

Synopsis

A LEARNING ALGORITHM FOR OPTIMAL FACE RECOGNITION IN DYNAMIC ENVIRONMENTS

By

Roll No	Names of Students
1MV07CS029	Guru Prasad M
1MV07CS048	Kunal Ghosh
1MV07CS043	Kiran Tej J L
1MV07CS025	Dharini S

UNDER THE GUIDANCE OF
G Thippeswamy

Sir M Visvesvaraya Institute of Technology
KRISHNADEVERAYA NAGAR, HUNASAMRANHALLI, NH-7, VIA-
YELAHANKA, BANGALORE-562157, KARNATAKA, INDIA

(1) Introduction

A general statement of the Face Recognition problem (in computer vision) can be formulated as follows: Given a Still Image or a Video sequence, identify one or more persons' face(s) in the scene using a stored database of faces.

In contemporary applications, Face Recognition systems are becoming increasingly popular and have become integral part of most modern Biometric Systems. Face Recognition has numerous applications including visual surveillance and security, personal authentication etc. Face Recognition systems can be designed to be non intrusive thus making them ideal for military surveillance and public surveillance requirements in crowded areas. In many legacy document archives (e.g. Police Records, Real Estate Documents), Images of people's faces is available and thus using Face Recognition to search through such large databases is a natural choice. Even with so many applications and advancements in the Face Recognition domain, many challenges remain unsolved.

(2) Motivation

Research on face detection, subsequently followed by recognition, must confront with many challenging problems, especially when dealing with outdoor illumination, pose variation with large rotation angles, low image quality, low resolution, occlusion, and background changes in complex real-life scenes. The design of face recognition algorithms that are effective over a wide range of viewpoints, complex outdoor lighting, occlusions, facial expressions, and aging of subjects, is still a major area of research. Several models have been found in the literature ranging from appearance based approaches to sophisticated systems based on thermal information, high resolution images or 3D models. A comprehensive survey of face recognition algorithms is given by Eigen- faces and Fisher-faces are the widely used and successful appearance based models for face recognition. Different algorithms tackle the above said problems with varying accuracy. Face recognition is usually performed in a dynamic scenario. The challenges vary in this scenario

(3) Algorithm

To overcome the above said drawbacks, we propose a hybrid model for face recognition. The challenges are triggered by various dynamic parameters.

(4) Software Requirements

- **Python** : Implementation Language of Choice , because of its Rapid Prototyping Capabilities. Python also has very good Image Processing and Distributed / Parallel Computing libraries.
- **OpenCV** : The Computer Vision Library being used.
- **LaTeX** : For Documentation Needs. Latex is a very effective document processor , which produced well formatted documents.
- **GIT** : This is a Revision Control Software for the collaborative Development of the Project.
- **Linux** : The Host Operating System on which the development and deployment will be done.

(5) Hardware Requirements

- **RAM (Primary Memory)** : A minimum of 4GB (most of the algorithms are very memory intensive and store a whole bunch of images on RAM for faster processing)
- **Hard drive (Secondary Memory)** : A minimum of 80 GigaBytes (may be more if a lot of images are there in the database)
- **Processor** : 2.2 GHz 4 Core Processor
- **Cluster of 4(arbitrary) computers(Optional)** : The idea is to speed up the computations by distributing the calculations over a cluster of computers.

(6) Conclusion

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