PES UNIVERSITY		**Document Ref.:**	
		Version No.:	1.0
		Date:	**22/03/19**
		Copy No.:	
Project Name:	Automated Attendance Management		
Project Code:	PW19DS203		
Status:	**Draft** / ~~Current~~ / ~~Superceded~~		
Document Type:	~~Controlled~~ / **Uncontrolled**		

Automated Attendance Management

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Definitions, Acronyms and Abbreviations

LBPH - Local Binary Pattern Histogram

References

1. https://ieeexplore.ieee.org/document/7947889

2. Review Paper on Face Recognition Techniques Sujata G. Bhele1 and V. H. Mankar

3. https://medium.com/search?q=face%20recognition

Change History

This section describes the details of changes that have resulted in the current low-level Design document.

#	Date	Document Version No.	Change Description	Reason for Change

1. Introduction

1.1. Overview

This application design document describes the architecture and system design of

Attendance management system using face recognition, a facial recognition based system for the attendance management. It is intended to outline the system structure and

provide technical guidance to the development team.

1.2. Purpose

Purpose of the project is to make automation of attendance system . Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognising face fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions.

1.3. Scope

Face recognition is an important application of Image processing owing to its use in many fields. Identification of individuals in an organisation for the purpose of attendance is one such application of face recognition. Maintenance and monitoring of attendance records plays a vital role in the analysis of performance of any organisation. The purpose of developing attendance management system is to computerise the traditional way of taking attendance. Automated Attendance Management System performs the daily activities of attendance marking and analysis with reduced human intervention. The prevalent techniques and methodologies for detecting and recognising face fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions. The proposed system aims to overcome the pitfalls of the existing systems and provides features such as detection of faces, extraction of the features, detection of extracted features, and analysis of students' attendance. The system integrates techniques such as image contrasts, integral images, colour features and cascading classifier for feature detection. The system provides an increased accuracy due to use of a large number of features of the face. Faces are recognised using Euclidean distance and k-nearest neighbour algorithms. Better accuracy is attained in results as the system takes into account the changes that occur in the face over the period of time and employs suitable learning algorithms.

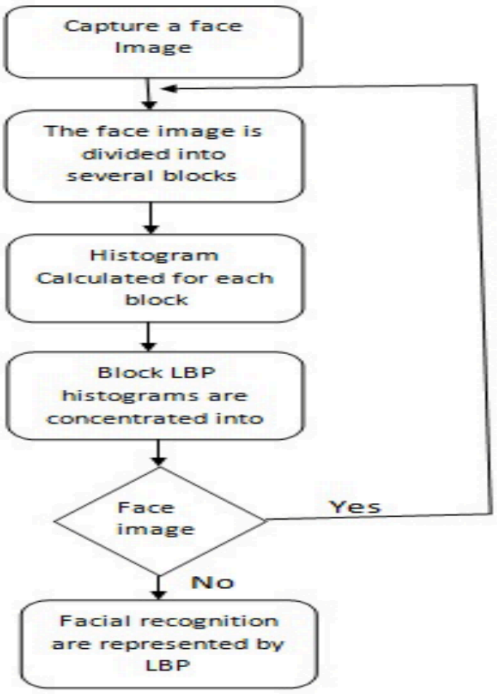
2. Design Constraints, Assumptions and Dependencies

This section of the document shall provide a general description of any other item that will limit the developer's option for designing the system. These can include the following:

- Zero power shut-down tolerance
- System capable of handling 5 requests
- Preferable to Linux os
- Clean visuals for the Camera
- Operations and updates should be atomic
- User access only after credential check
- Privileged access to lecturers to schedule special class/cancel class
- Student restricted only to view and submit request upon wrong marking

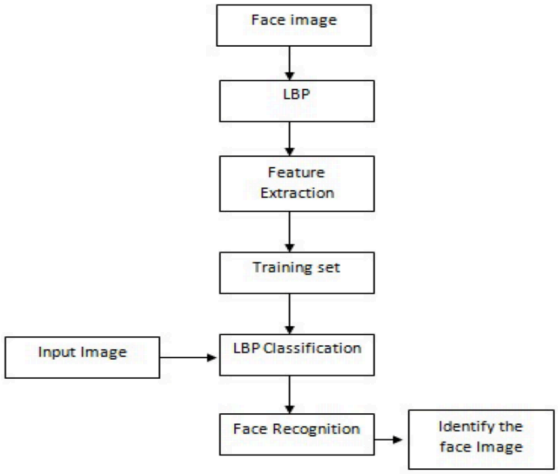
.

3. Design Description

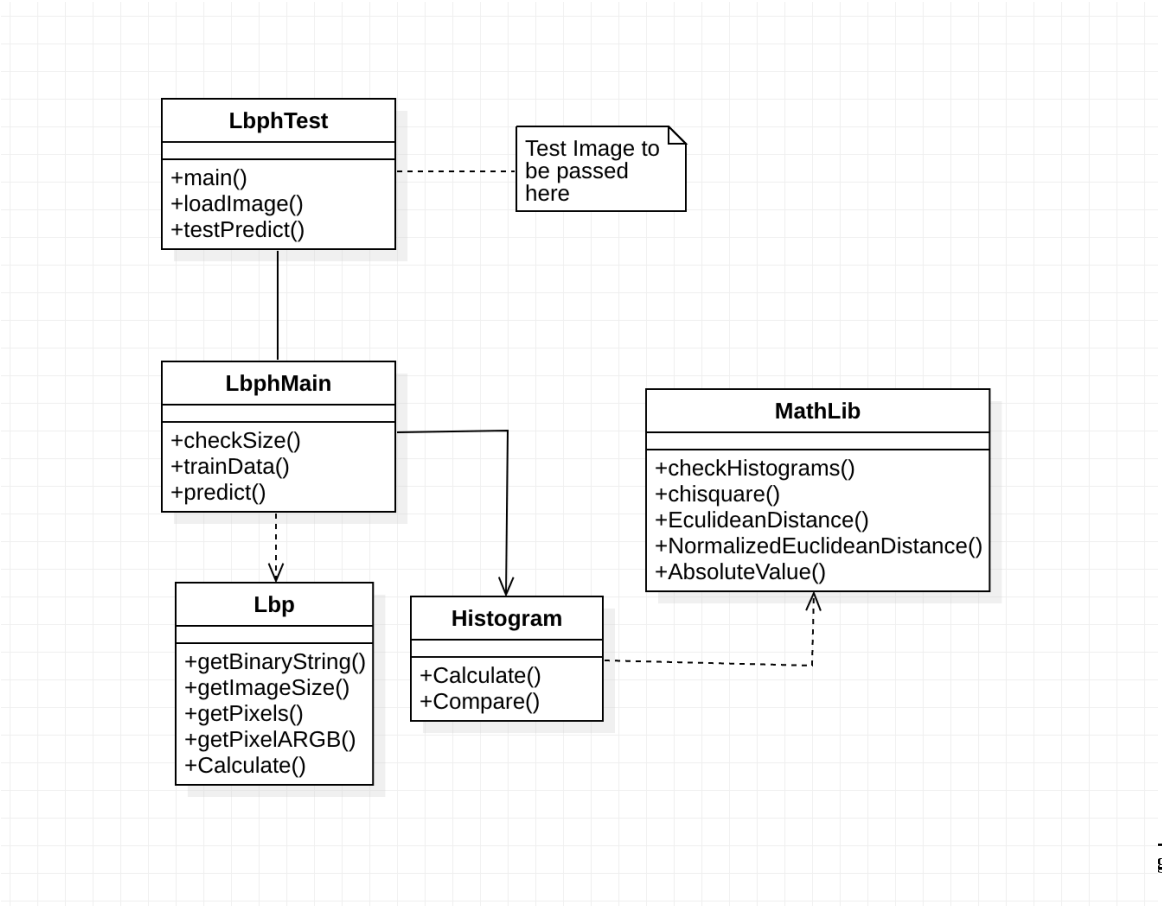


The above flow design chart depicts how the face is detected using LBPH.

The LBPH algorithm can further be extended to recognise faces but with less accuracy. The below design chart gives a pictorial representation of the same:



4. Class Diagram



4.1. <LBPH>

4.1.1. LbphTest

4.1.1.1. Class Description 1

Base class to test and train images

4.1.1.1.1. LoadImage

The following details shall be defined for the methods:

- Load image from the FilePath
- File name
- BufferedImage
- String Filename
- IOExceptions

4.1.1.1.2. TestPredict

- Input Training Images
- TrainData
- Stdout TrainedSuccessfully if no Exceptions

4.1.2. LBHP

4.1.2.1. Class Description 2

4.1.2.1.1. CheckSize

- Get the size of the image
- Check for null images in the List

4.1.2.1.2. TrainData

- Get Pixels from the the image to a 2d array from rob values
- Form the Histogram
- Add histogram to the list of histograms

4.1.2.1.3. Predict

- Get Trained image Histogrrams and compare them
- Output Image which is very near to the trained Image

4.1.3. MathLib

4.1.3.1. Class Description 3

4.1.3.1.1. CheckHistograms

- CheckHistogram for not null size
- Return 1 or 0

4.1.3.1.2. Chi-square , Euclidean , Normalised , Absolute

- **To check difference of the histograms**