

Application of QR Code Technology in Providing Information Services for Academic Disciplines

Win WinShwe¹

Abstract

This paper focuses on developing an application by using a QR code. QR Code is used to encode and decode data at a rapid rate. "QR" stands for "Quick Response", which refers to the instant access to the information hidden in the Code. QR Codes are gaining popularity because the technology is "open source", i.e. available for everyone. Significant advantages of QR Codes over conventional barcodes are larger data capacity and high fault tolerance. Using camera phones and a webcam attached to a computer to read twodimensional barcodes for various purposes is currently a popular topic in academic disciplines. This paper proposes an attendance tracking system that is based on a QR code, which is being displayed for students during or at the beginning of each lecture. The students will need to scan the code in order to confirm their attendance. The paper explains the high level implementation details of the proposed system. It also discusses how the system verifies student identity to eliminate false registrations.

Keywords- QR Code, Attendance Tracking System

Introduction

Technology is constantly evolving. Every day, human deals with the progress of technology. The goal is to create a more advanced technology and able to bring great changes in helping every human task. One of the technological developments that are developing is QR code. QR Code stands for "Quick Response" Code is a barcode type that contains scanned dots matrix / scan using QR scanner or smartphone with built-in camera. QR code is widely developed in various fields for reasons of its practicality. Responsive Web Design is a web system designed to be optimally accessible from computer PC and laptop. It will make the web adapt well when accessed from a computer.

Objectives

Objectives of this paper are outlined as follows:

- To develop an efficient attendance system.
- To record a list of student that absent from class or lectures.
- To evaluate the performance of the attendance system monitoring.
- To view student name list by each subject and faculty name.

About QR Code (Quick Response Code)

QR code (abbreviated from Quick Response Code) is the trademark for a type of matrix barcode (or two-dimensional bar code) first designed for the automotive industry in Japan. Bar codes are optical machine-readable labels attached to items that record information related to the item. It was initially patented; however, its patent holder has chosen not to exercise those rights. Recently, the QR Code system has become popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard UPC barcodes. The code consists of black modules (square dots) arranged in a square grid on a white background. The information encoded may be made up of four standardized types ("modes") of data (numeric, alphanumeric, byte / binary, Kanji) or, through supported extensions, virtually any type of data. QR Codes are gaining popularity because the technology is "open source", i.e. available for everyone.

¹Associate Professor, Department of Computer Studies, Dagon University

A QR code, as shown in Fig.1 is read by an imaging device, such as a camera, and formatted algorithmically by underlying software using Reed-Solomon error correction until the image can be appropriately interpreted. Data is then extracted from patterns present in both horizontal and vertical components of the image.



Fig (1) QR Code

The QR features are listed in table 1. Figure shows a sample of an unencrypted QR code that will be needed by the proposed system.

Table (1) Capacity, Features, and Standards for QR Code

Developer (Country)	DENSO(Japan)
Numeric	7,089
Alphanumeric	4296
Binary	2953
Kanji	1,817
Major Features	LargeCapacity Small Printout Size High Speed Scan
Standard	AIM International JIS ISO

QR patterns are list in Fig(2).The patterns included in a QR-code image are finder, alignment, timing, format, data, error correction and separator and remainder bits patterns. Each of these patterns has its own functionality.

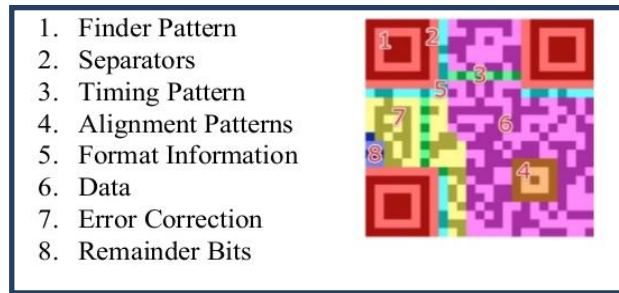


Fig (2) QR Code Pattern

Problem Statement

The existing attendance system is based on manual signing attendance that needs student to improperly sign the attendance sheet during classes. Typically, the attendance system is managed by each lecturer. The lecturer needs to record and keep all attendance sheets. Here student can easily forge the signature their friend that purposely to fill in class attendance. These non-effective system lead students to cheat and this previous system are not efficient. Therefore, universities should provide a system that able to improve the attendance system more efficiently.

Scope of Project

The work a scope is listed to ensure the project is conducted within its intended boundary. The work scope is useful to ensure that the project is heading in the right direction to achieve the goal. The scopes of this project are to study the basic of making a better attendance system. The main goal of this project is to develop a QR code system technology scanner by using a webcam attached to a computer.. This system is able to read and display the QR code. Software will be used to create the interface and a database is used to store the data that being created using correct framework and software. An applications that integrates the attendance system though the computer for checking the absent of students in real time will developed. The process will also include design and implementation of the database system to record the data.

Proposed System

The purpose of this project is to store the absent and present students attendance details in the easily system format, also to provide a fast and efficient attendance system for class in real time to store the data. In this project, the proposed attendance system is developed by scanning the QR code using a webcam attached to a computer. Subsequently the data is recorded and deposited in a database for further retrieval and reporting purposes. This system uses Laravel (PHP Framework), HTML, CSS and Java Script as front end and MySQL Server as back end. The required software used for development process of theQR codes scan and Web based program requires an operatingsystem Microsoft Windows 7 or Server with 32 bit. A webbasedWAMP server (PHP, MySQL & Apache) with anadditional QR code scanner application.

Implementation Form Design and User Manual

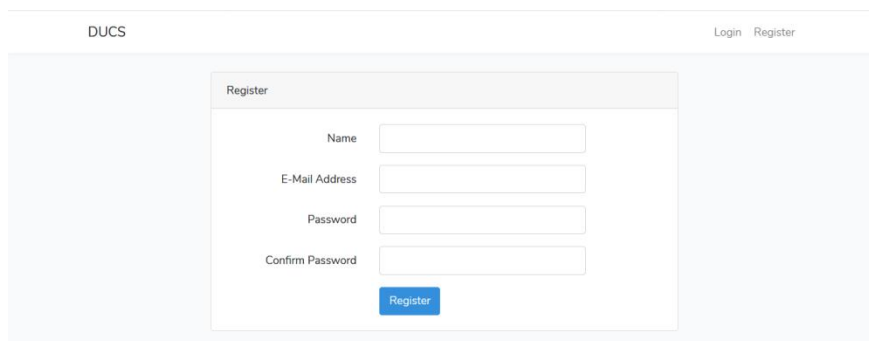
Register Form

This system is firstly need to register for each lecturer and each module. In this page, lecturer type name, email address, password and confirm password and then click register button. After register process, lecturer can login now. Register form shown in Fig (3).

Login Form

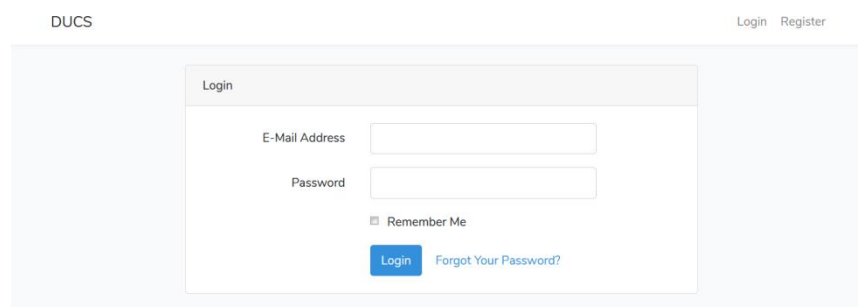
In Student Tracking System, this is the lecturer login view and lecturers who had already registered can sign in their email to look through the information that the system provided. Fig (4) is shown in login form.

Attendance Tracking System Applying QR Code



The screenshot shows the 'Register' form within the DUCS system. The form is titled 'Register' and contains four input fields: 'Name', 'E-Mail Address', 'Password', and 'Confirm Password'. Below these fields is a blue 'Register' button. The page header includes 'DUCS' on the left and 'Login Register' on the right.

Fig (3) Register Form

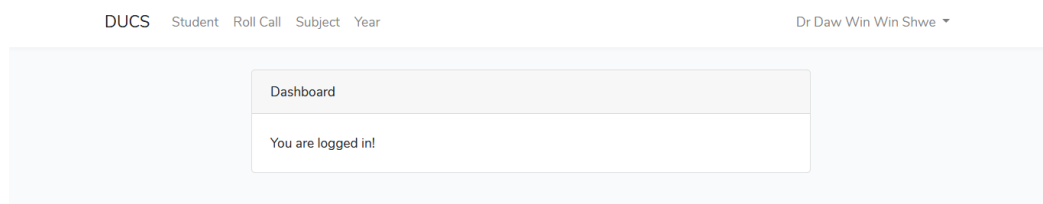


The screenshot shows the 'Login' form within the DUCS system. The form is titled 'Login' and contains two input fields: 'E-Mail Address' and 'Password'. Below these fields is a 'Remember Me' checkbox and a blue 'Login' button. A link for 'Forgot Your Password?' is also present. The page header includes 'DUCS' on the left and 'Login Register' on the right.

Fig (4) Login Form

Login Success View

This is what the lecturer will see their email is valid. There are four categories, Student, Roll Call, Subject and Year.

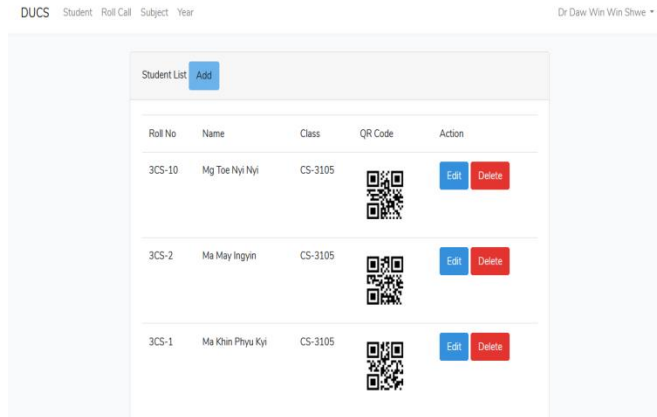


The screenshot shows the 'Lecturer View' dashboard within the DUCS system. The page header includes 'DUCS' on the left, navigation links for 'Student', 'Roll Call', 'Subject', and 'Year' in the middle, and a user profile 'Dr Daw Win Win Shwe' with a dropdown arrow on the right. The main content area is titled 'Dashboard' and displays the message 'You are logged in!'.

Fig (5) Lecturer View

Student List View

After the teacher clicked the Student link, this student list page of the system will appear with each QR Code for each student. The teacher can check the student of the class. If the teacher wants to add new student information, he or she click add button and fill the student information with name, roll no, class and year and then submit query button.



Fig(6) Student List with QR Code

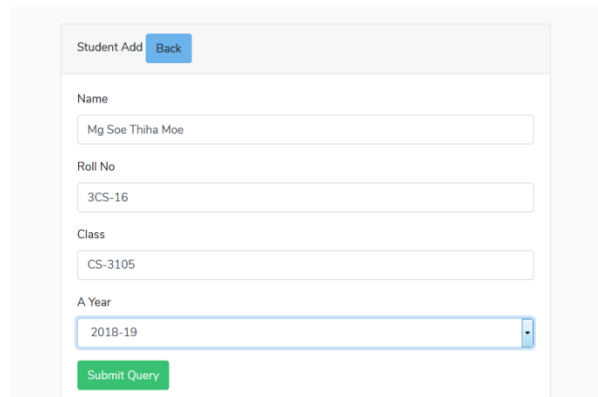


Fig (7) New Student Add View

Roll Call List View

The teacher can check student roll call list view with student detail information. The teacher will need to scan the code in order to confirm their attendance.

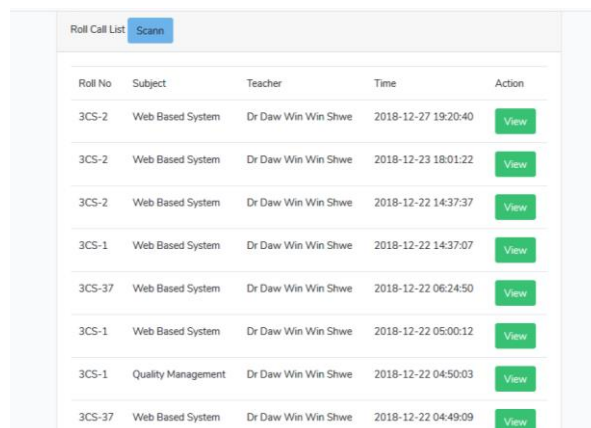


Fig (8) Scanning Result

Advantages of the Proposed System

- ❖ The calculation of the absentee rate is easier and more accurate; all calculations are performed by computer rather than manually.
- ❖ There will be no paper work involved; all processes are performed by computer. This will help protect against loss of data.
- ❖ The computerized processes will be performed more quickly and accurately than the previous system.
- ❖ The proposed system eliminates the notice board. Absentee rates can be viewed weekly by scanning an easily accessible QR code.

Conclusion

The automated attendance tracking system is to provide a new, quick and easy way of registering attendance by using the QR code technology which consists of QR code reader and the QR code. The core of the attendance tracking system is to provide a reliable and functional attendance tracking and reporting system which enables administrator to identify and rectify those students who do not meet the minimum attendance as stipulated in the policy and academic regulations of the University. In addition, the attendance system will ultimately reduce time and error.

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