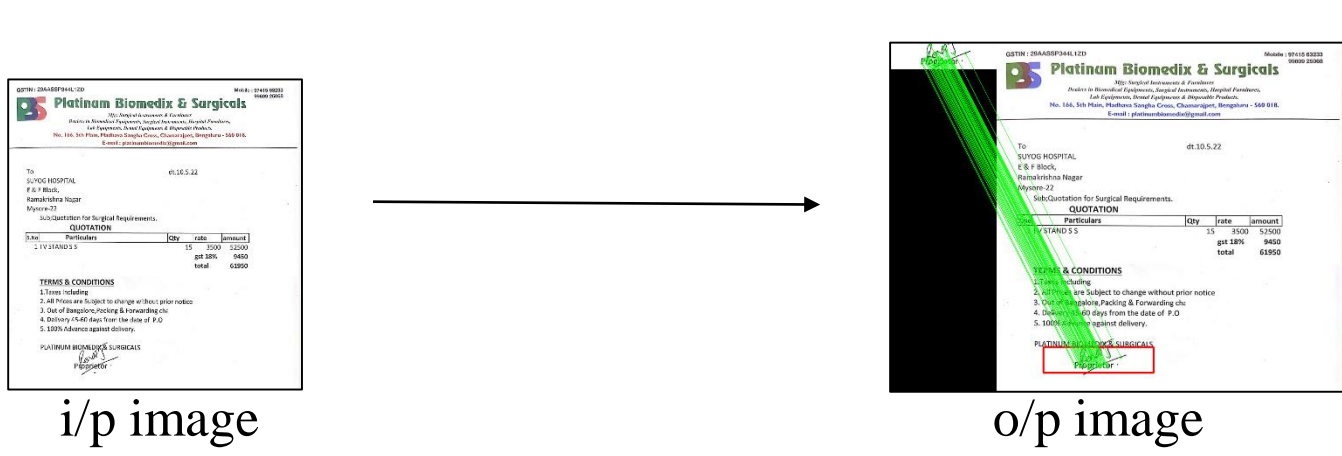
iii. Accuracy: 86%

[5] Template matching:
i. Workflow:

ii. Result:

i/p image → o/p image
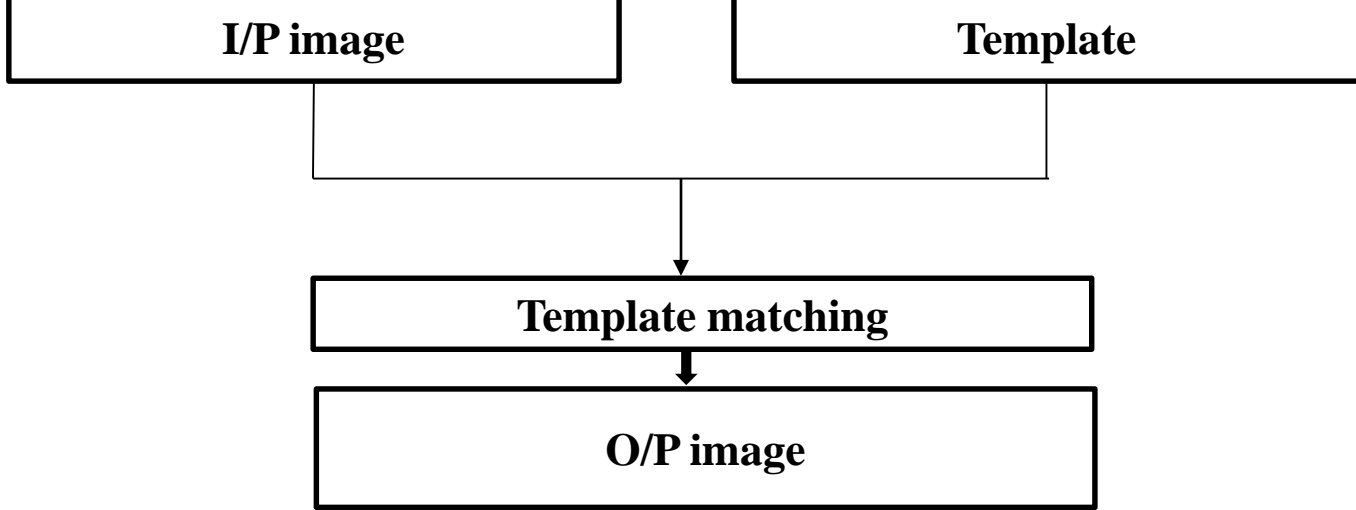
iii. Accuracy: 96%

Conclusions

➢ In this project, for detecting the signature from the documents, a comparative analysis was performed between the Connected component, Signature Extraction using Contour Height & Contour width Heuristic, and Detecting signatures through HSV Color Space methods.

➢ It is observed that the Connected component method gives more significant results with 92% of accuracy for the number given set of real-time documents. Hence this method may be adapted for signature extraction from the documents.

➢ To extract and locate the signature in a document we applied SIFT feature matching and Template matching methodologies. With the highest accuracy of more than 96%, it is evident that Template matching is more efficient to locate and detect the signature in a document.

➢ A refined method of detecting and extracting signatures was discussed which can further increase in accuracy of detecting and extraction.

Future Directions

➢ Although our results are encouraging, in the future we are working to improve upon previous work.

➢ Analyzing the recent work, we noticed to concentrate on obtaining better features to increase the accuracy.

➢ Augmenting the datasets: Related to the problem of having low number of samples, we focused in generating more signature documents, in order to increase the number of samples available for training.

Acknowledgements