Campus Connect: Advanced QR Based Identity Card

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Abstract: Educational institution in developing countries is a vast sector and it is expanding rapidly. With the rapid growth of technologies, educational institutions are still lagging behind. For identification of students they still lie on manual handwritten ID card and files. If proper ID card system is introduced then it would be much easier to identify a student and can track his/her progress. Therefore, in this research we implemented advanced using of QR code and student ID generation. We tried level best to make right implementation of QR code with student ID card. Automated student ID had image capturing facility and requirements of an ID and there is no need of hand written ID card. QR code is attached into ID card and student personal details can be found by scanning the QR code with smart phones (downloaded & installed QR reader software). QR code is said to be the next generation of the bar code and using QR code with ID card brought positive outcomes. While using software tools, identity cards work fine and suitable for an educational institution as it is free. Thus, ID card will be a perfect use of modern technology in developing countries.

Keywords: Identity Card; QR Code; Reed- Solomon Algorithm.

I. INTRODUCTION

Nowadays with the rapid growth of population, people need to be identified and it is now a must for every organisation from a company to a large country to have the Identity card (ID) for the every people. Therefore, now for every educational institute, an ID card for a student is compulsory. ID card is said to be the summary of any student indeed. It is highly essential for an educational institute to provide ID card to each and every student of it. ID card is generally considered to be the summary of a student's information. The project "Advanced QR coded Student ID Card Generation" is being created to decrease the effort of human as we know before people use the hand written ID card. The ID is the purely automated solution and it will help to generate student ID card easily. It is a special type of software which will be used to make an advanced ID card with QR code instead of the bar code. Our ID card produced software that captures both student picture and QR Code of the individual student. For example, the business card does have only QR code facility. But this software will add all the feature in one ID card and ID card will act as the smart ID card. Another important point it can be found as open source that means it will be available for free. QR code can be scanned with any smartphones and it will show the information of the student including – medical details (blood group, organ details), the progress of the student, current status to the school and some other personal details of him/her.

II. QR CODE

QR code (Quick Response Code) is said to be the two-dimensional bar code (2D) and it is a special type of matrix barcode which was made for the automotive factories purpose.[7] But soon after the system then become more familiar and popular and everywhere it is being used because of its large storage capacity and fast readability. The QR code is made up of the black modules on a pure white background and the black modules are kept like square pattern. For the data input the binary, kanji symbols or alphanumeric symbols can be used for the encoded information.

A. Function & Algorithm of QR Code

Normally the QR code provides the functions which have 6 major parts:
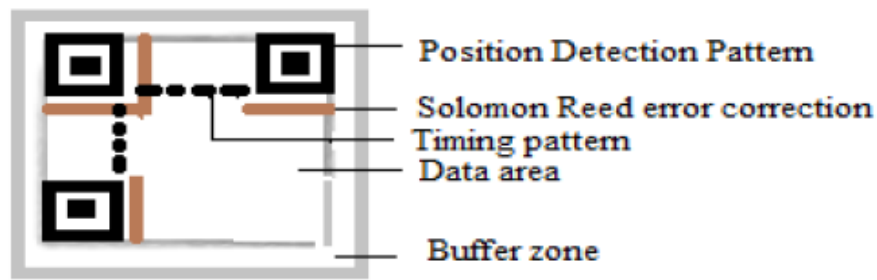
Fig. 1. Position detection pattern by finding three corners

1) Three Position Detection Pattern

At the three corner out of the four corners, the three codes are located which are called position detection pattern are three position detection pattern.

2) Timing Pattern Code

In order to identify the location of each and every cell inside the QR code, the timing pattern code is greatly used. All the things are done by the decoder application.

3) Reed- Solomon Error Detection

If ($x1$, $x2$, ..., xn) is the input sequence of the values of n in a field F then the codebook will be the input sequence of *n* distinct values over the finite field *F*; then the codebook C will be

C={(f(x₁),f(x₂),...f(x₃))|f € F[x], deg(f)<k}

(1) Here, $F[x]$ = polynomial ring The input sequence ($x1$, $x2$,.., xn) of value $n = N$ is made as

(0,a¹,a²,...aⁿ⁻²)

(2) Here, _ = *primitive root* [12].

4) Data Area

Into data area, the error correction codes are inserted where the each and every cell is saved in the form of a binary number.

5) Buffer Zone or Quite Zone

This zone is used for isolation of code from the information of different packaging.

6) Alignment Pattern

When the code is being curved then the QR coder make the correction for the distortion. The alignment corner is in the corner of lower right [4].

B. Adding QR Code to System

ID card is using the regular bar code for some extra

Information of anyone. But there is a problem here as it does not contain all the information in details. But if the bar code can be replaced by QR code than one can easily insert or make a link to more information. For example, the QR code can be linked to the web address or some other web link so that anyone can get more information easily. Point to be noted that QR code is totally free. Lots of popular business companies have already started the using of QR code. So adding the QR code to the ID card will make a new era to have more information about the student.

C. Advantages of QR code

When it is online then it can read anything and all is done with the help of the camera and sensor of the cell phone. [5]With a QR reader such as QR reader or Sema Code the QR code can easily give the link of the details of the product. One can easily download the QR code reader by downloading it from online and it is totally free [7]. The camera needs not to be lined-up to read the QR code in a particular way. People may think that the scanner must have to be lined uprightly which is wrong. But point to be noted that the user's hand must be stable for a couple of minutes and

then the QR code will show the link [6].

D. Disadvantages of QR codes

The user must have a camera phone and right kind of software installed on a mobile phone. The problem is only the work can be done using the smartphone that can take and read an image of QR code [6]. Many people have a mobile phone with cameras but the cameras are unable to read and the phone does not support QR reading software [5]. Smartphones are comparatively expensive than that of the other phones available in the market. Young people are aware of technology and they are using it but it is a real problem for people above 40 and they are not interested to spend money on the technology and also they do not know how to use them properly

III.   DESIGN

A student ID card generally deals with the fields:
Students Name, Class Roll Number, Registration, Number, Session, Name of the department, Hall name. To demonstrate the administrative requirements we need to meet the administration the following parameters: Basic student information, The feature, Add/remove department name and hall name, Take student snap from a real-time video streaming, Checking the printable form, Editing total amount of information, Going to printing process, Find student information using unique ID number
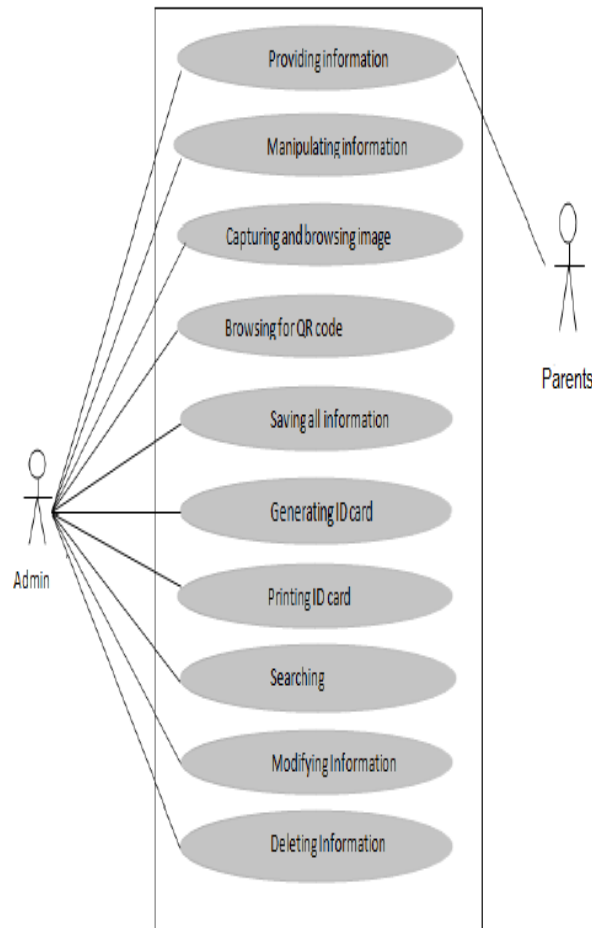
A.   Use Case Diagram

Fig. 2. The Use Case Diagram of QR coded Automated Student Identity Card Generation

B) Using Microsoft visual studio 2008 & SQL server management studio express:
To make the whole system we need to use the software and for coding, we take the Microsoft visual studio and for connection of database, we took the SQL server management studio express. Visual studio supports different types of programming languages that can allow the debugger and code editor for supporting the programming language including C, C++, VB.NET, Basic.NET. We can configure and manage within Microsoft SQL Server. SQL server can add the graphical tools and script editors and they can easily work with object and features.

C) Semacode/QRReader and Code Reader:
Semacode or QRReader are Softwares in order to scan QR code. They can be compatible with the smartphones especially iPhone. But Sema code is comparatively faster than QR Reader. The software can be found for free. Once we install it into the phone then we can scan the QR code anytime. The code Reader is to scan the barcode when we will compare QR code ID card with barcode ID card.

IV   IMPLEMENTATION

For the implementation of the system, we need to do three important steps system construction, support plan, and software user interface. In the System Construction, it is required to validate a new system for acceptance of the whole system. The system also needs to be tested carefully.

A. Installation

Microsoft Windows XP, Vista, 7 and all XP versions are easily compatible for installing of the software. For supporting plan, three parts are included back-end implementation, front-end implementation and last of all is the combination of the front and back-end implementation.

The back-end implementation is for storing the data as the user does not know the number of tables in the database. In the front-end implementation of the system, the front-end user can read the data and also they can modify or enter data without any concept of a database.

B. Software User Interface

In the software user interface, we can show the user interfaces of the whole project.

C. Starting up Screen

Here we can see that into the data entry part we can add the name, roll, registration number, session, department, and hall of the student. There is a capture option for taking a picture and in below there are the other buttons available save, browse for QR code, print, and close. By clicking the browse for QR code we can get the QR code. All the information can be stored by clicking save and can be printed by the print option.

D. *Capturing the picture of student*

Fig. 3. Capturing image of the student
Once we click the capture option then we can take the live picture of the student and then it can be saved into the box of the image

E. Save to Database

After providing all information, capturing an image and generate the ID demo the following interface appeared and once procedure had been completed then ID card was ready to print.
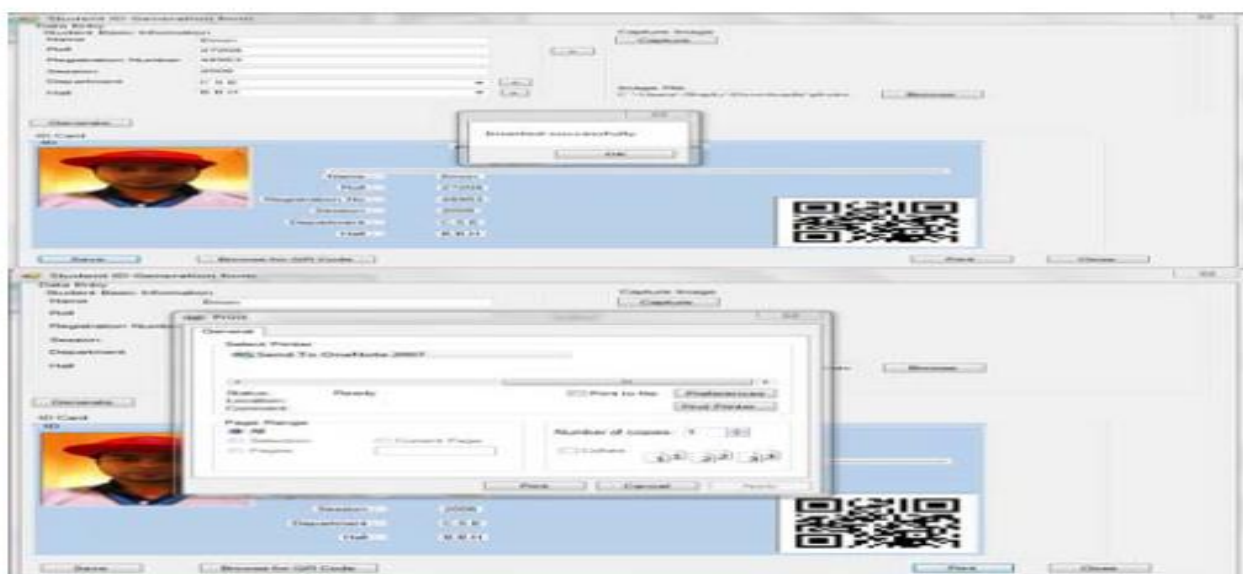

Fig. 4. Capturing student's image & printing order

G. Scan QR code of student

QR code was made from the www.smartytags.com. By opening account, we made QR code for the individual student and it was linked to the website: 80 www.qrcodesample.webs.com. The linked website is our educational sample website where the administrator will have student's secured data access using login details. The website will only show the general information of a student on homepage currently and student's data can be shown using SQL server Moreover, we can make our own QR Code using JSERVELET program. Now if someone scans the above QR code then it will give the following seen output on the iPhone

Fig. 5. Print screen shows web link for QR Code (Left) & our QR Code (Right)

Here (fig.5) we can see all the details of a student by using the phone. Therefore, the implementation of the advanced QR code automated student ID card has been done successfully.

V. EVALUATION

Data will be then collected and will be analysed to get the best result from the requirements of the users of the system. Then we can compare our ID card with another market available ID card and compare all the facilities as well, see Table I. Therefore it can be said that QR code is much better than anything to make the ID card perfect.

TABLE I. COMPARING QR ID CARD & OTHER ID

Subject	Traditional ID card	Normal ID card	QR ID Card
Type of ID card	Handwritten	Barcode ID Card	QR ID Card
Scan speed of barcode from smartphone	Do not have any facility	2.5 seconds	3 seconds
Swapping speed to open security gate	Not valid	3 seconds.	1.5 Seconds.
Information in each Code	Do not have Any	Hundreds of character	5000 Characters

CONCLUSION

By viewing all of the above analysis and result it can be said that the product is a GUI based system with highly efficiency. After completing the project we can make the surety of overcoming the problems of the existing system. Advanced QR coded Student ID card generation is being made computerised to increase efficiency and reducing of error of human being. All records and data are stored in Microsoft SQL Server management studio express database and from which respective data can be deleted and retrieved easily. Editing is made also flexible as the authority only need to give the required information and then print ID card with the image of a student with real-time video streaming and added QR code is introduced that contains details information of student which can be scanned in a single second using the smartphone. Computerisation of Advanced QR Coded Student Identity Card Generation will not only reduce the human stress but also improve human stress and advanced system with the modern QR code and all the things can be got free. Getting the modern technologies free is a great advantage for developing countries as they can introduce the system to their many different organizations and different educational institutions.

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