

# Exploring Concept of QR Code and its Benefits in Digital Education System

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**Abstract**— To Transfer Digital information from one Location to a different, one should specialize in Security and Privacy of concern document. During this era of digital world, with the evolution of technology, there's a necessary would like for improvement of on-line digital information and data. Nowadays, security and legitimacy of digital information become an enormous challenge. This project proposes associate innovative technique to manifest the digital documents in Digital Education System.

A Digital Education System is the future of India. E-Learning topology is implementing in many institutes of Higher Education.

The digital identification of the student as well as faculty is the starting phase of the Digital Education System. The Digitization of every content crucial to use in an education system has to convert and stored respectively for manipulation either online or offline.

A new method to embed 2 - QR Code in the mark sheet of student for authentication and checking the originality of the document. It can produce QR Code for mark sheet without using any encryption algorithm, which could be created and will be ready to print. The flexible data interface will be accessible data sources (MySQL Server). QR Code generation system will be utilized in universities, schools, faculties to modify the distribution of digitally verifiable mark sheets of scholars. The project aims at developing a QR Code digital system which can be used in universities to automate the distribution of digitally verifiable student result mark sheets and their profile information. The system accesses the student's result information from the Institute student database and generates the Mark sheets in Portable Document Format, which is tampered proof that provides the authenticity of the document. Authenticity of the document can also be verified easily by online method. The Quality of The developed QR Code is also verified. The testing and result are presented which state that the QR Code is the best way to compose the identical information of any entity to quickly figure out the originality.

**Keywords:** Digital, QR Code, URL, 2-D BAR Code Matrix, Mark Sheet.

## 1. INTRODUCTION

Education sector in Republic of India has long anticipated AN overhaul to fulfill the growing demand for a recent education system that's accessible to any or all. Youngsters and youth in our country dead the last decade become progressively

technology-driven, revealing goodish potential and readiness to imbibe and learn by digital media.

The Digital Education Revolution (DER) was an Australian Government funded instructional reform program, secure by then Prime Minister of Australia Kevin Rudd throughout the launch of his 2007 Australian federal election campaign in the state capital. It was started in late 2008, with the initial deployments declared by then Deputy Prime Minister of Australia and Minister for Education, Employment. Julia Gil lard so New South Wales counterpart, Verity Firth. The initial preparation passed at Fairvale high school in August that year.

Historically, education was designed and conceptualized as a face-toface educational method about to support and develop students' temperament and native potential to their fullest. This instructional ideal (i.e. the most goal of a country's instructional system) still supports an equivalent core beliefs nowadays, however the means that and channels of planning the educational method had to unceasingly update in keeping with the social and technological changes, in order that they will meet today's digital native's expectation.

The convenience of digital technology offers an extensive array of advantages and risks. Educators, parents, and students ought to perceive each the positive and negative potential of digital devices to require the full benefits of the technology. As an example, storing vital data (e.g. phone numbers, health data, etc.) in a manner that enables its access at any time, provides convenience however also will place users in danger if wind is assessed at the incorrect time, by the incorrect individuals, or if the device is misplaced: one in six Americans may be a victim of fraud per annual. Schools should take an entire faculty approach, operating with students and oldsters, to attain digital security for everybody.

Educators area unit liable for protective student knowledge, maintaining secure networks, filtering, and observance any access Educators area unit liable for protective student knowledge, maintaining secure networks, filtering, and

observance any access shared by students. Policies ought to be aligned with state and federal laws:

CIPA, HIPPA, FRCP thirty-four (archiving), Individual State Laws, FERPA, NCIPA, Education Laws, COPPA, Broadband Act protective Students for Twenty-first Centuries.

Network directors should keep current on the safety desires for technology inside the college, including configuration testing, monitoring, and change of all systems, as well as computers, servers, and networks. They are accountable for:

1. Knowledge backup
2. Personal devices connecting to the network
3. Work and log analysis
4. Antiviral and spy ware suppression
5. Filtering, patching, and firewalls
6. Documentation of systems
7. Applicable user access
8. Crisis preparation

Youth ought to come through digital security by maximizing edges of technology and minimize the risks; they need to shield the digital devices. A number of the vital steps they need to require advantage of the resources they need invested with cash and time are:

Secure their digital devices. Keep track of all the devices 24\*7 moreover as place them at many locations.

Secure the information algorithmic program generated passwords, and don't share them with anyone (except oldsters or guardians). Per a recent analysis, "one out of 5 net users still decides to depart the digital corresponding of a key under the doormat: they select a straightforward, basically guessed word like 'abc123,' 'iloveyou' or perhaps 'password' to safeguard their knowledge. To form a lot of artistic word, combine letters, numbers and even symbols.

Back up knowledge. Microsoft analysis showed that 9 out of 10 homeowners don't often copy their files.

Who were born within the digital era? Their preference is to look at visuals, videos, games and to scan shorter text instead of totally browse longer version. Since digital native's area unit, a lot of at risk of democratic culture means that model has to be compelled to become a lot of democratic and fewer passive. Even while not technology, this approach a minimum of mirrors the expertise of natives on-line - they need decisions and may direct their learning. Category websites chat rooms and educational games area unit some applications that may be enforced for digital natives.

Primarily Digital Education has three components:

1. The content

2. The technology platforms
3. The delivery infrastructure

## 2. THE RISE OF MOBILE LEARNING ACROSS THE WORLD

The global education sector is experiencing a shift in learning models. Fuelled by the exploding demand for mobile devices and digital education across the globe, mobile learning has become the thought and utterly modified the means within which earliest academic business models are perceived. With AN already well-established foothold within the West and exploding growth figures in rising markets, the increase of mobile learning is resulting in a desire for each firm and education establishments similar to amalgamate its use into their business and education models, severally.

### QR CODE

The Quick Response (QR) Code is a recent involvement of digital technology with print media. The Format of QR code looks like a 2-D Matrix Bar code. The Mobile Codes available today are 2-D and 1-D bar codes which work under the internet on Mobiles. Mobile phones today with proper configuration added Camera make it possible to read Mobile Codes as Code Scanner or Reader due to recent advancements in imaging technology. It combines both hardware modeling and image processing techniques.

Table 1: Three Common Types of Mobile Codes [1]




S. N	Example	Symbol	Data
1.		QR	<a href="http://www.openmobilealliance.org">http://www.openmobilealliance.org</a>
2.		DATA-MATRIX	<a href="http://www.openmobilealliance.org">http://www.openmobilealliance.org</a>
3.		EAN-13 [EAN/UPC]	5901234123457

Table 1 is an example of Mobile Codes available today, where QR and Data Matrix codes are 2D symbol and the EAN-13 code is a 1D symbol. These codes are generated by specific algorithms that encode data such that it form a structure of types to which it belongs. QR Codes have speedily gained international fame and found widespread adoption, particularly in Japan where it's ability to encode Kanji symbols by default makes it is mainly suitable. [1] [2]

## History

QR Code invented by Denso Wave in 1994. It uses as a registered trademark by Denso Wave for tracking product. Denso Wave promoted the widespread use of QR codes, by providing QR code tutorial at [www.qrcode.com](http://www.qrcode.com). QR codes as a quick, easy method to tracking their vehicles and auto parts. QR codes have been used on large scale in marketing campaigns since the early 1990s to create an interaction with a consumer. Denso Wave made an extensive use of this technology because of their potential in the auto industry. The QR code first came into the market as a commercial product in 2011 when the telecommunications industry was on a hike. Today QR Code has become popular due to new technology with Smart phones. [3]

### How is QR code different from bar code?

1. QR codes have a hundred times more storage capacity than the BAR code.
2. It stores information on both axes as horizontal and vertical.
3. The BAR code is only 1-Dimensional, But QR Codes is two-dimensional matrixes.
4. QR Code has error correction capability, but Bar Code doesn't have.
5. Standard linear bar codes can only hold up to 20 alphanumeric digits, but QR codes can hold up to 7,089 numeric characters and up to 4,296 alphanumeric characters value of data.
6. Readable from any direction in 3600. [2] [4]

### Standards of QR Code

QR Code is standardized based on respective national standards or international standards. It was approved as an international standard in June 2000.

## 3. DIGITAL EDUCATION SYSTEM

The Digital Education System is nothing but education using Digital Gadgets. The Information Technology advantage is that to provide vital information to the connected people. The developed countries all around the world are improving their education system via digital technologies. Using Digital Appliance in education is like making automation in study methodology. It is a process to provide knowledge form available resources to the student or participates to the belonging course.

India as developing country has recently started a "Digital India" program to enhance Digitization in India to reach the best solution to the common problem like Literacy, Corruption, and Long Time in processing. The solution to the all problem is Digitization of Common Application requirement.

The techniques to make education or study environment easier and reachable there is multiple ways to get a goal. Delivering video lectures are one to the main goal of the Digital Education System. The techniques and concepts incorporating the digital study process via Internet are known as E-Learning. Providing study material is one part of Digital Education System, but if the system wants to organize an examination of the participants; then the system which provides examination is called Digital Examination System. Digital Examination System is very popular these days as many competitive exams are organizing with its help. The advantage is to maintain records of all the participants at a single location; it also facilitates generating result and analysis report very fast and accurate using Digital System. So, Digitization in Education making is easier to spread and maintainable the record as well resources.

## 4. LITERATURE REVIEW

There have been number of technologies proposed to generate the QR code for documents or mark sheets.

**Somdip Dey, Asoke Nath et al.** suggest Associate in Nursing inventive methodology to attest the digital documents, in which an associate in Nursing trespasser tries to vary the marks within the mark sheet then he cannot try this within the QR Code, as a result of the cryptography secret is unknown to him. Wherever the marks obtained by a candidate will be encoded in QR Code in encrypted type, during this methodology, we have a tendency to write the mark sheet information mistreatment the TTJSA cryptography algorithmic rule. The encrypted marks area unit entered within QR code which QR code is also written with the first information of the mark sheet. The marks will then be extracted from the QR code and may be encrypted mistreatment TTJSA cryptography algorithmic rule and so it will be confirmed with marks already there within the mark sheet. [5]

**Srushti A. Shimpi et al.** - provides the certificate generation system is versatile for generating the mark-sheets of the scholars. This technique is principally based mostly} within the info technology and also the credit based grading system (CBGS). The system is targeted to varied enterprises, schools, schools and universities. Certificate generation system will be utilized in universities to change the distribution of digitally verifiable mark-sheets of scholars. The system accesses the scholars' communication info from the university info and generates the gadget-sheet and mark-sheets of all the students in a very transportable document format that provides credibility of the document and may be verified simply. [6]

**Dr. Neeraj Bhargava et al.**—They deal with the ability to come up with QR bar codes with facilitate of document package like ms-word document 2007/2010. The main goal is to attain creation and understanding the technology of QR code in today's atmosphere. [7]

**Mr.Madhav V. et al.** - presents an innovative methodology to digitize the educational transcript i.e. mark-sheets, and insert the digital format within the mark-sheet itself within the variety of encrypted QR Code; so that the digital knowledge cannot be retrieved by any unauthorized user. During this approach, we will save plenty of digital area; that is critical to saving lots of those digital tutorial records of every student. During this new mark sheet system, the digital knowledge, which is embedded within the mark sheet in a variety of encrypted QR Code, will solely be retrieved and encrypted victimization our own net application that is hosted over a network. [8]

**Somdip Dey** - the author presents a brand new methodology to digitize the educational transcript i.e. mark-sheets, and insert the digital format within the mark-sheet itself within the variety of encrypted QR Code and that they used unambiguously encrypted algorithmic rule i.e. own custom engineered cipher methodology with unambiguously generated key, that is extremely secure so. [9]

**5. PROPOSED SYSTEM**

The QR Code generator generates the QR Code for the mark sheet using huge data and provides QR Code in a very user-friendly manner by not making it very complex.

The system being automated and generalized, in the system the administrator keeps the information on the server. This data carries the details of students, their marks and academic details, then server on require patches the encoded QR Code by the feature of system. It aims to improving and easing out the work of the existing.

As exposed in Fig.1 there are two QR codes generated on the mark sheet in which first one show the profile information and academic details of the student and another one show the URL information of the server and also provide online authentication of the mark sheet for example Rajasthan Technical University. Such system can be used by any sort of university on a large scale for authenticating the mark sheets.

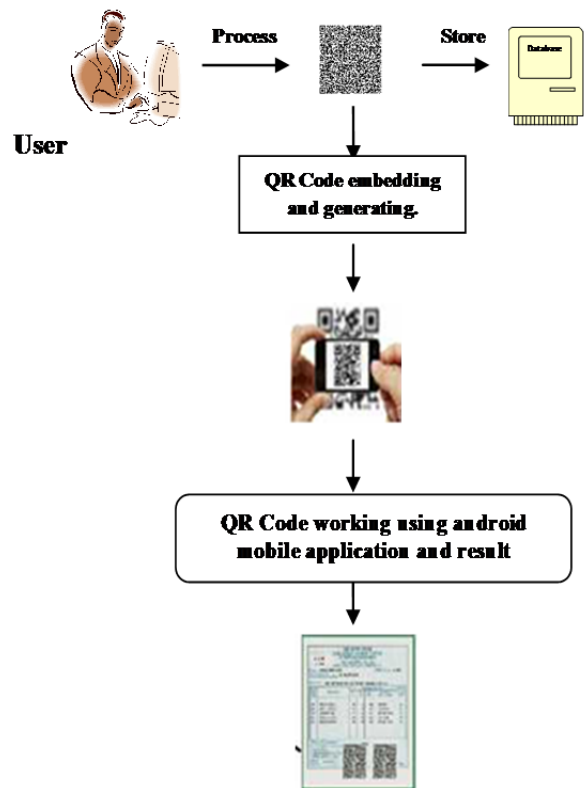
The technology is rapid and can generate, store & display the mark- sheets along with the student details of the students using Android Apps. [10]



**Fig. 1 QR code based digitized mark sheet system [11]**

**6. ALGORITHM**

1. Is to acquire significant information from the user using design form. (Either window application or web application).
2. The information acquired will then process for QR Code embedding.
3. The exterior libraries for QR Code generation for using PHP will call the function to embed and generate two QR Code images, one QR code image embeds profile and academic information of the student and another image embed URL information of the corresponding server.
4. Then connect the database to store the information achieved.
5. Now store the QR Code an image folder with the unique id.
6. To show respective QR Code with their related information.
7. Now to test QR Code working using Android mobile applications and present the result.



**Fig. 2 Flow Chart for QR Code generation for Document**

## 7. ADVANTAGE OF PROPOSED SYSTEM

1. There need not go for Xerox copy attested for Mark sheet and other official document for verification instead can be show and check by just scanning the QR Code. It will improve the response and efficiency of overall System.
2. Information retrieval and verification on 24\*7.
3. Easy to manage digital document with QR Code.
4. Eco- friendly.
5. Due to availability smart phone QR code scanning, no other S/W is required to purchase for QR code scanning.
6. A young to old, who is an able to operate to mobile phone take advantage of QR code verification.

## 8. FUTURE SCOPE

This research work not only provides authenticity of the Mark sheet; but it can also apply in another field such as degree evolution, Students fees account statement, Students activity records, Faculty Records, and Study Material as well. This proposed concept is very significant for Government Organization, which deals public matter such as E- Mitra (billing system). Government Certificate, Government Policies, etc.

## 9. CONCLUSION

By this paper, the conclusion is that authenticity and security are provided the document without using any encryption algorithm. This authenticity is providing by URL QR Code. This is very simple and innovative method to digitize the mark sheet in the digital era. The keen advantages of Digital Education System are the transparency of records, availability 24\*7, Reliability and easy to access or student as well as their parents.

The concept of digitally mark mark-sheet with QR Code can also be applied to college and university for higher education. The Rajasthan Technical University with facilitating students to view result and Mark sheet online but there is no authenticity, and it can easily be duplicate.

By using the concept of this research the overall efficiency and faith of user as well as university can be established. If RTU provides Mark sheet online with QR Code embedded a person can directly check the originality of the QR Code.

There is no chance to create Mark sheet because the original marks can be verified by just scanning the QR Code (Mark sheet). It is the best Method to provide authenticates the information in just short time.

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