

# Person Identification System using Machine Learning

## Introduction

Human beings perform face recognition automatically every day and practically with no effort. Although it sounds like a very simple task for us, it has proven to be a complex task for a computer, as it has many variables that can impair the accuracy of the methods, for example: illumination variation, low resolution, occlusion, etc. Face recognition technology can be used in wide range of applications such as identity authentication, access control, and surveillance. Interests and research activities in face recognition have increased significantly over the past few years. A face recognition system should be able to deal with various changes in face images. However, the variations between the images of the same face due to illumination and viewing direction are almost always larger than image variations due to change in face identity [1].

## Motivation

The main motivation behind pursuing this project are as follows:

- The proposed system can be effectively used in simplifying the process of Attendance by eliminating the need of any biometric devices like fingerprint or retina scanner with just a digital camera. This will reduce the costs considerably and simplify the process of attendance.
- This system can also be used for tracking a suspect/criminal or for surveillance of dangerous individuals and can help to improve security.
- It has wide range applications in security including security of our personal electronic devices like smartphones, laptops, PCs, etc.

## Dataset

For this project we use the Database of Faces, (formerly 'The ORL Database of Faces'), which contains a set of face images taken between April 1992 and April 1999. The database was used in the context of a face recognition project carried out in collaboration with the Speech, Vision and Robotics Group of the Cambridge University Engineering Department [1]. There are ten different images of each of 40 distinct subjects. For some subjects, the images were taken at different times, varying the lighting, facial expressions (open / closed eyes, smiling / not smiling) and facial details (glasses / no glasses). All the images were taken against a dark homogeneous background with the subjects in an upright, frontal position (with tolerance for some side movement) [2]. The final testing will be done on a much larger database which will be composed of many smaller databases from other universities and one database of our own and will contain more than 1000 images.

## Work Plan:

The process of face identification will basically consist of these four steps:

- The initial step is to extract face region from a still image by applying Haar Cascade which uses Viola Jones Face detection algorithm.

- Then implement the Face detection Haar cascade to a live video feed from a webcam.
- Extract the face region from the video feed
- Apply various face identification algorithm like Support Vector Machines (SVM), Neural networks, etc [2].
- Compare the accuracy obtained from various face identification algorithm and implement some modifications to previous known algorithms.

## **Abstract:**

In computer science, face recognition is basically the task of recognizing a person based on its facial image. It has become very popular in the last two decades, mainly because of the new methods developed and the high quality of the current videos/cameras. The proposed system is meant to devise an economical as well as efficient way to identify a person from their face by the use of various machine learning algorithms like SVM and neural networks and find the best suited algorithm for this task [1].

## **Tool/Resource:**

Language Used: Python

Libraries Used: OpenCV, matplotlib, sklearn

Hardware Used: Webcam or Digital Camera

## **References:**

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- [3] Viola, Paul, and Michael Jones. "Rapid object detection using a boosted cascade of simple features." Computer Vision and Pattern Recognition, 2001. CVPR 2001. Proceedings of the 2001 IEEE Computer Society Conference on. Vol. 1. IEEE, 2001.