** MINISTRY OF EDUCATION AND TRAINING**

**FPT UNIVERSITY**

Capstone Project Document

The Roll System using Mobile Device

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| **Capstone Project code** | RSM |

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**Report No.1: Introduction**

## Project Information

* Project name: **The roll system using mobile device**
* Project Code: **RSM**
* Product Type: **Website, Phone Application**
* Start Date: **September 9th, 2013**
* End Date:

## Introduction

Roll system was known with HPLite32, SimplePass of HP fingerpint system; roll system with ID card using by almost corporation or company around the world; the system face identify by Uniqul – Finland publish on 7/15/2013 or LogonSmart by Asus. Today, the trend machines replace humans in the hard work or the work does not require high intelligence became popular. So roll system face recognition becomes ever more necessary. The number of students in a university as well as the number of employees in large corporations in Vietnam is increasing dramatically, which means that the system should have professional roll with accuracy high.

## Current Roll Call System

Below are some current roll call systems:

* By manual: This system is widely used in school, university. The instructor will call the name of each student, check the absent, then submit the result to log system.
* Using ID card: This system is usually used in corporations. Each employee has a card. The card will be read by a card reader to check the attendance of the employee.
* Using fingerprint: This system is currently used in FPT University. 15 minutes before and after a studying session, the student must show his fingerprint to a machine to take attendance.
* Using camera + face recognition: This system is just in experimental stage. Each classroom has a camera. At the beginning of the studying session, the instructor uses the computer, connect to the camera and take picture of classroom. The system will recognize the student in the picture, write to roll call log system.

## Problem Definition

Below are the advantage and disadvantage of current roll call systems:

* By manual

+ Advantage: Simple to implement, cheap.

+ Disadvantage: The roll call take 3-5 minutes, take effort of instructor, wrong roll call.

* Using ID card

+ Advantage: High accuracy, not take much effort to check attendance.

+ Disadvantage: High cost (ID Card, Card Reader). Risk of ID card missing.

* Using fingerprint

+ Advantage: Quickly. No effort must be made from instructor.

+ Disadvantage: Cost of fingerprint reading machine. Risk of machine error. The student checks the attendance but not go to class.

* Using camera + face recognition

+ Advantage: Quickly. The entire class picture can be stored as log.

+ Disadvantage: High cost (Camera cost). Face recognition not too accuracy.

## Proposed Solution

The system is intended for used in only school or university, where the pupils/students sit in a classroom (A small classroom, from 20-30 students). The system must to manage the course, teacher, check attendance…. In detail, the system will enable following function:

### **Feature functions**

* The admin can manage information about course, class, instructor, students.
* The system will provide a method for admin to upload the student’s images, select the students in the images to make training data.
* The system will make a roll call list (Contains: Course, Class, Time, Instructor, Student List) for each class, based on the input information.
* The system will provide a method to assign instructor and student to course. The system must check the availability of the instructor before assigning.
* The system must support a method to change instructor of a course (When instructor is sick or busy).
* The system can output report about the absent rate of a course, or a student.
* The instructor/examiner (fix other place) can view info about: What course they are teaching. Roll Call and student lists of these classes.
* The instructor will use the mobile application. At the beginning of a studying session, a picture of entire class will be taken for checking attendance.
* Base on the student list, the system will recognize the students from the picture, show the attendance result to instructor.
* The instructor can confirm the attendance result, re-check attendance manually.
* The system will alert the instructor when it detects stranger in classroom.
* Based on the respond from instructor, the system will gather more data to become more accuracy.
* The student can view info about what course they’re studying.
* The student can view their own attendance of the course they participated in.

### Advantage and disadvantage

The advantage and disadvantage of the proposed solution:

* Advantage: Small cost or no cost (If the instructor has phone). Face Recognition accuracy is about 70~80%, will reach 100% with confirm from instructor. The attendance check is quickly (< 30 seconds). The taken picture can be stored as log.
* Disadvantage: Complex to implement. The accuracy can vary depend on: Noise, brightness, number of people, image solution… Need student’s picture to be used for recognition training.

## Functional Requirement

Function requirement of the system are listed as below:

### Create Account

* The account of instructors and students will be auto-created by the system, basing on the input from admin.
* The instructors and students can change their profile and password.

### Instructor Management

* The staff can add/edit/active/inactive instructor.

### Class Management

* The staff can add/edit/active/inactive class.

### Student Management

* The admin can add/edit/active/inactive student.
* Each student must has a training set, contains 8-20 images for face recognizing. The admin can upload images, select the faces of the students to add. The admin can also remove images from training set.

### Course Management

* The staff can add/edit/active/inactive course.

### Roll Call Management

* The staff can add/edit/active/inactive roll call.
* The staff must input info of a roll call: The course, The instructor who teach the course, the student list, the time of the course (Begin, End Date).
* The instructor can see what roll call they belong to.
* The instructor can change their roll call to another instructor, in case of sickness or busy.

### Attendance Checking

* At the beginning of each studying session, the instructor takes a picture of entire class for attendance checking.
* The instructor can re-confirm the recognize result, re-check some student manually.
* In case of wrong recognition, the student face will be added to training set for higher accuracy.
* The instructor can view the attendance log of the course they are teaching.
* The student can view the attendance log of the course they are studying.

### Stranger Alert

* If stranger is detected in the classroom, the system will alert to teacher. A log file will also be written.
* In case of wrong recognition, the student face will be added to training set for higher accuracy.

### Attendance Report

* The system will make attendance report, which shows the rate of absence in a course, or the rate of absence of a student.
* The report is only available to staff and instructor

## Role and Responsibility

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| --- | --- | --- | --- | --- |
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Table 1: Roles and Responsibility