**MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

The Roll System using Mobile Device

|  |  |
| --- | --- |
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-Ho Chi Minh City, 09/2013-

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# Table of Contents

[**Table of Contents 4**](#_Toc374116965)

[**List of Tables 5**](#_Toc374116966)

[**List of Figures 6**](#_Toc374116967)

[Definitions, Acronyms, and Abbreviations 7](#_Toc374116968)

[A. Software User’s Manual 8](#_Toc374116969)

[1. Installation Guide 8](#_Toc374116970)

[1.1 Setting up environment at server site 8](#_Toc374116971)

[1.2 Deployment at server side 8](#_Toc374116972)

[1.3 Setting up the environment at client side 14](#_Toc374116973)

[2. User Guide 16](#_Toc374116974)

[2.1 Login 16](#_Toc374116975)

[2.2 Admin – Add Image for student 16](#_Toc374116976)

[2.3 Staff – Create Roll Call 17](#_Toc374116977)

[2.4 Instructor – Check Attendance (Mobile) 21](#_Toc374116978)

[2.5 Instructor – Check Report 24](#_Toc374116979)

[3. User Notice 26](#_Toc374116980)

[3.1 Image Data Notice 26](#_Toc374116981)

[3.2 Position & Angle Notice 27](#_Toc374116982)

[3.3 Other Notice 28](#_Toc374116983)

# List of Tables

[Table 1: Login Step 16](#_Toc374117031)

[Table 2: View Student Image Step 16](#_Toc374117032)

[Table 3: Upload Image Step 17](#_Toc374117033)

[Table 4: Select Student Image Step 17](#_Toc374117034)

[Table 5: View Roll Call List Step 18](#_Toc374117035)

[Table 6: Create Roll Call Step 19](#_Toc374117036)

[Table 7: Change Student List Step 20](#_Toc374117037)

[Table 8: Change Schedule Step 20](#_Toc374117038)

[Table 9: Login Step 21](#_Toc374117039)

[Table 10: View Roll Call List Step 21](#_Toc374117040)

[Table 11: Check Attendance Step 22](#_Toc374117041)

[Table 12: View Roll Call Detail Step 22](#_Toc374117042)

[Table 13: Take Attendance Manual Step 23](#_Toc374117043)

[Table 14: View Teaching Roll Call Step 24](#_Toc374117044)

[Table 15: View Roll Call Report Step 24](#_Toc374117045)

# List of Figures

[Figure 1: Prepare deployment package 9](#_Toc374117046)

[Figure 2: Deploy database – 1 9](#_Toc374117047)

[Figure 3: Deploy database - 2 10](#_Toc374117048)

[Figure 4: Deploy database - 3 10](#_Toc374117049)

[Figure 5: Configure Server before deploy – 1 10](#_Toc374117050)

[Figure 6: Configure Server before deploy – 2 11](#_Toc374117051)

[Figure 7: Configure Server before deploy - 3 11](#_Toc374117052)

[Figure 8: Deploy web application on server - 1 12](#_Toc374117053)

[Figure 9: Deploy web application on server – 2 12](#_Toc374117054)

[Figure 10: Deploy web application on server – 3 12](#_Toc374117055)

[Figure 11: Deploy web application on server – 4 13](#_Toc374117056)

[Figure 12: Deploy web application on server – 5 13](#_Toc374117057)

[Figure 13: Change Settings 14](#_Toc374117058)

[Figure 14: Download app 15](#_Toc374117059)

[Figure 15: Install App 15](#_Toc374117060)

[Figure 16: Login Page 16](#_Toc374117061)

[Figure 17: Student List Page 16](#_Toc374117062)

[Figure 18: Upload Image Page 17](#_Toc374117063)

[Figure 19: Select Student Image Page 17](#_Toc374117064)

[Figure 20: Roll Call List Page 18](#_Toc374117065)

[Figure 21: Create Roll Call Page 19](#_Toc374117066)

[Figure 22: Roll Call Student List Page 20](#_Toc374117067)

[Figure 23: Change Schedule Page 20](#_Toc374117068)

[Figure 24: Login Screen 21](#_Toc374117069)

[Figure 25: Roll Call List Screen 21](#_Toc374117070)

[Figure 26: Camera Screen 22](#_Toc374117071)

[Figure 27: Roll Call Detail Screen 22](#_Toc374117072)

[Figure 28: Take Attendance Screen 23](#_Toc374117073)

[Figure 29: Instructor Home Page 24](#_Toc374117074)

[Figure 30: Roll Call Detail Page 24](#_Toc374117075)

[Figure 31: Report - Sheet 1 25](#_Toc374117076)

[Figure 32: Report - Sheet 2 25](#_Toc374117077)

# Definitions, Acronyms, and Abbreviations

|  |  |
| --- | --- |
| RSM | Roll System Mobile |
| Face Detection | **Face detection** is a computer technology that determines the locations and sizes of human faces in arbitrary (digital) images. It detects facial features and ignores anything else, such as buildings, trees and bodies.  <http://en.wikipedia.org/wiki/Face_detection> |
| Face Recognition | Face recognition is the task of identifying an already detected object as a **KNOWN or UNKNOWN face**, and in more advanced cases, **telling EXACTLY WHO'S face it is**! |
| Student List for final exam | A list contains all the students who can take part in the final exam of a roll call (Student with **absent rate > 20%** can’t take part in final exam). |

# Software User’s Manual

## Installation Guide

### Setting up environment at server site

The following software must be installed into the server machine:

#### Hardware requirements

Personal computers for developing with the minimum configuration:

* CPU Core 2 Duo 2.0GHz.
* 4GB of RAM.
* 300GB of hard disk.
* Wifi Internet (> 2Mbps).

#### Software requirements

* Web Server: Internet Information System – IIS 7.5
* Microsoft Windows 7: operating system and platform for development
* SQL Server 2008 R2: used to create and manage the database for web application
* Other library:
* EmguCV x86 2.4.2

(<http://sourceforge.net/projects/emgucv/files/emgucv/2.4.2/libemgucv-windows-x86-gpu-2.4.2.1777.exe/download>)

* Microsoft Visual C++ 2010 SP1 Redistributable Package (x86)

(<http://www.microsoft.com/en-us/download/details.aspx?id=8328>)

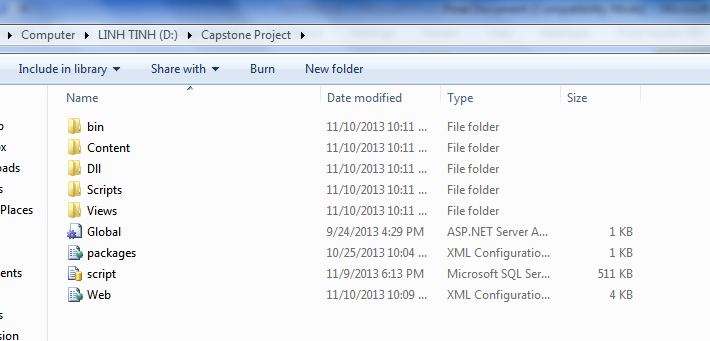
#### Mobile Requirement

* Android 4.0 or above
* Camera 3.0 Megapixed or above

### Deployment at server side

#### Prepare deployment package

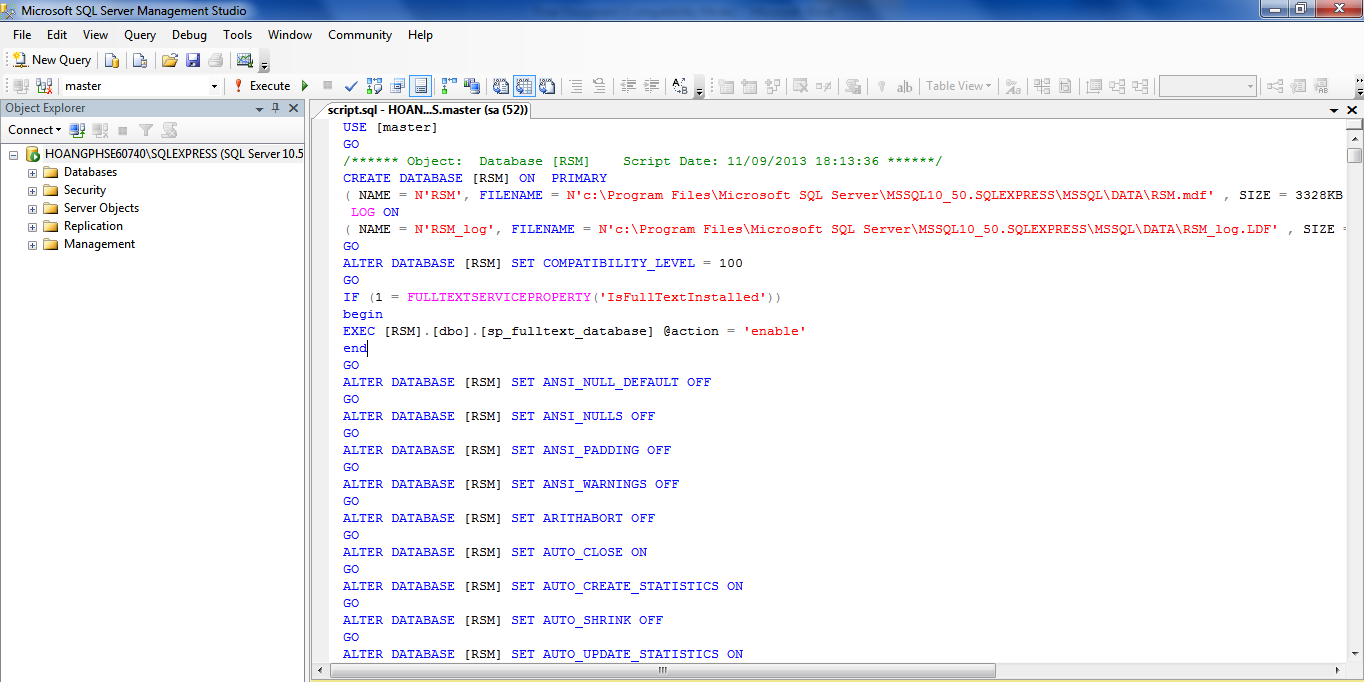
* Extract the deployment package to a folder on the server.
* For example: D:\Capstone Project



**Figure 1: Prepare deployment package**

#### Deploy database

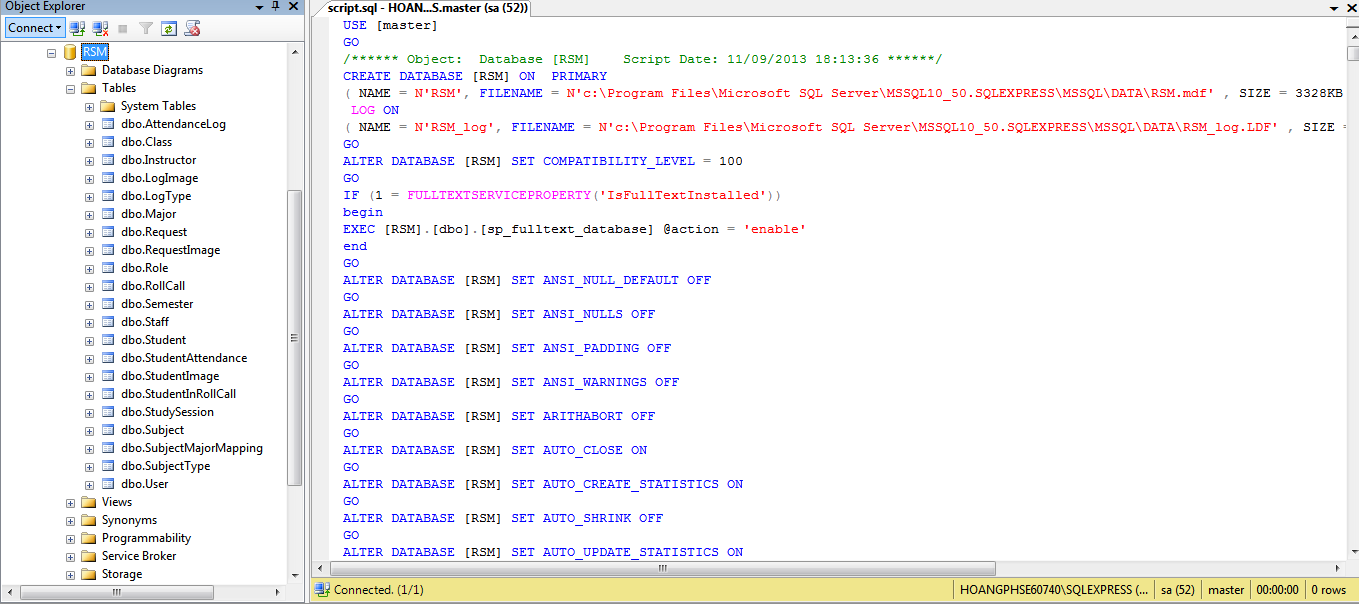
* Open Microsoft SQL Server Management Studio
* Open the script.sql file



**Figure 2: Deploy database – 1**

**Figure 3: Deploy database - 2**

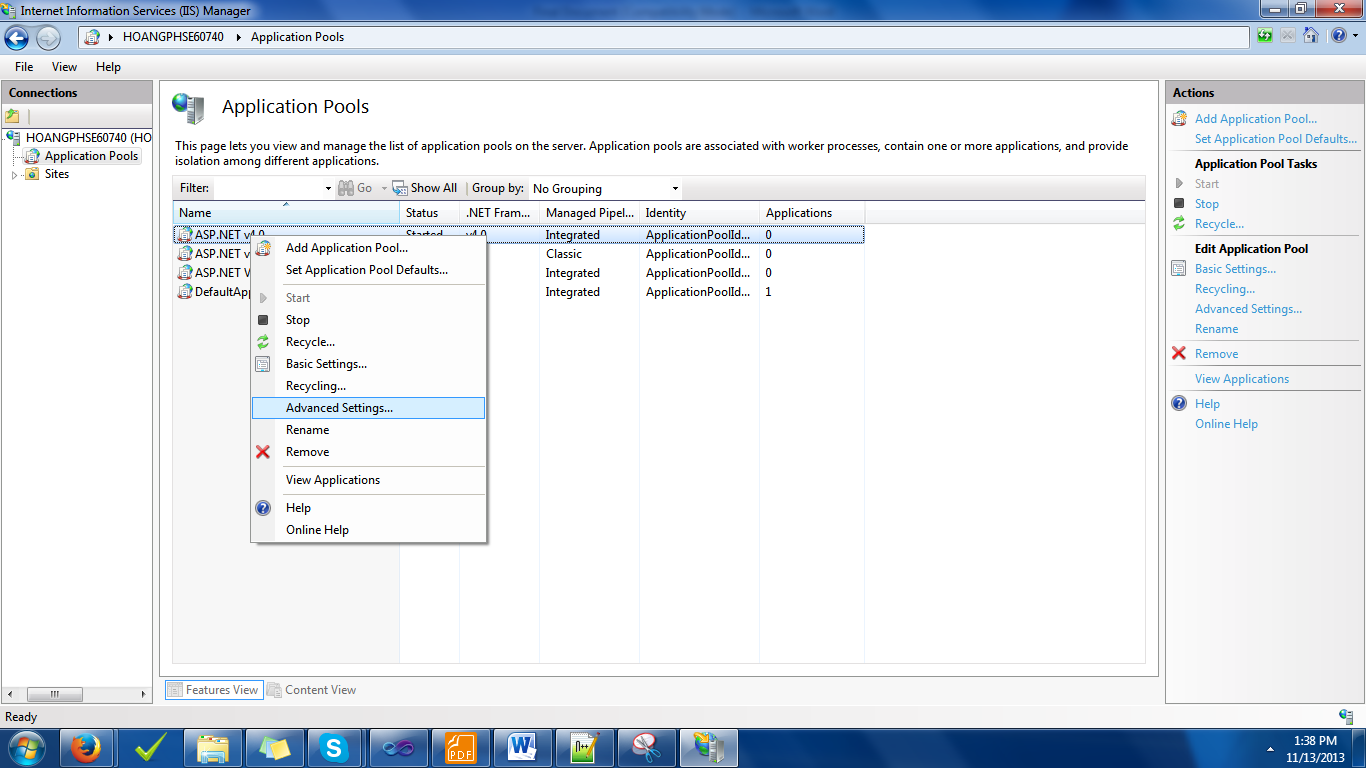
* Execute the script to finish the process



**Figure 4: Deploy database - 3**

#### Configure Server before deploy

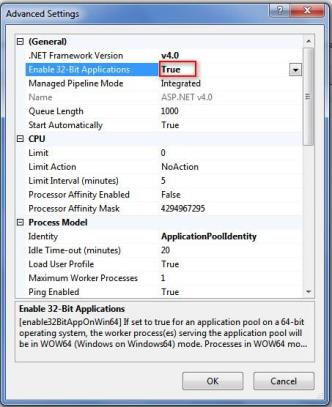
* Open the Internet Information System Manager
* Change the .NET Framework version to 4.0
* Click the Application Pool



**Figure 5: Configure Server before deploy – 1**

**Figure 6: Configure Server before deploy – 2**

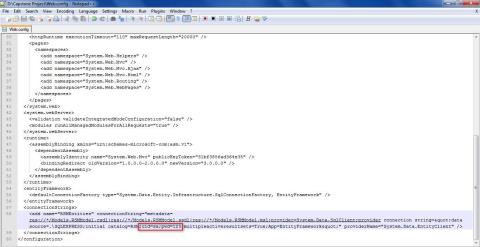
* Right click the ASP.NET 4.0 Pool, select “Advance Settings”.
* Set “Enable 32-bit Applications” to True.



**Figure 7: Configure Server before deploy - 3**

#### Deploy web application on server

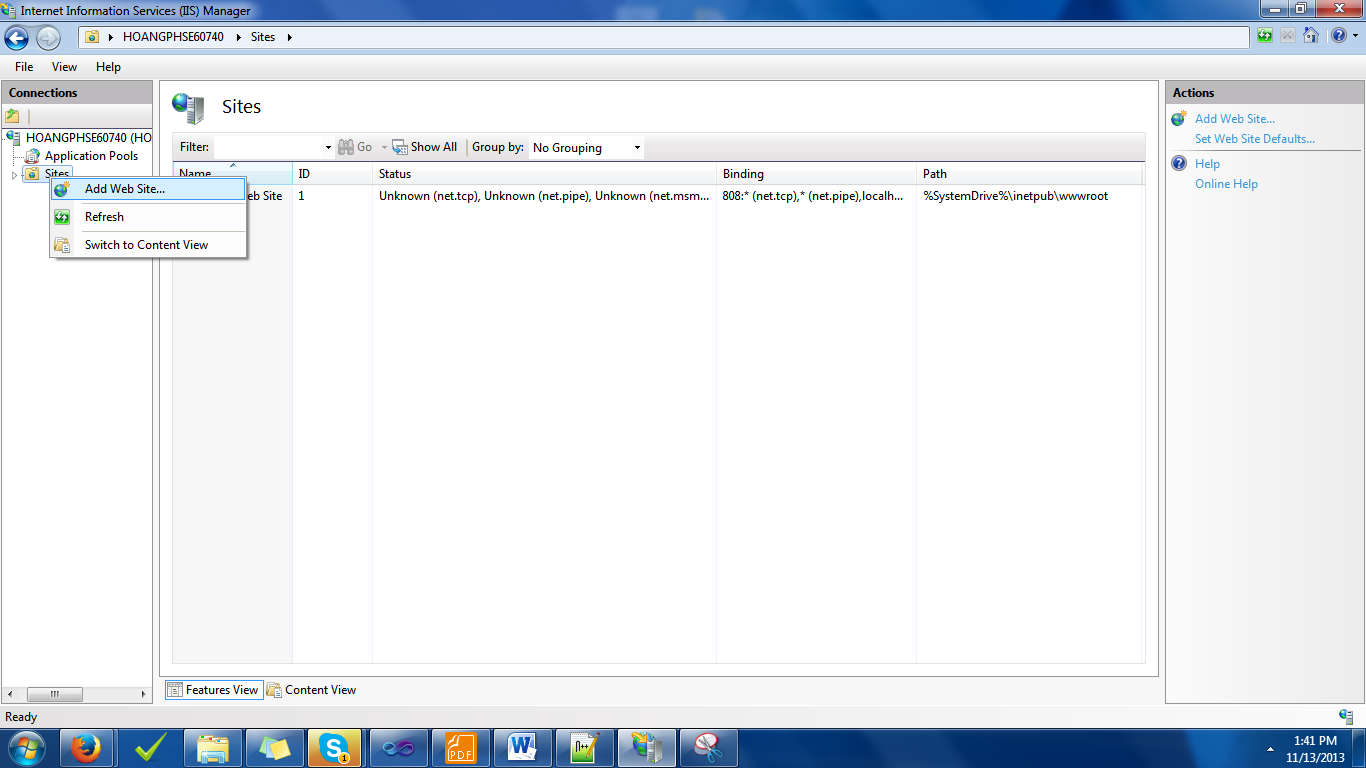
* Change the connection string in Web.config
* Replace the “integrated security” with your own username and password



**Figure 8: Deploy web application on server - 1**

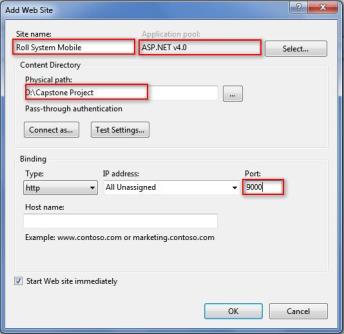
**Figure 9: Deploy web application on server – 2**

* Right click as Sites. Choose “Add Web Site”.



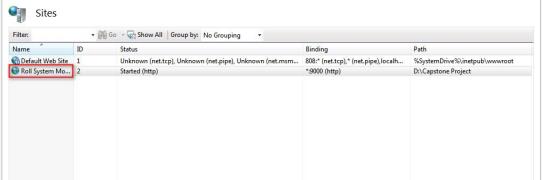
**Figure 10: Deploy web application on server – 3**

* Enter site name. Choose Application Pool as ASP.NET 4.0
* Select the path as the folder in step 1. Enter port other than 80.



**Figure 11: Deploy web application on server – 4**

* Press ok to finish the process



**Figure 12: Deploy web application on server – 5**

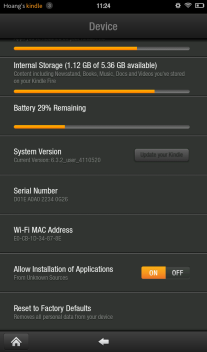
### Setting up the environment at client side

#### Setting up for computer

* The client devices need to have one of the following browsers to access the website:
* Google Chrome.
* Firefox.

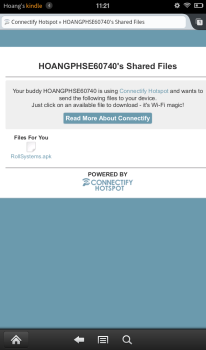
#### Setting up for Android devices

* Change setting to install unknown source apk.
* Connect to the same network as the server

****

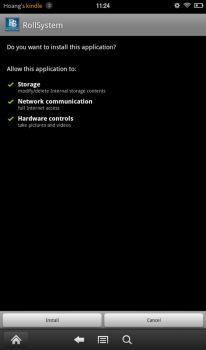
**Figure 13: Change Settings**

* Use browser and goto address 192.168.218.1:2987, download the apk file.



**Figure 14: Download app**

Click Install to install the app.



**Figure 15: Install App**

## User Guide

The user guide is based on the normal workflow of the system

### Login



**Figure 16: Login Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Fill Username and Password  (Sample admin account:  Username: admin1. Password: 123456) |
| 2 | Click button Login |

**Table 1: Login Step**

### Admin – Add Image for student

#### View Student Image



**Figure 17: Student List Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click Tab Student Images |
| 2 | Click link Student List |
| 3 | Click button “…. Images” to view, add more image for students |
| 4 | Click button “Request Upload” to send image upload request to students |

**Table 2: View Student Image Step**

#### Upload Image

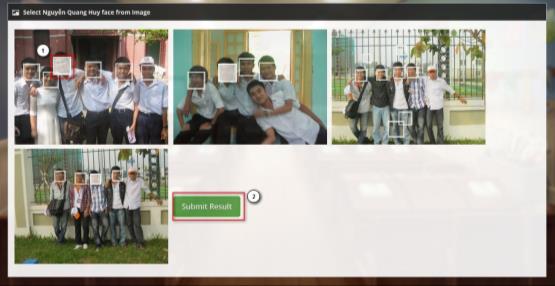


**Figure 18: Upload Image Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click to delete an image |
| 2 | Click button “Select student’s images” to select image for upload |
| 3 | Display thumbnail of selected image |
| 4 | Click button “Upload” to upload the selected images |

**Table 3: Upload Image Step**

#### Select Student Image



**Figure 19: Select Student Image Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click to select the face of students |
| 2 | Click button “Submit result” to save the selected face |

**Table 4: Select Student Image Step**

### Staff – Create Roll Call

#### View Roll Call List

#### index.png

#### Figure 20: Roll Call List Page

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click on link “Create new roll call” to create a roll call. |
| 2 | Select the semester, duration date includes roll calls you want to show in list. |
| 3 | Click on “Select” button to show result of step 2. |
| 4 | Click to report attendance of roll call. |
| 5 | Click to report attendance summary of roll call. |
| 6 | Click to search information you find. |
| 7 | Clink on link “Check Attendance” to check attendance for roll call. |
| 8 | Click on link “Change” to change schedule of roll call. The old roll call will not have this link. |
| 11 | Click on link “Student list” to view, remove or add student for roll call. The old roll call or roll call start over 2 day will not have this link. |

**Table 5: View Roll Call List Step**

#### Create Roll Call

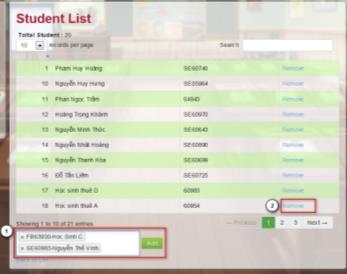


**Figure 21: Create Roll Call Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Select the semester of roll call. |
| 2 | Select the start date of roll call. |
| 3 | Select the major of roll call. |
| 4 | Select the class of roll call. |
| 5 | Select the subject of roll call |
| 6 | Select the start time of roll call. |
| 7 | Select the instructor of roll call. |
| 8 | Click on button “Create” to create a roll call. |

**Table 6: Create Roll Call Step**

#### Change Roll Call Student List



**Figure 22: Roll Call Student List Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click to remove student from roll call. |
| 2 | Type or select students to add to roll call. |

**Table 7: Change Student List Step**

#### Change Roll Call Schedule



**Figure 23: Change Schedule Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click to add a session or change instructor of roll call. |
| 2 | Click to change session of roll call. |

**Table 8: Change Schedule Step**

### Instructor – Check Attendance (Mobile)

#### Login

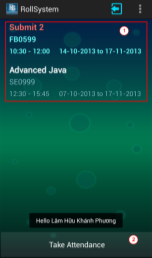


**Figure 24: Login Screen**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Fill Username and Password  (Sample instructor account:  Username: phuonglhk. Password: 123456) |
| 2 | Click button Login |

**Table 9: Login Step**

#### View Roll Call List



**Figure 25: Roll Call List Screen**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | View Roll Call list and make sure about the roll call that you want taking attendance |
| 2 | Click button Take Attendance |

**Table 10: View Roll Call List Step**

#### Take Attendance Auto

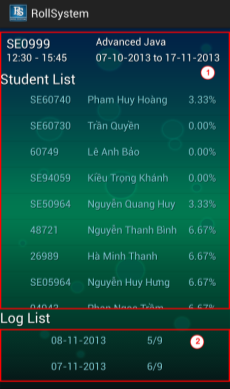


**Figure 26: Camera Screen**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | View camera screen and choose the best position and angle |
| 2 | Click button to capture image |

**Table 11: Check Attendance Step**

#### View Roll Call Detail

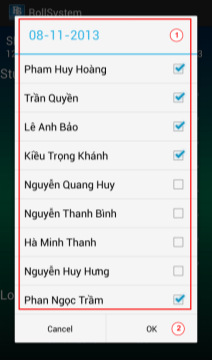


**Figure 27: Roll Call Detail Screen**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | View Roll Call info (class, subject, date, time, student list and log list) |
| 2 | Click one log you want to taking attendance manual |

**Table 12: View Roll Call Detail Step**

#### Take Attendance Manual



**Figure 28: Take Attendance Screen**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | View student list in roll call and check or uncheck any student. |
| 2 | Click button OK to taking attendance manual |

**Table 13: Take Attendance Manual Step**

### Instructor – Check Report

#### View Teaching Roll Call

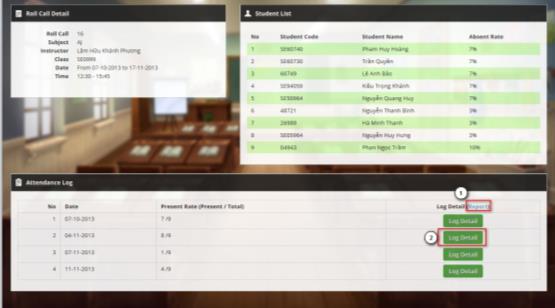


**Figure 29: Instructor Home Page**

|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click link “Attendance” to view and check attendance of teaching class |
| 2 | Click link “Detail” to view attendance detail of the roll call |

**Table 14: View Teaching Roll Call Step**

#### View Roll Call Report

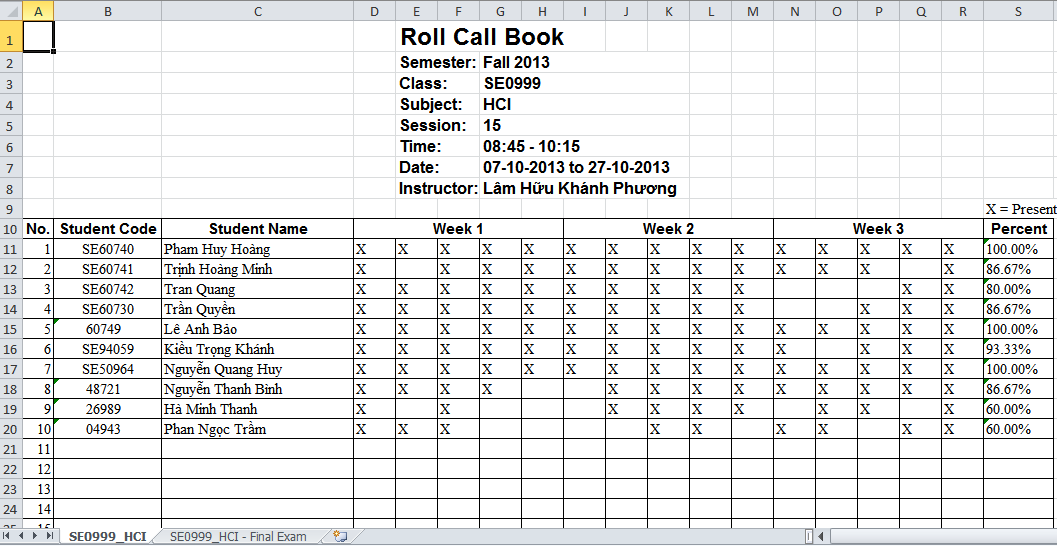


**Figure 30: Roll Call Detail Page**

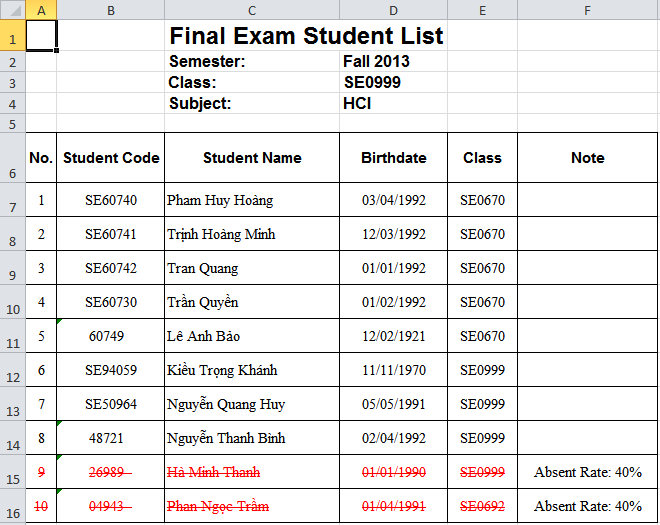
|  |  |
| --- | --- |
| **Step** | **Description** |
| 1 | Click link “Report” to download the attendance report |
| 2 | Click link “Log Detail” to view the log detail of selected date |

**Table 15: View Roll Call Report Step**

#### Report Sample



**Figure 31: Report - Sheet 1**



**Figure 32: Report - Sheet 2**

## User Notice

### Image Data Notice

* Each students must has at least 8 images as training images, for acceptable accuracy.
* The image should be clear without too much noise.
* Two eyes should be as the center.
* The face must look front, or tilt ~5-10 degree.
* Gray image is also okay

Example of good image data:



Sample data of a student (From 8-20 images), should contains:

* 70-80% of frontal face, with different brightness, facial expression....
* 20% of side face, with different brightness.

Example of a good sample data set:

****

Avoid using images like these:

****

### Position & Angle Notice

The below position and angle are recommend for best result.

For small class room

****

* According to test result, with class of 15-20 students, the number of required image is 4-6 images.
* With bigger class, the number of required image is 6-10 images.

### Other Notice

* The classroom should has good brightness.
* The student should look to front, look at the camera.

Example:



In some situation, the student on the front cover the face of back students, this lead to lower recognition rate.

Solution for better recognition rate:

* Take more images in different angles.
* Tell front student to lower their head.
* Use the “learning” modules.

