



## SECURITY IN PAYMENT WALLETS USING QR CODE: A REVIEW

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**ABSTRACT:** A barcode is an optical machine-understandable exemplification of data relating to object to which it is committed. Later they changed into rectangles, dots, hexagons & other geometric patterns in two dimensions. Albeit 2D systems utilize a variety of symbols, they are in general referred to as barcodes as well. QR code stands for Quick Response Code, Which is trademark for type of matrix barcode which was invented by Japanese corporation Denso Wave. QR code has a number of elements such as large capacity data encoding, dirt & damage resistant, high speed reading, small print out size, 360 degree reading & structural flexibility of application



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**Keyword:** OR, CIRCUMVENT, SYMBOLS, ECEMPLIFICATION, ARCHITECTURE

### [1] Introduction

A QR code or quick response code is a kind of barcode that could be read using a bar code scouldner. These shoulders are mainly referred to as QR code scolders. Scolders are in form of apps for smart devices. These codes could contain encoded info such as website URLs, data, & text as well as pre-formatted SMSs among other things. These codes initiate from Japan where they were used by Toyota to track car parts. Today, all smart phones come with a QR code scolder to verify that everyone using a smart phone could benefit from this technology. Today, QR codes are used by businesses & companies to reach out to their client base.



Fig 1. Using Qr code in PayTm wallet

### [2] QR Code Payments

Compared to NFC, a QR Code is a much cost-effective & viable option. Enabling mobile payments via QR Codes would only need following software updates:

Update to mobile app that includes QR Code scanning & generation features. This is possible by integrating a **QR Code Generation API**

Update to POS to accept payments processed by your service

Most retailers had barcode scanning hardware integrated within their POS for billing of products. So no need for extra hardware. Let's assume small businesses do not had scanners. Even then buyers could make QR Code payments. Let's see how this works.

#### QR Code Payments Working

Businesses had options on how they wish to process QR Code payments. This depends on scale of business — self-employed, small business, or large retailer.

#### Buyer-to-Large Retailer Transactions

This system of QR Code payment applies to large retailers such as supermarkets. Let's assume they had barcode scanners at each POS.



This is how it works:

Let's say buyer Megan picks up items worth \$500 at Walmart & goes to cashier for checkout

The cashier scans each item & generates a bill of \$500. He generates a unique QR Code on a screen near POS

Megan opens payments app on her smart phone, scans QR Code, & authorizes payment

The cashier gets a notification that Megan had made payment & prints sale receipt

If you think this type of QR Code payment is far-fetched, think again.

Here are major retailers who had already deployed this:

### **Walmart Pay**

In 2015, Walmart added Walmart Pay to its app. They did this to get rid of extra fees charged by credit card companies & Apple Pay. Using Walmart Pay app, buyers could pay within any major credit, debit, or pre-loaded gift card.

### **Starbucks**

For a long time now, Starbucks had been using this method of payment. Customers had cards within QR Codes. Instead of swiping a credit/debit card, cashier scans QR Code using a fixed scanner. System deducts bill amount from prepaid card. Customers also had option of using a 'virtual card' on their Starbucks app.

### **Buyer-to-Small Business Transactions**

This mode of QR Code payments applies to small businesses & retail outlets. Let's assume they do not had barcode scanners at POS.

This is how process works:

Megan picks up items worth \$10 at a small store

The cashier requests her to make a payment & points at a printed QR Code near POS

Megan opens payments app, scans QR Code, enters amount, & authorizes payment

The cashier gets confirmation via SMS

Note that in this case, buyer enters amount & merchant had a permanent QR Code. This QR Code helps buyer app to identify merchant account.

### **Peer-to-Peer Transactions**

This mode of QR Code payment applies when an individual needs to pay another. For example, friends, family members, or self-employed professionals.

This is how it works:

Megan just got some plumbing work done from Mark, plumber & she now owes him \$50

Mark opens payments app & generates a QR Code worth \$50

Megan opens her payments app & scans this QR Code on Mark's phone to allow transfer

The transfer is complete & both Mark & Megan receive an SMS confirmation

### **Architecture of QR Code:**

Data could be translated into QR code via any QR generator, many of which are available on lie for free. User's simply enter data converted to security code electrically form. That contains authentication information like some people personal information & company's logo etc.

## **[3] LITERATURE REVIEW**

**Gresham Muradzikwa in 2014 Designing of Android Mobile Based System Using QR Code**  
**INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH & DEVELOPMENT Vol 3 Issue 11**

This paper explores a solution to create a cashless mobile payment system. aim is to provide most cost efficient & secure alternative to current systems. Current systems use SMS & USSD to process payments. These are not cost effective of communication. There is also no current method of processing credit payment on a mobile phone without need for a specialized piece of hardware. system



is broken up into three parts, a visual QR code, Qpay Android application & a payment server. identification of mobile phone is encoded in a QR Code allowing built in camera on a mobile to scan a card. This is improved on by using a HTTPS connection between mobile phone & server. HTTPS provides an encrypted communication channel. This paper shows that a mobile can capable of processing QR code payments on a mobile. Time taken to process a payment was within an acceptable limit. objectives of project were met. Having been equipped within a clear statement of system requirements & design specifications application was developed using Java Eclipse & android Eclipse. system design & implementation was successfully done properly & Qpay Android Application System is now working properly. application was designed with the system requirements in mind thus; it fully meets all specified requirements.

**Dr. Neeraj Bhargava 1, Anchal kumawat 2, Dr. Ritu Bhargava3 in 2014 Demonstration of Barcodes to QR Codes through Text Using Document Software International Journal of Innovative Research in Science Engineering & Technology Vol. 3, Issue 9**

There is increased interest in use of barcodes to encode more information per area unit than regular, black and-white barcodes. This research paper deals within facility to generate QR barcodes within help of document software such as ms-word document 2007/2010. Main goal is to achieve creation & understanding technology of QR code in today's environment. This research paper analyze that generation of a QR code within help of document software. A general user could generate own QR code of their text in a user friendly environment of word & a user could generate for this by following above steps given in this research paper.

**Sankara Narayanan in July 2012 QR Codes & Security Solutions International Journal of Computer Science & Telecommunications Volume 3, Issue 7**

Identification of objects & places in real world is important, & 2-D printing code is useful to store identifiers of them. Any camera mobile device within capture function could read content from a barcode tag directly. A barcode contains important data or privacy information, risk of security becomes an important problem. Because QR codes simply feature a square barcode within a unique pattern, people had no idea whether code would take them to reputable information or a site loaded within malware. In this paper, discusses QR codes different data types, attack via QR codes & security solutions. However, since it is easy to modify content stored in 2-D code, we must verify whether identifier written in 2-D code is indeed issued by authorized organization. In general, we believe that QR codes had great potential in business media.

**Ashvini Bharambe, Vaishali Bhirud, Dhanashri Bhuse In May 2016 Android Mobile Based Payment System Using QR Code International Journal of Trend in Research & Development, Volume 3(3)**

In Era of Computer Technology, We need to communicate & accelerate our life within help of Information & Technology (ICT). We all require certain types of services on online, which require less workout or interference of Human being. Mobile payment is very significant & critical resolution for mobile commerce. A user-friendly mobile payment solution is robustly needed to carry mobile users to conduct secure & reliable payment transactions using mobile devices. This paper presents a modern mobile payment system based on 2-Dimensional (2D) barcodes called QR-codes for mobile users to recover mobile user experience in mobile



payment. Unlike other existing mobile payment systems, projected payment answer provides distinct advantages to support buy-and-sale products along within services based on QR codes. Safe QR-Pay scheme based on QR-code by expressing 2 dimensional could pay things between User & Merchant. As more & more products & goods are identified using 2D barcodes in commerce, there is a clear need to build new mobile payment systems for mobile users to support mobile transactions based on 2D barcodes. To address this need, this introduces an innovate mobile payment system, which supports & delivers secure & easy operating mobile payment transactions based on 2D barcodes. When digitally signed document is printed out in a human-readable text image, it is useful to include signature information in text image for authenticity & integrity checks. within development of dense 2D bar codes, we could put digital signature in 2D bar code form into a small area of printed document.

**In 2014 Kinjal H. Pandya & Hiren J. Galiyawala brought out a research paper titled “A Survey on QR Codes: Research & Application”** which was about QR code being a type of matrix barcode, which was first designed for automotive industry by Denso Wave in Japan. QR Code system had been become admired outside automotive industry due to its fast readability & greater storage capacity compared to standard UPC barcodes. Within technology of mobile phones constantly emerging, especially in area of mobile network access, QR codes to be an adequate tool to quickly & efficiently converse URLs to users. QR code so versatile because of its structural that it leads to so many diverse field for research such as increasing data capacity, security applications such as dissimilar types of watermarking & steganography as well.

A barcode is an optical machine readable something of data relating to object to which it is committed. QR code stands for Quick Response Code, Which is trademark for

type of matrix barcode which was invented by Japanese corporation Denso Wave. QR code had been a number of features such as large capacity data encoding, dirt & damage resistant, high speed reading, 360 degree reading & structural flexibility of application. This paper includes basic understanding of QR code in next section.

**In a research titled “Application of QR Codes in Mobile Tagging System for Retrieving Information about Genetically Modified Food” by Tan Shian Long Yoon Foo & Roshan Idrus** explain that purpose of their paper is to introduce an integrated mobile system, which could be used by consumers to retrieve product information about Genetically Modified Food (GMF) products in market. In proposed mobile tagging system, 2 dimensional Quick Response (QR) codes are adopted as tag for identification purpose. Consumers could use camera on their mobile phone to capture image of QR codes & send to server for decoding. Subsequently, server sends back details of GMF product in form of Multimedia Message Service (MMS). This paper reviews & discusses various available tagging techniques, & thus justifies appropriateness of QR codes to be used in proposed system. Additionally, paper presents overall system architecture & system design of proposed mobile tagging system.

#### [4] OBJECTIVES

The objective of research is use investigate into QR code based security in digital wallet.

The opportunity to put ones business & clients into action had been increased manifolds using QR codes. 2D barcodes are giving smart-phone users direct access to products, services & information. This might be looking to re-order, to engage you or just want more information. By simplifying process for a mobile user, person could hard link his/her business clients.



QR (quick response) code scouldning had been increased by 1600% over last year. Around 68% are between ages of 25 to 55. As you could see from chart below, people are very interested in using QR codes for getting more information. You could use them to build your customer base & if used intelligently could help you create recurring consumers.

### ADVANTAGES OF QR CODES

One of main elements that had been contributed to QR Code's great success is remarkable versatility that it offers its users. QR Code could redirect its scouldner to a website, a specific location on a map, a video or song, a Facebook profile page, could made a contact in your address book or even call a special number. When you create a QR Code, you have freedom to break out of mundane, banal crowd & advertise your product in an original, approachable manner that is most suitable for your product, in a path that enhances its advantages. Although QR Codes look like an innocuous cluster of black & white dots, they have potential to raise your product or company to a higher level of awareness, accessibility & success.

## [4] PROBLEM FORMULATION

### Need & significance of proposed research work

**There are several areas where QR Code has been used.**

**Some of them are discussed as follow:**

#### 1. Virtual stores

During month of June 2011, according to one study, 14 million mobile users scanned a QR code or a barcode. Some 58% of those users scanned a QR or barcode from their homes, while 39% scanned from retail stores; 53% of 14 million users were men between ages of 18 & 34. use of QR codes for "virtual store" formats started within South Korea, & Argentina, but is currently expanding globally. Walmart, Procter & Gamble & Woolworths have already adopted Virtual Store concept.

#### 2. Code payments

QR codes may be used to store bank account information or credit card information, or they may be specifically designed to work with particular payment provider applications. There are several trial applications of QR code payments across world.

In November 2012, QR code payments were deployed on a larger scale within Czech Republic when an open format for payment information exchange - a Short Payment Descriptor - was introduced & endorsed by Czech Banking Association as official local solution for QR payments QR codes are commonly used within field of cryptographic currencies, particularly those based off & including Bitcoin. Payment addresses, cryptographic keys & transaction information are often shared between digital wallets within this way.

#### 3. Website login

QR codes may be used to log within into websites: a QR Code is shown on login page on a computer screen, & when a registered user scans it with a verified smart phone, they will automatically be logged in. Authentication is performed by smart phone which contacts server. Google tested such a login method within January 2012.

#### 4. Storage

The amount of data that may be stored within QR code symbol depends on datatype (*mode*, or input character set), version (1, 40, indicating overall dimensions of symbol), & error correction level. maximum storage capacities occur for 40-L symbols.

Here we will discuss use role of QR Code within securing details of items that are represented on e-commerce based site.

## [5] METHODOLOGY/ PLANNING OF WORK

### Existing threats to payment system

There are several threats to payment wallet based system.



A **hacker** is someone who seeks & exploits weaknesses within a computer system or computer network. Hackers may be motivated by a multitude of reasons, such as profit, protest, or challenge. subculture that has evolved around hackers is often referred to as computer underground & is now a known community. While other uses of word *hacker* exist that are not related to computer security, such as referring to someone with an advanced understanding of computers & computer networks, they are rarely used within mainstream context. They are subject to longstanding hacker definition controversy about term's true meaning.

### Techniques

#### *Password cracking*

Password cracking is process of recovering passwords from data that has been stored within or transmitted by a computer system. A common approach is to repeatedly try guesses for password.

#### *Packet sniffer*

A packet sniffer is an application that captures data packets, which may be used to capture passwords & other data within transit over network.

#### *Spoofing attack (Phishing)*

A spoofing attack involves one program, system or website that successfully masquerades as another by falsifying data & is thereby treated as a trusted system by a user or another program—usually to fool programs, systems or users into revealing confidential information, such as user names & passwords.

### [6] CONCLUSION

We have studied in detail what QR codes are & what are its fields of application. We have understood that QR codes have a very bright scope of work for future as it had been a very wide area of application. QR code had been an appealing factor to it what marketers worldwide are catching up to. It just started as a identification tool o

assembly line of vehicles & today it finds its application in almost every aspect of life from branding to medical science, to education to promotion, from visiting cards to application forms etc. Since it could be encoded & could be password protected so developer could restrict type of users who could navigate to 'link' provided in QR code.

The company issuing QR code could also develop a data base of users that scould on to QR codes as QR scouldners are linked to profile info provided by user in its OS of mobile handset. Hence it had been a big statistical advantage over other technologies. Then we have also studied amount of data that could be stored in a QR code & methodology to store data in QR code. We have also seen that QR codes could be customized in any color scheme & therefore had been an artistic value to it too.

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