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| Face Recognition System |
| Synopsis |
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Table of Contents

[Introduction & OBJECTIve 3](#_Toc344539141)

[INTRODUCTION 3](#_Toc344539142)

[Objective 3](#_Toc344539143)

[PROJECT CATEGORY 3](#_Toc344539144)

[Hardware and Software Specification 3](#_Toc344539145)

[Hardware Requirement 4](#_Toc344539146)

[Software Requirement 4](#_Toc344539147)

[REQUIREMENTS AND ANALYSIS 4](#_Toc344539148)

[Problem Definition 4](#_Toc344539149)

[Existing System 4](#_Toc344539150)

[Documents maintained 6](#_Toc344539151)

[Work To Be Done 7](#_Toc344539152)

[Requirements Specification 7](#_Toc344539153)

[Functional Requirements 7](#_Toc344539154)

[technical specification 10](#_Toc344539155)

[Planning and Scheduling 10](#_Toc344539156)

[Gantt chart 10](#_Toc344539157)

[Tracking Gantt 11](#_Toc344539158)

[Pert chart (Network Diagram) 12](#_Toc344539159)

[Scope of the Solution 12](#_Toc344539160)

[Analysis 13](#_Toc344539161)

[Context Diagram 13](#_Toc344539162)

[Data Flow Diagram 13](#_Toc344539163)

[Level 0 DFD 13](#_Toc344539164)

[Level 1 DFD 14](#_Toc344539165)

[Level 2 DFD 16](#_Toc344539166)

[E-R Diagram 16](#_Toc344539167)

[Class Diagram 20](#_Toc344539168)

[Database & Table Details 20](#_Toc344539169)

[COMPLETE DATA STRUCTURE 22](#_Toc344539170)

[Module Description 22](#_Toc344539171)

[Face Recognigation Server 22](#_Toc344539172)

[Face Recognigation Client 23](#_Toc344539173)

[Face Recognigation Database 23](#_Toc344539174)

[estimation 23](#_Toc344539175)

[Data Structure 24](#_Toc344539176)

[Implementation Methodology 27](#_Toc344539177)

[List of Reports 27](#_Toc344539178)

[sECURITY MECHANISM 27](#_Toc344539179)

[FUTURE SCOPE AND FURTHER REQUIREMENTS 28](#_Toc344539180)

[bIBLIOGRAPHY 28](#_Toc344539181)

# Introduction& OBJECTIVE

## Introduction

Face recognition and detection is a reliable technique to authenticate a user’s identification. That’s why The face recognition has become a popular area of software in computer vision and as well as research one of the most successful applications of image analysis and understanding.

So facial recognition system and detection is a [computer application](https://en.wikipedia.org/wiki/Application_software) for automatically  [identifying](https://en.wikipedia.org/wiki/Identification_of_human_individuals) or [verifying](https://en.wikipedia.org/wiki/Authentication) a [person](https://en.wikipedia.org/wiki/Person) from a [digital image](https://en.wikipedia.org/wiki/Digital_image) or a [video frame](https://en.wikipedia.org/wiki/Film_frame) from a [video](https://en.wikipedia.org/wiki/Video) source any source. One of the ways to do this is by comparing selected [facial features](https://en.wikipedia.org/wiki/Face) from the image and a facial [database](https://en.wikipedia.org/wiki/Database_management_system).

Face recognition and detection typically used in security system and can be compared to other biometrics such as face or eye iris recognition systems.

Admin has to register their face images from different angel and images will be stored in database.

So the administrator can gather statistics about the kind of people at the venue at any given moment. The Facial Recognition system can even calculate the number of seconds each person spends in front of the camera and determine for how long the person was looking to the camera directly during this period. By using this mechanism the property owner can discover what is the age and gender distribution on a specific moment of the day as well as if the latest changes in decoration or advertising are increasing the attention spans of the visitors. All the information gathered via different cameras is integrated into one single server to create statistics defined specifically to fit the necessities of every authorized user of the platform.

Face recognition is one of the most relevant applications of image analysis. It’s a true challenge to build an automated system which equals human ability to recognize faces. Although humans are quite good identifying known faces, we are not very skilled when we must deal with a large amount of unknown faces. The computers, with an almost limitless memory and computational speed, should overcome human limitations.

## Objective

Face Recognition is versatile and complete end-to-end Face Recognition software. There are following feature in face recognition:

* Recognition from outdoor facial images.
* Recognition from non-frontal facial images.
* Greater understanding of the effects of demographic factors on performance.
* Development of better statistical methods for understanding performance.
* Develop improved models for predicting identification performance on very large galleries.
* Effect of algorithm and system training on covariate performance.
* Integration of morphable models into face recognition performance.
* Preprocesses the captured images (removes background, scales size, and so on)

# PROJECT CATEGORY

This software will follow Object Oriented Programming Paradigm and use below mentioned areas:

OOP Language: Matlab, Java, C#.

RDBMS: MySQL 5.5.15

Networking: TCP/IP

Applications: Expert Systems

 Images : A set of training images in 'gif' format.

# Hardware and Software Specification

## Hardware Requirement

* **Disc capacity :** 10 MB of available hard disk space
* **RAM :** 1 GB (32 Bit) or 2 GB (64 Bit)
* **Processor :** 1.6GHz or faster
* DVD-ROM Drive / USB **Port**

## Software Requirement

* Windows XP (x86) with Service Pack 3 / Windows Vista (x86 & x64) with

Service Pack 2 / Windows 7 (x86 & x64)

# REQUIREMENTS AND ANALYSIS

## Problem Definition

### Existing System

The existing system is traditional paper books and ledger system where several records are stored and to track other details about the human.

### Documents maintained

* **Admission Register**: Name, Address with Contact Number, Initial amount for registration, Form Submission Date.

### Work To Be Done

We will incorporate the above mentioned workflow of a Face Recognition System in an automatic computerized way.

## Requirements Specification

### Functional Requirements

After getting valuable information we reached to the following important conclusions: -

* It should meet the functional requirements as mentioned in Objectives.
* It should be able to handle 'gif' and 'jpeg' images.

### NON- Functional Requirements

This project is intended to meet the following non functional requirements: -

* This face recognition software should be available on the Internet, to enable the users to use , download it any time.
* The program should be platform independent.

#### Changing Password and Username

**Introduction**

Change existing username and password

**Input**

New username and password

**Processing**

Old username and password will be replaced by user provided new username and password after authenticating.

**Output**

Password and Username can be changed according to the Employee requirement whenever they want to change for better security of the System.

### Technical specification

**Front End/ GUI Tools:** Windows Presentation Framework (WPF)

**IDE:**Matlab

**Framework:** Microsoft .NET 4.0

**Database:** MySQL

**Database Tool:** MySQL workbench CE

**Operating Systems**: Windows XP, Windows 7

**Cloud Technology**: Google Drive, Google forms

## Planning and Scheduling

### Gantt chart

### Tracking Gantt

### Pert chart (Network Diagram)

# Scope of the Solution

Currently this software is aimed for a human Face Recognition. It can be extended to support images and have a centralized database and to serve wider range of humans of different branches of same face around the images.

We have developed this for Desktop Computers running on Windows Operating System. It can be enhanced to support UNIX / Linux, MAC OSX Operating systems.

Our software will not be integrated with Mobile Application right now. But in future we can easily extend to support that.

# Analysis

## Context Diagram

## Data Flow Diagram

### Level 0 DFD

### Level 1 DFD

### Level 2 DFD

## E-R Diagram

## Class Diagram

# Database & Table Details

The database used for this software is called **frsdb**. A screenshot from the MySQl workbench is given below. It shows the tables and its columns. The first row is the primary key.

# COMPLETE DATA STRUCTURE

## Module Description

Face Recognition System is divided three main modules such as:

1. Face Recognition Server
2. Face Recognition Client
3. Face Recognition Database

### Face recognition Server

Face Recognition server is a singleton server designed provide services for Face Recognition system. It controls various activities required for the Face Recognition system. To manage these activities it has several sub modules such as:

1. Admission Management
2. Student Management
3. Faculty Management
4. Course Management
5. Attendance & Leave Management
6. Library Management
7. Accounts Management
8. Administration Management

### face recognition Client

Face Recognition System will provide two different clients for the convenience of the user. Desktop client is for doing bulk activities and faster tasks. Web client will allow instant access from anywhere and anytime.

### face recognition Database

Face Recognition System will have a unified database for storing all the information. It can be a networked database or a database situated in the server machine.

## Estimation

## Data Structure

## Implementation Methodology

* Object Oriented Programming methodology will be adopted and Java will be used as programming language.
* Apache tomcat web server will be used to implement the server
* User interface development will be done in MVC architecture using SWT (Standard Widget Toolkit).
* Relational FRSS MySQL will be used to implement & execute SQL query to database.
* Agile Software Development model will be used while developing this software.

# SECURITY MECHANISM

* Face Recognition software is password protected software. It will be developed such a way that the admin will have complete control data.
* Admin create  account can register new faces in to database.
* The data of the face will be stored in the database with an encrypted format so even if someone hacks the database somehow still he can make no real harm.
* The software will provide a backup and restore feature in case of loss of data.

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