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Course: COMP 3275

Project: Student ID Roll Image Capture

Title: Report

GitHub Link: https://github.com/Javier-Rojas/Android-project

Problem addressed

Keeping track of student class attendance is an important process in understanding and measuring student performance. However, because of the difficulty of the manual process and the expense of scanning equipment, the strict adherence to attendance keeping has been lacking.

Proposed solution

The increasing presence of smart phones that come equipped with cameras and processing units make mobile phones the perfect solution to this problem. An android app will be created that can scan a student's ID card, which contains their unique identifier and use this information to sign the attendance register for classes. The students ID will be recorded along with the name of the course in which they are attending.

Interesting Problems Encountered

Effects of Light on the Barcode Scanner - During the testing of the barcode scanner within the app, the scanner took quite some time to scan barcodes. After further testing, it was realized that light had a drastic effect on the ease at which the scanner was able to read the barcode.

Database Anomalies - Whenever a user enters the name of the course they can sometimes enter it incorrectly or with capital letters and uppercase letters. This would introduce anomalies within the database.

User Account Control – Determining the privileges of the user. If there was no form of user account control, a student could easily edit the database and create anomalies within the database.

Solutions for Problems Encountered

Effects of Light on the Barcode Scanner – After the discovery that light had a major impact on the rate at which the barcode was read, the barcode scanner was then tested in various forms of light. In yellow light, the scanner took very long to read the barcode. In white light the scanner took roughly ten seconds to recognize the barcode and scan it. In infrared light the scanner quickly scanned the barcode. Due to the nature of the common mobile smart phone, most do not come with the feature of having infrared light. As such, white light was used for the remainder of the app testing.

Database Anomalies – To prevent these inconsistencies within the database, a spinner was introduced, this spinner allowed for the user to select from a set of pre-defined courses from a drop down menu.

User Account Control – Implementation of an Administrator account and a Guest account. The administrator would be allowed all the functionalities of the database, such as editing the database. Whereas the guest would only be able to scan and submit attendance.

Future Work

Student Location - Since the app currently has no means of knowing where the student is located. A student can essentially sign the register while at home or at work. To fix this, the app can request permission from the user to take a reading of the user's current position via GPS, and based on the student's location the app will allow them to scan and submit their barcode to sign the register. However, for this to work, each class' GPS co-ordinates in the university will have to be added to a database of GPS locations for comparison purposes.

Class Schedule – Currently the app has no information on the start and end times of classes as well as on what days or class location. So each course will have its own separate class schedule that will be used to determine if a student is late or early for class.

Edit Schedule – Allow the lecturer to edit the class schedule. This will allow the lecturer to cancel/shift classes and cancel courses.

Storage of Administrator Passwords – The administrator passwords were hardcoded into the app, to combat this we implemented a means of changing the password. However, the passwords were not being saved after the program was closed. To fix this, a file will be stored on the device that will store the current administrator password and username.

Signing the Register on your friends' behalf – Within the University it is a known issue that students sometimes sign the register for their friends when they are absent for class. Currently for this app, a student can easily use their friends' Student ID card and scan the barcode to achieve the same outcome. To combat this, whenever a student scans and submits their barcode, a copy of their MAC Address is added to the database a swell and the app will prohibit any further scanning from that device until the class is over.

Setting a Scanning Period – The student will have a set amount of time to scan their barcode. This will be put into place due to the scanner draining the mobile phone battery very quickly.