**MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

The Traffic Sign Recognition and Training

|  |  |
| --- | --- |
| **Group 1** | |
| **Group member** | Mai Văn Tân – Team Leader – SE90061  Bùi Việt Phong – Team Member - SE60747  Hồ Đắc Nghĩa – Team Member - SE60628  Trần Lê Tuấn – Team Member – 60350 |
| **Supervisor** | Mr. Kieu Trong Khanh |
| **Ext. Supervisor** | N/A |
| **Capstone Project code** | TSRT |

-Ho Chi Minh City, 04/2013-

*This page is intentionally left blank*

***ACKNOWLEDGEMENTS***

We wish to thank various people for their contribution to this project: Our teachers for their advices and participant in the final review, our friend for the valuable technical support.

Special thanks should be given to Mr.Kiều Trọng Khánh, our research supervisor for his professional guidance and the useful, constructive recommendations throughout the course of this project.

# Table of Contents

[**Table of Contents 4**](#_Toc372401166)

[**List of Tables 7**](#_Toc372401167)

[**List of Figures 9**](#_Toc372401168)

[Definitions, Acronyms, and Abbreviations 13](#_Toc372401169)

[Report No 5 - System Implementation & Test 14](#_Toc372401170)

[1. Introduction 14](#_Toc372401171)

[1.1 System Overview 14](#_Toc372401172)

[1.2 Test Approach 14](#_Toc372401173)

[2. Database Relationship Diagram 15](#_Toc372401174)

[3. Performance measures 16](#_Toc372401176)

[3.1 Face Detection Performance 16](#_Toc372401177)

[3.2 Face recognition performance 16](#_Toc372401178)

[4. Test Plan 18](#_Toc372401179)

[4.1 Features to be tested 18](#_Toc372401180)

[4.2 Features not to be tested 18](#_Toc372401181)

[5. System Testing Test Case 19](#_Toc372401182)

[6. Module Test Case 22](#_Toc372401183)

[6.1 Manage RollCall 22](#_Toc372401184)

[6.2 Manage Student Image 24](#_Toc372401185)

[6.3 Check Attendance 27](#_Toc372401186)

[6.4 Attendance Report 30](#_Toc372401187)

[6.5 Manage Teaching Calendar 31](#_Toc372401188)

[6.6 Manage Study Session 33](#_Toc372401189)

[6.7 Check own Attendance Rate 35](#_Toc372401190)

# List of Tables

[Table 1: Core Workflow Test Case 16](#_Toc372401211)

[Table 2: Manage Roll Call Test Case 18](#_Toc372401212)

[Table 3: Manage Student Image Test Case 21](#_Toc372401213)

[Table 4: Check Attendance Test Case 24](#_Toc372401214)

[Table 5: Attendance Report Test Case 25](#_Toc372401215)

[Table 6: Manage Teaching Calendar Test Case 27](#_Toc372401216)

[Table 7: Manage Study Session Test Case 29](#_Toc372401217)

[Table 8: Check own Attendance Rate Test Case 30](#_Toc372401218)

# List of Figures

[Figure 1: ERD - Physical Diagram 9](#_Toc372401219)

[Figure 2: Face Recognizer Algorithm Accuracy 10](#_Toc372401220)

[Figure 3: Number of images required 11](#_Toc372401221)

[Figure 4: Full Recognize Percent 11](#_Toc372401222)

[Figure 5: Core Workflow 13](#_Toc372401223)

# 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). |

# Report No 5 - Software Test Documentation Guide Implementation

## Introduction

### System Overview

This section provides in detail all necessary information about test plans, test cases, test result, test environments, pass/fail criteria and risks estimations as well as a checklist to cover all possible cases of TSRL.

### Test Approach

- Goal: To test the whole system based on the core workflow.

- Method:System Testing, Black-box Testing.

## Database Relationship Diagram

## C:\Users\Hoang\Desktop\Capstone Project\Document\Diagrams\ERD\Physical-Diagram.jpg

Figure 1: ERD - Physical Diagram

## Performance measures

### Traffic Sign Detection Performance

* Average time to detect face in 100 images(Resolution: 1100 x 750px): 116.5s
* Best face detected result: 206/222 faces. Percent: 92.8%
* Worst face detected result: 173/222 faces. Percent 77.9%

### Traffic Sign recognition performance

* Maximum time to load the face recognizer: 12.56s
* Average time to load the face recognizer: 1.22s
* Recognition accuracy:

Figure 2: Face Recognizer Algorithm Accuracy

* The result in real world testing:

Figure 3: Number of images required

**Figure 4: Full Recognize Percent**

About testing progress and detail report, read **FaceRecognizerTestingReport.docx.**

## Test Plan

The purpose of this section is to verify and ensure that TSRT meets its design specification and other requirements from user. The following part will describe which features to be tested and which will not.

### Features to be tested

We will test the entire system based on the following core workflow (Reference: [**Figure 101: Core Workflow**](#_Toc371697397)).

Based on the workflow, all following features will be tested, which can include one or more functions. These features will be focused and tested thoroughly during the test phase.

* Traffic Sign Detection & Recognition: Detect Traffic Sign From Image, Recognize Traffic Sign From Image.
* Recognition: Recognize Traffic Sign by using mobile to take a picture, Recognize Traffic Sign from uploaded image on mobile, web.

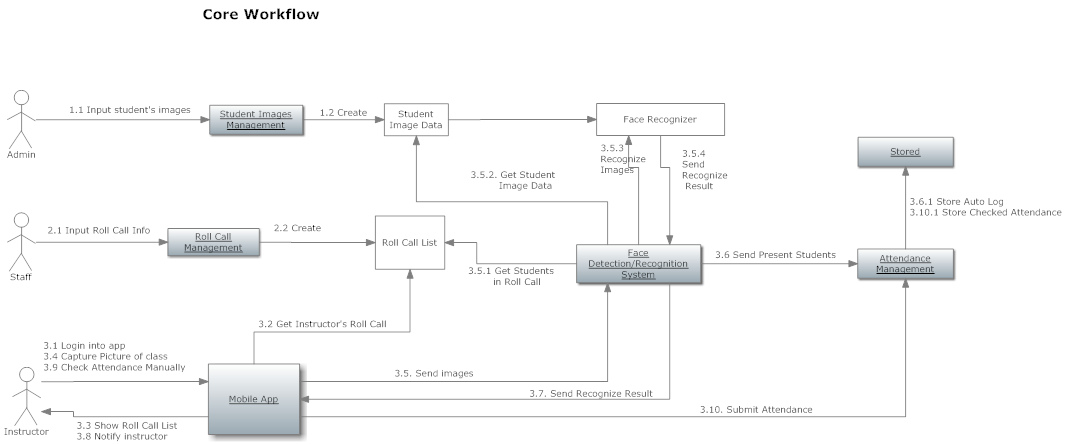
These remaining feature will be tested as individual module:

* Manage Traffic Sign Information: Add/Edit/Remove Traffic Sign Information.
* Manage Traffic Train Image: Add Train Images for Traffic Sign, Remove Train Image of Traffic Sign, Add Train Image for Traffic Sign from Report.
* Manage Report: View details, edit Traffic info from report, add Train Image from report.
* Manage Favorite: View/Add/Delete favorite on mobile, web.

### Features not to be tested

* Login, Logout
* Configure System
* User – Send Report, Search Manual.
* Admin - Manage Account.
* Staff – Manage Account.

## System Testing Test Case



**Figure 5: Core Workflow**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Test Case Description** | **Test Case Procedure** | **Excpected output** | **Result** | **Test Date** | **Note** |
| ST01 | Recognize traffic sign by using mobile to take a picture. | 1 – Touch the app icon from mobile.  2 – On the main screen, touch icon “Nhận diện biển báo”.  3 – Touch the “Camera” icon for take picture or touch the “Auto” icon for take picture automatically.  4 – Press “Back” button of device to return capture screen. | - After step 2, the screen for take a picture will be shown.  -After step 3, the popup will show “Xin vui lòng đợi trong giây lát”.  - After that screen will show the result of recognize include: - Picture was taken. - Result of recognize. | Passed | 7/4/2014 |  |
| ST02 | Recognize traffic sign by using mobile to upload an image. | 1 – Touch the app icon from mobile.  2 – On the main screen, touch icon “Nhận diện biển báo”.  3 – Touch the “Upload” icon for upload image.  4 – Press “Back” button of device to return home screen. | - After step 2, the screen for take a picture will be shown.  - After step 3, the pop up will show for you choose the image from your device.  -After that, the popup will show “Xin vui lòng đợi trong giây lát”.  - After that screen will show the result of recognize include: - Picture was uploaded. - Result of recognize. | Passed | 7/4/2014 |  |
| ST03 | Recognize Traffic Sign from uploaded image on web. | 1 – On the home page, click on “Nhận diện tự động”.  2 – Click on button “Choose File”.  3 – Choose the image you want recognize. | - After step 1, the “Nhận diện tự động” page will show include: - Button for choose upload image with label is “Tải hình ảnh”  - After step 2, the windows for select the image will be shown.  - After step 3, “Nhận diện tự động” page will show include:  - Uploaded Image. - Result of Recognize. | Passed | 7/4/2014 |  |

**Table 1: Core Workflow Test Case**

## Module Test Case

### Manage Traffic Info

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Test Case Description** | **Test Case Procedure** | **Excpected output** | **Inter-test Case Dependence** | **Result** | **Test Date** | **Note** |
| MT01 | Admin/Staff view traffic list. | 1 – Login into the system using an admin/staff account.  2 – Click the “Quản lí biển báo” tab in menu sidebar. | - The Traffic Sign list is showed. |  | Passed | 07/04/2014 |  |
| MT02 | Create new traffic sign info. | 1 – On the “Quản lý biển báo” Page, click on “Thêm mới biển báo” button.  2 – Fill in information:   1. “Số hiệu biển báo” 2. “Tên biển báo” 3. “Hình ảnh” 4. “Loại biển báo” 5. “Thông tin” 6. “Mức phạt”   3 – Click “Chấp nhận” button. | - After step 1, the popup window will be shown.  - After step 3, the new traffic sign is added to the database. | MT01 | Passed | 07/04/2014 |  |
| MT03 | Edit traffic sign info. | 1 – On the traffic list table, click on “Sửa” button.  2 – Click “Lưu”; | - After step 2, transfer to “Quản lí biển báo ” with new traffic sign, which have been update. | MT01 | Passed | 07/04/2014 |  |
| MT04 | Delete traffic sign info. | 1 – On the traffic list table, click on “Xóa” button. | - After step 1, transfer to “Quản lí biển báo” page. | MT01 | Passed | 07/04/2014 |  |

**Table 2: Manage Traffic Sign Test Case**

### Manage Train Image

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Test Case Description** | **Test Case Procedure** | **Excpected output** | **Inter-test Case Dependence** | **Result** | **Test Date** | **Note** |
| MTI01 | Admin/Staff view list of traffic train image. | 1 – On the traffic list table, click on “Sửa” button.  2 – Click on “Xem” link. | - After step 2, the popup will show with the list of train image. | MT01 | Passed | 07/04/2014 |  |
| MTI02 | Add new train image by upload image on web. | 1 – On the traffic list table, click on “Sửa” button  2 – Click on “Thêm ảnh mẫu” button:  3 – Click “Lưu” button. | - After step 2, the popup window will be shown for choose train image user want to add.  - After step 3, the popup will show “Thêm ảnh thành công”, the train image will be save. | MT01 | Passed | 07/04/2014 |  |
| MTI3 | Delete train image. | 1 – Click icon “Xóa” or “x” on image which want to delete in the train image list. | - The train image will be remove. | MTI01 | Passed | 07/04/2013 |  |

**Table 3: Manage Train Image Test Case**

### Manage Report

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Test Case Description** | **Test Case Procedure** | **Excpected output** | **Inter-test Case Dependence** | **Result** | **Test Date** | **Note** |
| MR01 | Admin/Staff view list of report. | 1 – Login into system with admin/staff account.  2 – Click the “Quản lí phản hồi” tab on menu bar. | - After step 2, the popup will show with the list of report. |  | Passed | 07/04/2013 |  |
| MR02 | View detail of report. | 1 – On the list of report. Click “Chi tiết”. | - After step 1. The pop up will be show with detail of report include: “Mã số”, “Loại phản hồi”, “Nội dung”….. | MR01 | Passed | 07/04/2013 |  |
| MR03 | Edit traffic info from report. | 1 – Click on filter to select type of report is “Thông tin sai”.  2 – Click on “Chi tiết” button.  3 - Click on “Xem” link.  4 – Fill in information:   1. “Số hiệu biển báo” 2. “Tên biển báo” 3. “Hình ảnh” 4. “Loại biển báo” 5. “Thông tin” 6. “Mức phạt”   5 – Click “Chấp nhận” button | - After step 1. The list of report which type is “Thông tin sai” will be show.  - After step 2. The pop up will be show with detail of report include: “Mã số”, “Loại phản hồi”, “Nội dung”…..  - After step 3, the popup window will be shown.  - After step 3, the new traffic sign is added to the database. | MR01 | Passed | 07/04/2013 |  |
| MR04 | Add train image from report. | 1 – Click on filter to select type of report is “Nhận diện sai”.  2 – Click on “Chi tiết” button.  3 - Click on “Xem” link.  4 – Click on traffic sign surround with detect square.  5 – Choose traffic sign which admin/staff want to add train image for it. | - After step 1. The list of report which type is “Nhận diện sai” will be show.  - After step 2. The pop up will be show with detail of report include: “Mã số”, “Loại phản hồi”, “Nội dung”…..  - After step 3, transfer to AddTrainImageFromReport page. | MR01 | Passed | 07/04/2013 |  |

**Table 4: Manage Report Test Case**

### Manage Favorite

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Test Case Description** | **Test Case Procedure** | **Excpected output** | **Inter-test Case Dependence** | **Result** | **Test Date** | **Note** |
| MF01 | User add favorite on mobile app by using Search Manual with input search key. | 1 – Login into system with user account.  2- Touch “Tra cứu biển báo”  3 – Input search value into text field.  4 – Touch item “search”.  5 – Touch traffic sign which user want to view detail.  6 – Touch item “Star” to make traffic sign is favorite. | - After step 1, transfer to main screen.  - After step 1, transfer to search screen include: Category, text field for input search value. - After step 4. The list of traffic sign have name equals search value will be show.  - After step 4. The detail of traffic sign will be shown. - After step 6. The traffic sign will be saved to favorite list. |  | Passed | 07/04/2013 |  |
| MR02 | User add favorite on mobile app from result of recognition. | 1 – Login into system with user account.  2 – Repeat step 1-3 of test case ST01.  3 – Touch traffic sign of recognition’s result.  4 – Touch item “Star” to make traffic sign is favorite. | - After step 3. The detail of traffic sign will be shown. - After step 4. The traffic sign will be saved to favorite list. | ST01 | Passed | 07/04/2013 |  |
| MR03 | Delete Favorite on mobile. | 1 – Login into system with user account.  2 – Touch on “Ưa thích” icon.  3 – Touch traffic sign in the list user want to view detail.  4 – Touch item “Star” to unmake traffic sign is favorite | - After step 2. The list of favorite traffic will be shown.  - After step 3. The pop up will be show with detail of report include: “Mã số”, “Loại phản hồi”, “Nội dung”…..  - After step 4. The traffic sign will be removed from favorite list. |  | Passed | 07/04/2013 |  |
| MR04 | User add favorite on web by using Search Manual with input search key. | 1 – Login into system with user account.  2- Click on “Tra cứu biển báo” item on menu bar.  3 – Input search value into text field and choose type of traffic sign on fillter.  4 – Click button “Tìm kiếm”.  5 – Click on traffic sign which user want to view detail.  6 – Click on button “Thêm ưa thích” to make traffic sign is favorite. | - After step 2, transfer to “Tra cứu biển báo” page include: Category fillter, text field for input search value. - After step 4. The list of traffic sign have name equals search value will be show.  - After step 4. The detail of traffic sign will be shown. - After step 6. The traffic sign will be saved to favorite list. |  | Passed | 07/04/2013 |  |
| MR05 | Delete favorite on web. | 1 – Login into system with user account.  2- Click on “Danh sách đã lưu” item on menu bar.  3 – Click on traffic sign which user want to view detail.  4 – Click on button “Xóa ưa thich” to unmake traffic sign is favorite. | - After step 2, transfer to “Danh sách đã lưu” page include: list favorite traffics of user.  - After step 3 the pop up will be shown the detail of traffic sign.  - After step 4, the traffic sign will be removed from favorite list |  |  |  |  |

**Table 5: Manage Favorite Test Case**