ENEL3SF H2 - Software Engineering 2

Computer vision based class attendance monitoring

USER MANUAL

GROUP 4

Devashnee Bhagawandin
Nivaan Krishundutt
Keshav Jeewanlall
Adin Arumugam

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SYSTEM REQUIREMENTS

- Windows 7 Operating System (or later versions)
- Webcam or system camera

SOFTWARE REQUIREMENTS

- OpenCV version 2.4.13 library files.
- Visual Studio 2012 (or later versions)
- MySQL Workbench

INSTALLATION PROCESS

1) Due to the limitations in MySQL, the database has to be manually created on the system which is intended for use.

   A database needs to be created for this system using MySQL. The database should be named 'studentattendancedb'. This database contains one table called 'studentattendancetbl' which stores the details students and their attendance statistics in the module for the system.

   The table should consist of 32 columns which stores the student's ID, name, surname, and lectures 1 – 25 for 25 lectures per module per semester.

   StudentID column is of datatype INT(11), is set to not null and is our primary key because each student has a unique student number. All other columns are of type VARCHAR(45) and is set to not null.

   The database must have a data source as localhost with the username as 'root', the port as 33063 and the password as 'password@0105'.

   Figure 1 shows the design of the database. For correct operation, ensure that the created database is exactly designed as per Figure 1.

Table Name: studentattendancetbl Schema: **studentattendancedb**

Column Name	Datatype	PK	NN	UQ	B	UN	ZF	AI	G	Default/Expression
StudentID	INT(11)	☑	☑	☐	☐	☐	☐	☐	☐	
Surname	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Name	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Quarter1	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Quarter2	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Quarter3	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Quarter4	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture1	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture2	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture3	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture4	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture5	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture6	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture7	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture8	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture9	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture10	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture11	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture12	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture13	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture14	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture15	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture16	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture17	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture18	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture19	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture20	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture21	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture22	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture23	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture24	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'
Lecture25	VARCHAR(45)	☐	☑	☐	☐	☐	☐	☐	☐	'unknown'

Figure 1: Database design

2) Extract the folder "*Class_Attendance_System_Files*" to the system's local disk (C:). Ensure that the file path is "*C:/Class_Attendance_System_Files/*". This folder stores images of the faces that need to be recognized.

RUNNING THE SOFTWARE

There are two ways to run the software:

1) Run the software through Visual Studio. This is achieved by opening the solution file (*Group4_Class_Attendance_System/Group4_Class_Attendance_System.sln*). By doing this, the user can gain access to the source code and therefore modify the software.

2) Run the software as an executable file. This is achieved by opening the executable file (*Group4_Class_Attendance_System/Debug/Group4_Class_Attendance_System.exe*). This file is independent of Visual Studio and therefore can run on any system.

Once opened, the Main_Screen will appear.

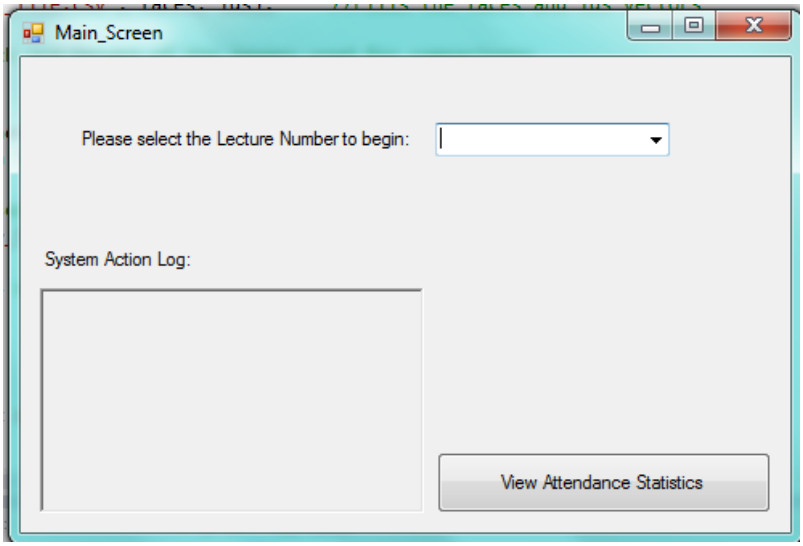

Figure 2: Main_Screen

Refer to Figure 2. The user is required to select a "Lecture Number" from the combo box (values ranging from 1 to 25). If the attendance is already taken for that specific Lecture Number, an error message is displayed and the user can select another Lecture Number.

Once a valid lecture number is chosen, the software will then capture the first of four images for the lecture session. The remaining three images will each be captured after an interval of 10 minutes.

The software then displays each action that is performed via the "System Action Log" text area.

Attendance for the day is set after the 4th image capture. The results are stored in the database and can temporarily be viewed on the System Action Log.

By pressing the “View Attendance Statistics” button, the Main_Screen will be sent to the background and a new window will open called Attendance Statistics.

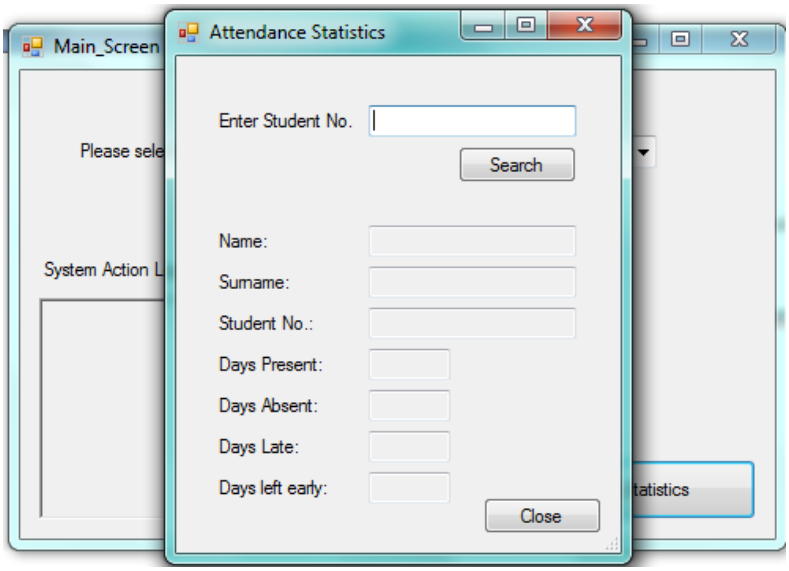

Figure 3: Attendance Statistics Screen

Refer to Figure 3. In this screen the user can view the attendance statistics of a student for the entire semester. This is achieved by entering the student’s ID in the first text field and thereafter pressing the “Search” button. The student’s statistics are then displayed in the respective fields.

ADDING A STUDENT TO THE SYSTEM

Due to limitations on the software, a new student has to be manually entered into the system. The following steps are required:

1) Add the student's details to the database using MySQL Workbench.

2) Add images of the student's face to the "*Class_Attendance_System_Files*" folder. Ensure that the image solely consists of the user's face and is in grayscale colour. Preferred dimensions of the images are 300 x 300.

3) Update the CSV file in the "*Class_Attendance_System_Files*" folder. Enter the file paths of the new images followed by the respective student's ID with a semicolon (;) separating the two. Refer to Figure 4 as an example.

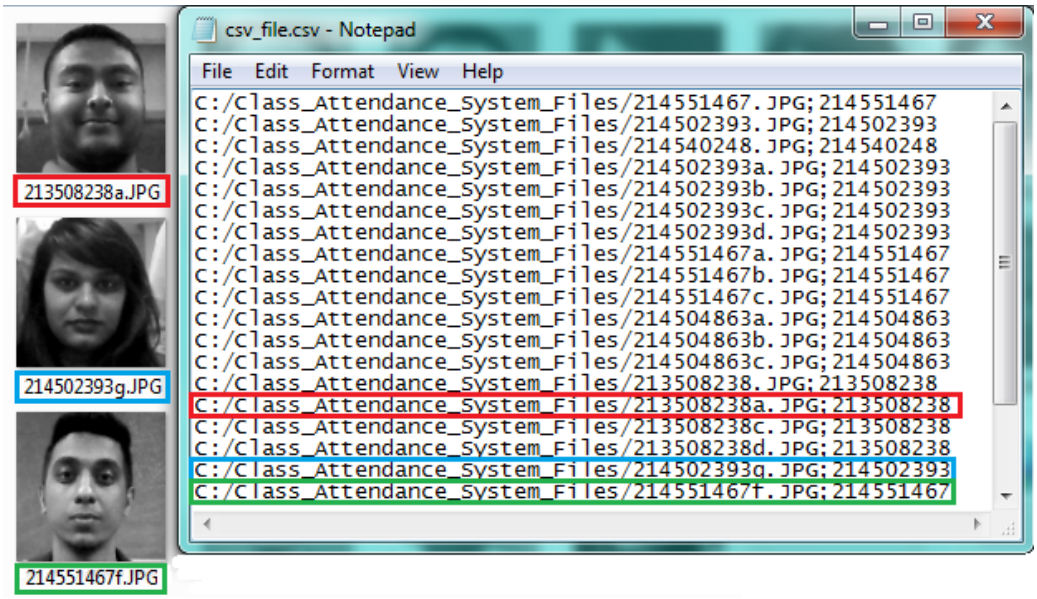

Figure 4: Updating CSV file example