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| Face Recognition System |
| Synopsis |
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# Introduction& OBJECTIVE

## Introduction

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 humans limitations.

## Objective

Face Recognition is versatile and complete end-to-end Face Recognition software . Face Recognition ministrative efficiency of educational institutions. It is an interactive platform for all entities viz. Students, Teachers, Management, Parents. It is a simple yet powerful one point integrated platform that connects all the departments of an institution namely office, fee counter, library, hostel, stores, academics, activity center and so on.

# PROJECT CATEGORY

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

OOP Language: Matlab

RDBMS: MySQL 5.5.15

Networking: TCP/IP

Applications: Expert Systems

# 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

### 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

**Introduction**

Face recognition is an example of advanced recognition. The process is influenced by several features such as shape, reflectance, pose, occlusion and illumination which make it difficult. A human face is an extremely complex object with features that vary over time, especially the skin which cover human face which determines the important features of the face. It should be quite clear that human face is more difficult to model, and recognize than most industrial parts, but integration of features in recognition of faces has a beneficial effect on robust classification .

Human faces are very interesting as objects of picture analysis for several reasons :

They are not artificial and not simple as the geometrical shapes such as cubes, or pyramids which have been used in the visual sense analysis of hand-eye projects.  A face has many component substructures such as: eyes, nose, mouth, chin, and so on, which are proper for "context of the face ". These components as distributed with a certain permissible range, whose cultural relations can be correctly grasped by the concepts of picture structure.

Lines in the face are very difficult to define, difficult to extract and are not always straight.

The variety of human face images as large as the human family.

The purpose of this research is to have a good probability to create a special cluster to the different face images of each of the given persons and this cluster determines the common features of his real face.

**Input** Relevant student and employee data like name, address, contact no., applying for which class.

**Processing**

User will enter data in Face Recognition and create a new Student enrolment no, as well as a new code number for Employee.

**Output**

Face Recognition will generate humans face .Details can be viewed later on whenever required.

#### View and Enter new timetable information

**Introduction**

User can view the time table and can also update the timetable information.

**Input**

User number, department number and Week range

**Processing**

Employee number and department number must be unique, and when entering timetable of any employee or teacher both values must be valid references. Week range must be between 1to 52.

**Output**

Teacher and Student both can see the time table.

#### Security

**Introduction**

Only the high level members of the School and Network manager will have access to the system for securing their important data from others.

**Input**

System username and password

**Processing**

The network operating system in the department will be used to enforce security. Another security level should also be incorporated to make the system more secure.

**Output**

All data are secured and that can be used in future.

#### 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.

#### Mail Notification

**Introduction**

If holiday is declared suddenly, all students, teachers and employees are informed by sending them a mail.

**Input**

Student and Teacher’s name and email id.

**Processing**

User will enter the name, email id and reason of holidays in the SMS and it will generate a message.

**Output**

User get a message from FRS.

#### Exam Grade Details

**Introduction**

Data sheets are prepared for individual class. And each datasheet is given via email to the student of the corresponding class.

**Input**

User name, marks in individual face, attendance, class performance**.**

**Processing**

Grade card can be generated for individual students. Exam administrators would need to be able to view, update, delete, print and add grade details.

**Output**

A printed Grade card can be given to the student as well as an email can be received by the student with Grade card.

### 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 networked multiple school and have a centralized database and to serve wider range of students of different branches of same School around the country.

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

We will design a RDBMS for Face Recognition System. The entities and their attributes are listed below. Attributes in Bold letter is the unique key.

|  |  |
| --- | --- |
| **Entities** | **Attributes** |
| Student | **Student\_ID**, Student\_DOB, Student\_Name, Student\_Parent\_Name, Student\_Address, Student\_Admission\_Date, Student\_Course\_Name, Student\_Contact |
| Account | **Transaction\_ID**, Transaction\_Amount, Transaction\_Type, Transaction\_Reason,Account\_Balance |
| Admin | **Staff\_ID**, Staff\_Name, Staff\_Permission\_Level, Staff\_Address, Staff\_Admission\_Date, Staff\_Course\_Name, Staff\_Contract\_details, Staff\_Join\_Date, Staff\_Email, Staff\_Role |
| Books | **Book\_ID**, Book\_Name, Book\_Author, Purchase\_Date, Book\_Status, Book\_Description,Purchase\_Amount |
| Faculty | **Faculty\_ID**, Faculty\_Name, Faculty\_Address, Faculty\_Join\_Date, Faculty\_Course\_Under, Faculty\_Contact\_Details, Faculty\_Salary\_Details |
| Course | **Course\_ID**, Course\_Faculty, Course\_Name, Required\_Qualification, Course\_Fees, Course\_Admission\_Date, Students\_Under, Course\_Description |

**Relationship between Entities:**

School Management System has Courses 1 : N

School Management Systemhas Students 1 : N

School Management System has Faculties1 : N

School Management System has Admin 1 : 1

Studenthas Attendance 1 : 1

AdminChecksAttendance 1 : 1

StudentsreadsBooks M : N

StudentspaysAccount 1 : 1

AdminControlsAccount 1 : 1

Students Studies in Course N:1

## 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 DBMS MySQL will be used to implement & execute SQL query to database.
* Agile Software Development model will be used while developing this software.

## List of Reports

List of reports that are likely to be generated in this software are given below:

* Results & Grade report can be generated
* Class toppers will be given a certificate as a token of appreciation
* List of students can be generated
* List of teachers can be generated
* List of courses can be generated
* Course details can be generated
* Fund details can be generated
* Yearly donation report can be generated
* Salary slips can be created

# SECURITY MECHANISM

* School Management System is password protected software. It will be developed such a way that the admin will have complete control on the school’s data.
* Admin can create account with various permission levels, like clerk, librarian, teacher, admin etc. so that the users can see relevant data only.
* The data of the school 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.

# FUTURE SCOPE AND FURTHER REQUIREMENTS

* Mobile application could be developed for students’ guardians for querying about various details.
* Support for Linux operating system could be added.
* Online result checking and fees payment feature could be added.

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