

THE USE OF QUICK RESPONSE CODE APPLICATION FOR ACADEMIC RECORD

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Abstract

This paper concentrates on developing Quick Response Code application for academic record. Academic record includes student enrollment record, student attendance record and student exam record. Student records are maintained by academic departments throughout the University and are used to provide documentation of an undergraduate or graduate student's academic progress within a specific department or program. The purpose of this paper is to create an efficient students' enrollment and their attendance system by using Quick Response code technology. Quick Response code is two dimensional barcodes that are used to encode and decode information. QR code can contain information such as text, URL links, automatic SMS messages, or just about any other information that can be embedded in a two-dimensional barcode. This encoded data can be decoded by scanning the barcode with a mobile device and a web cam attached to a computer that is equipped with a camera and QR reader software.

Keywords: QR Code, Students' Academic Record, Student Attendance Record.

Introduction

Technology and trends rapidly increase day by day and has affected the education area. In the digital era, ICT has become an integral part of every economic, social activity and education sector. Computers are widespread and many everyday-objects come equipped with computer technology. Mobile phones are equipped with high-resolution color displays, wireless access to the Internet, and respectable processing power and memory. Nowadays, different kinds of codes are used in order to store, retrieve and manage information. As new technology rapidly evolves, there are various ways of capturing academic record which include student enrollment record, attendance record and exam record. Students' record is one of the important issues for most of the education institutes like classes, school, college, universities, etc. A proper record needs to be maintained by teachers and administrator. Manual attendance record system is not efficient and requires time to arrange record and to check the attendance of each individual student. The proposed system is intended to replace the manual model.

Objectives

Objectives of this research are as follows:

- To study the concept of QR code which involves the structure of QR code, the characteristics of QR code, different types QR code and the features of different QR code
- To develop a fast and efficient academic record management system
- To analyze the benefits of using QR code for academic record management system
- To implement well-organized students' record management system by developing an application that helps teachers and administrators to monitor and review in the students' database with date and time

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Proposed System

The purpose of the proposed system is to provide the academic record which include student enrollment record with student name, class, academic year and QR code, student attendance record with students' QR code, name, class and present or absent. This system is also to provide a fast and efficient student's academic record management system for class in real time to store the data. The proposed system developed by scanning the QR code using a webcam attached to a computer. Subsequently the data is recorded in a database for retrieval and reporting purposes.

System Requirement

This proposed system requires minimum hardware specification of Intel core i5 with RAM size of 4GB and minimum hard disk capacity of 500 GB. The required software used for development process of the QR codes scan and Web based program requires an operating system Microsoft Windows 7 or Server with 32 bit. A web based WAMP server (PHP, MySQL & Apache) with an additional QR code scanner application. The development system creates with Laravel (PHP Framework), HTML, CSS, and Java script as front end and MySQL server as back end.

QR Code

A QR Code is a two-dimensional barcode introduced by the Japanese company Denso-Wave in 1994. This kind of barcode was initially used for tracking inventory in vehicle parts manufacturing and is now used in a variety of industries. QR stands for "Quick Response" as the creator intended the code to allow its contents to be decoded at high speed.

A QR Code is a matrix code developed and released primarily to be a symbol that is easily interpreted by scanner equipment. It contains information in both vertical and horizontal directions, whereas a classical barcode has only one direction of data (usually the vertical one). Compared to a 1D barcode, a QR Code can hold a considerably greater volume of information: 7,089 characters for numeric only, 4,296 characters for alphanumeric data, 2,953 bytes of binary (8 bits) and 1,817 characters of Japanese Kanji/Kana symbols. QR Code also has error correction capability. Data can be restored even when substantial parts of the code are distorted or damaged. In the QR Code standard, corners are marked and estimated so that the inside-code can be scanned. The barcode recognition process has 5 steps: (1) edge detection, (2) shape detection, (3) identification of barcode control bar, (4) identification of the barcode orientation, dimensions and bit density using the control bar, and (5) calculating the value of the barcode. [3] A QR code shows in Figure (1).



Figure 1 QR Code

QR Code Structure

QR code structure is very important to for encoding and decoding QR code because this is the main features of the process. There are various version of QR code from version 1 until version 40. Each version has a different module configuration or number of modules.

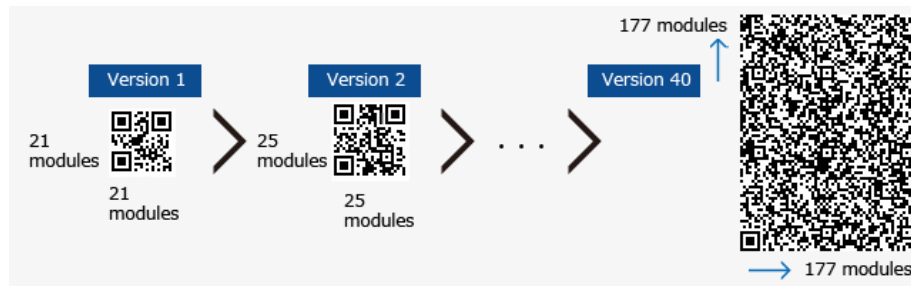


Figure 2 Version of QR Code

Module configuration refers to the number of modules contained in a symbol, commencing with Version 1 (21 rows and 21 columns) up to Version 40 (177 rows and 177 columns) shown in Figure (2). Each version thereafter increases by 4 rows and 4 columns. The largest version is version 40 with results in the 31,329 needed to encode the 3kb of data.

Characteristics of QR Code

(1) High Storage Capacity

A QR code symbol can store up to 7,089 characters of information, which is a huge amount as compared to 1-D barcode.

(2) Encodable Character Set

Numeric data (Digits 0-9)

Alphanumeric data (upper case letters A-Z; Digits 0 - 9; nine other characters: space, : % * + - / _ \$)

Kanji characters

(3) Small Printout Size

The information in QR code is stored in both horizontal and vertical directions. Due to this feature, for the same amount of data, space acquired by QR code is one fourth times less than the space acquired by 1-D barcode.

(4) 360 Degree Reading

QR code is readable from any direction. This feature is provided by the finder patterns present at three corners of the symbol. The finder pattern helps to locate the QR code.

(5) Capability of Restoring and Error Correction

If the part of code symbol is damaged or dirty, data can be recovered. The error detecting procedure can focus on the region of correct information.

Implementation of the Proposed System

The main feature of this system is that store student enrollment record and attendance record, exam record and seminar attendance record and make excel report from attendance data. This is very simple system, there are three main modules which include admin, teacher and student. Student can only register, while teacher able to check all students' data. In this system admin and teacher password has been store in encrypted form.

The proposed system will need first step enroll from each student. In the registration form, the student enter email, password, confirm password, name, father's name, Roll No, academic year, class, date of birth and then click the register button. Student's registration page is shown in Figure (3). After that the system will generate QR code each student shown in Figure (4).

Figure 3 Registration Page for Student

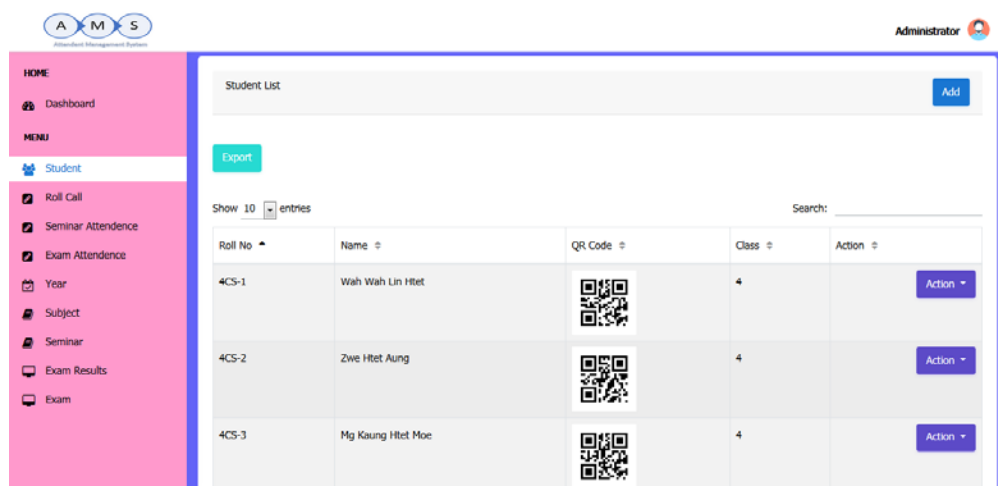


Figure 4 Registration Page for Student

The next step of this system is the teacher needs to register for each lecture and each module in a classroom. In the registration form, the teacher insert teacher's name, email address, password and confirm password and then click the register button. After the registration process success, the teacher can login now. Register page shows in Figure (5).

Figure 5 Registration Page for Teacher

A teacher who has been given an email address and password simply enters that information and selects the Login button. Figure (6) is shown in login page.

Figure 6 Login Page

After successful login teacher will view the home page of Student Attendance. There are four categories in this page, Student, Roll call, Year and Subject shown in Figure (7) Firstly, The teacher will set lecture class to record attendance.

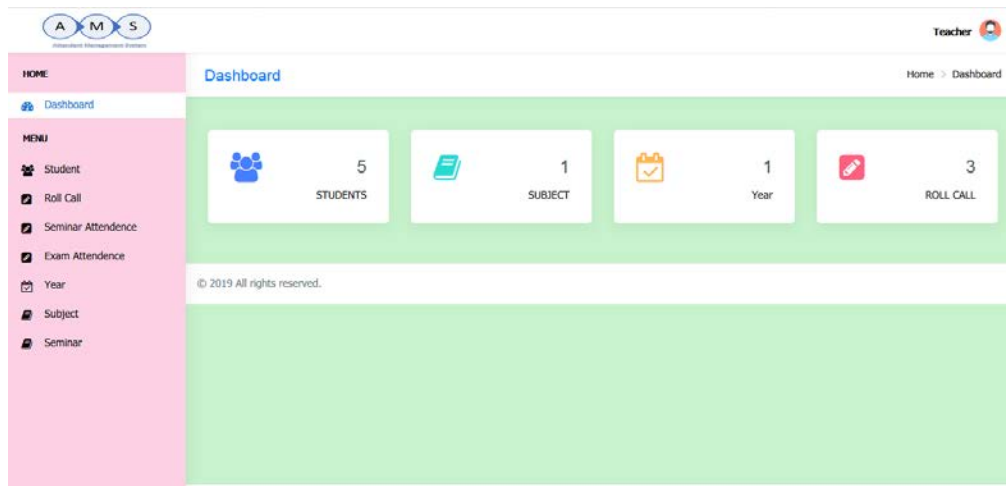


Figure 7 Student Attendance Page

In the next page, the teacher can check students' attendance. And also student need to scan QR code reader with their id card. Students select his or her Roll No, and Subject and choose web cam attached to the computer. And then click scan button. If the student information is correct, scan success message will appear. Figure (8) and figure (9) are shown in QR code scan process.

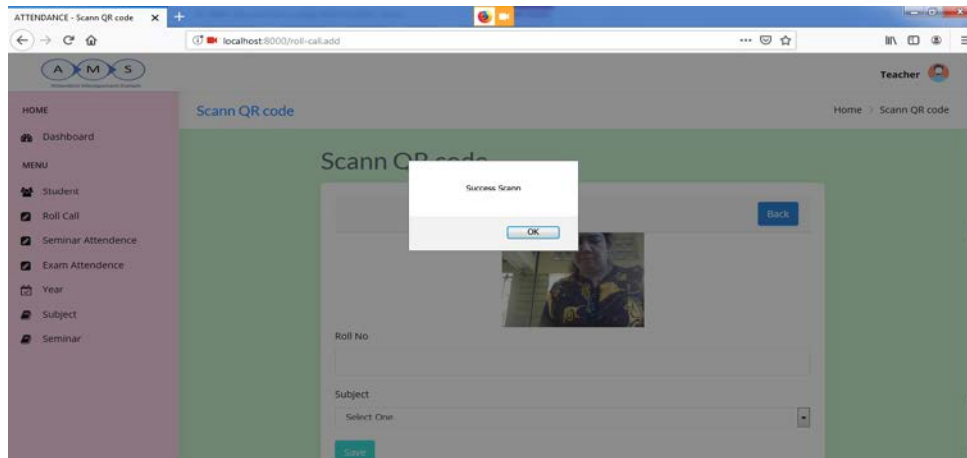
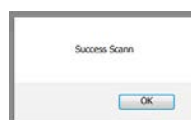


Figure 8 Student Roll Call Scan Page



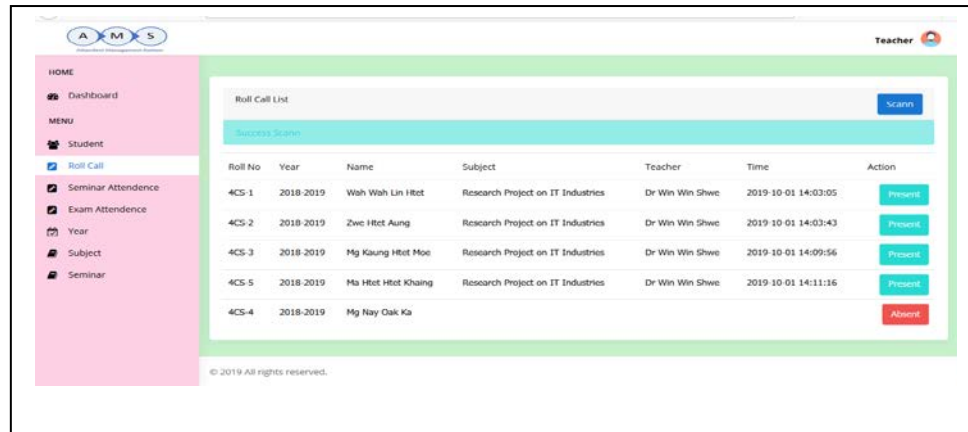


Figure 9 Student's Roll Call Scan Successful Page

Results and Discussion

QR Code based Students' Record Management System" is developed for taking and storing the student's data, attendance of the students in the classroom and attendances of students in seminars and exams. In this system, the teacher who has to handle the subjects, will be responsible to mark all attendance records of the students. An accurate report based on the student data is generated easily.

Advantages of QR Code based Students' Record Management System are follows: It can

- Provide better security by using QR code
- The system is easy to maintain and cost effective
- Generate the result quickly and no use of paper work
- Provide accurate and efficient data for academic record
- User friendly

It is rather convenient for storing academic record using QR code. Among the academic records, a Students' Record Management System is created testing students' record by using only QR code. It is found out that the intended data are able to be searched through a QR code. As an administrator, it is easy to store records and he or she is able to update them when necessary. For the sake of teachers, they will also find QR code is more convenient than manual to search lecture attendances, seminar attendance and exam attendance easily.

Conclusion

The Students' Record Management System is to provide the benefits of using QR code. QR Code is the most famous 2D barcode in the world. QR codes are easy to generate and use. QR technology is open source technology, available free of cost and simple implementation process and user friendly technology. Users do not need special knowledge for using QR code, only required smart phones like iPhone, Android phone, and webcam attached to a computer etc. with QR code scanner. In addition, the computerized processes will be performed more quickly and accurately than the manual system. There will be no paper work involved; all processes are performed by computer. This will help protect against loss of data.

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