

**School of Engineering and Applied Science (SEAS),
Ahmedabad University**

ECE501: Digital Image Processing

Group Name: Humans.exe

Project 2: Person Retrieval

Team Members:

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I. Introduction

- **Goal:** Person Retrieval - finding all images of the same person in a given photo database.
- **Common Method:** Normally done with Machine Learning / Deep Learning.
- **Our Approach:** Use only Classical Digital Image Processing (DIP) Techniques.
- **Our Database:** 20 photos → 4 persons x 5 photos each.

II. Objectives

The Person Retrieval project is aimed at creating a system that recognizes and recovers all the images of the same person in an image database through only classical Digital Image Processing (DIP) methods without involving machine learning or deep learning. The project seeks to adopt the technique of histogram-based similarity, Local Binary Pattern (LBP), Discrete Cosine Transform (DCT) and Principal Component Analysis (PCA) as feature extraction and matching techniques. The idea is to show that the conventional image processing functions can both be effective in the way they execute person retrieval tasks and are simple, interpretable, and computationally efficient.

III. What has been done so far (Progress)

To date, the project team has researched several classical Digital Image Processing techniques for person retrieval and has done a comprehensive literature review of traditional face recognition techniques. Some of the methods that the team analyzed include the similarity based on histogram, edge-detecting, and use of Local Binary Pattern (LBP), as well as Discrete Cosine Transform (DCT) and Principal Component Analysis (PCA) to extract features.

A small database of 20 images of four people has been made manually, keeping a difference in the lighting and facial expressions. Other preprocessing methods that have been applied by the team are a strategy of converting to grayscale, scaling, and equalization of histograms. The initial trial with Euclidean distance and cosine similarity has been conducted to bring similar faces which can be the basis of further optimization and advancement.

IV. What is planned for next week

- Include face detection prior to the extraction of the features so as to target only the facial area and eliminate background noise.
- Use combinations of many feature descriptors (LBP, DCT, PCA) with weighted feature fusion to achieve better accuracy.
- Use cosine similarity or correlation measures in order to enhance matching accuracy.
- Add more subjects and pictures in the database to enhance reliability and model accuracy.

References

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