QR Code and Application in India

Suraj Kumar Sahu, Sandeep Kumar Gonnade

Abstract- This paper examines QR Codes and how they can be composed and scan and decode by a camera. QR code is 2-dimensional barcode used for quick response in promotional and marketing purpose. The paper describes about QR code, how QR code is different from barcode, It's formation, Capacity and Error correction code. It's application in India and worldwide.

Keywords: QR Code, Cryptography, Data Hiding, encryption, decryption, code generation;

I. INTRODUCTION

QR codes (short for Quick Response codes) is a two dimensional barcode were invented in 1994 by the Toyota Motors subsidiary Denso Wave to track vehicles and parts during the manufacturing process. The QR code consists of black modules (square dots) arranged in a square grid on a white background. The information encoded may be made up of data (numeric, alphanumeric, byte / binary, Kanji) or, through supported extensions, virtually any type of data.

A QR code is read by an imaging device, such as a camera, in a mobile phone and there a number of different barcode scanner applications such as Red Laser, Barcode Scanner and QR Scanner that can read and decode data from a QR code. The majority of these are completely **FREE**, and all you have to do once you install one is to use your phone's camera to scan the barcode, which will then automatically load the encoded data for you.

II. QR CODE IS DIFFER FROM BARCODE

A QR code is a type of bar code. A bar code is one dimensional whereas QR codes are two dimensional. QR codes can hold far, far more data. QR codes can trigger several different types of actions, such as send a tweet, dial a phone number, bookmark a webiste, download a Vcard, Also, QR codes can be modified with up to a 30% loss ratio, so they can be branded to reflect your business.

The QR code, similar to a barcode, is an example of an information matrix. However a significant difference in the two is that while a barcode only holds information nicely in the horizontal direction, a QR can do so vertically as well. This is why QR codes are referred to as two-dimensional, because they carry information both vertically and horizontally.

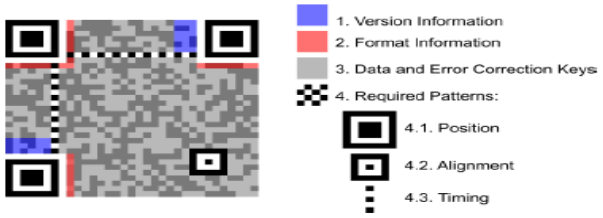

FIG. 2.1 BARCODE

FIG 2.2 QRCODE

QR codes are far more powerful and can contain much more information. While out current barcoding system holds information only one-way, QR Code holds info both vertically and horizontally.

III. CONCEPT OF STEGNOGRAPHY

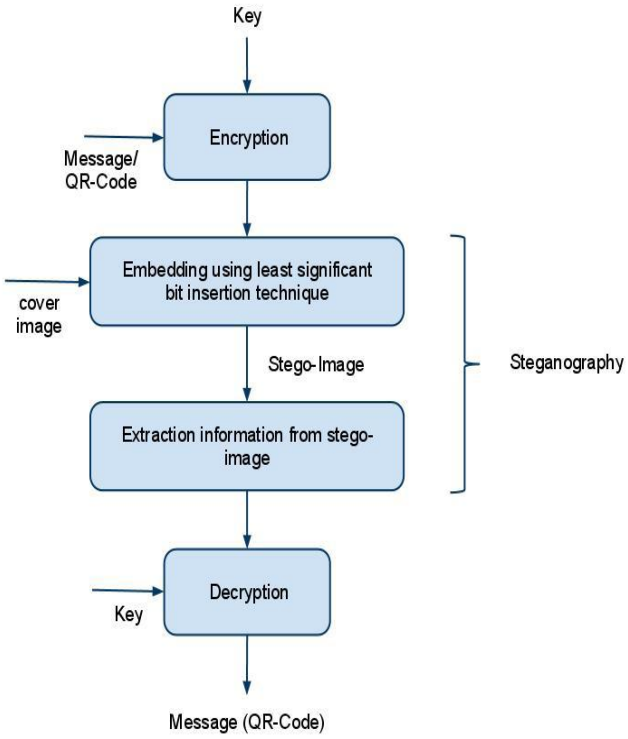

Figure: 3

3.1Embedding phase

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Suraj Kumar Sahu, M-tech (CSE) MATS university Raipur (C. G). India.

Mr. Sandeep Kumar Gonnade, Asst. professor-department of computer science and Engg. MATS university Raipur (C. G.) India.

- In integration of QR code using stegnography use not only embedding the text but also imbed the other file like; audio clip, word file, video clip etc.
- In the stegnography use the embedding phase. In imbedding phase firstly generate the QR code and now we can use the cover image as QR code and now imbed the data in cover image that is QR code now encrypt and send to the receiver side.
- Then use the stegno decryption and remove the QR image and find the original data. The QR code can access by scanning with the help of smart phone using the android application that capable for encoding the QR image.
- These methodology uses for embedding the data, signature, embeds the very personal document and send by the mail using internet.
- This method can be used to stegno encrypt any type of message or file (picture, video, audio, etc.) in the cover image AS QR code and send it to the receiver safely or the method can also be used to store important data or information safely. The inclusion of QR Code adds an extra level of security to the encrypted message and the receiver can access the original message very quickly, just by scanning the QR Code and decrypting it using a this software. Future scope of this technique is big and can also be implemented in daily life use, but, the use of this technique in reality depends and varies from user to user.
- At the end of Embedding Phase a Stego Image is obtained which contains an encrypted QR Code embedded in it.

3.2Extraction phase:

Use the stegno decryption and remove the QR image and find the original data. The QR code can access by scanning with the help of smart phone using the android application that capable for encoding the QR image.

For encryption and decryption we can use the Rijndael algorithms that is advance encryption standard.

3.3 Rijndael algorithms: AES

- It is *not* a Feistel cipher.
  – It works in parallel over the whole input block.
- Designed to be efficient both in hardware and software across a variety of platforms.
- It's a block cipher which works iteratively
- Block size: 128 bit (but also 192 or 256 bit)
- Key length: 128, 192, or 256 bit
- Number of rounds: 10, 12 o 14
- Key scheduling: 44, 52 or 60 subkeys having length = 32 bit_ Each round (except the last one) is a uniform and parallel composition of 4 steps
- SubBytes (byte-by-byte substitution using an S-box)
- ShiftRows (a permutation, which cyclically shifts the last three rows in the State)
- MixColumns (substitution that uses Galois Fields, *corps de Galois*, GF(28) arithmetic)
- AddRound key (bit-by- bit XOR with an expanded key)

IV. APPLICATION OF QR CODE

The potential uses for QR codes within an industrial context is virtually unlimited; here are but a few examples:

- **Maintenance & Repair Records**
  Maintain service records and important documentation for equipment and buildings.
- **Operations & Instructions**
  Provide instructions and procedures for performing critical tasks or operating equipment; communicate this information using text, images and/or video.
- **Facilities Management**
  Document critical specifications and schematics within key locations (e.g. wiring, plumbing, electrical, and alarm systems) that can be accessed by contractors and maintenance personnel.
- **Regulatory Compliance**
  Document important authorizations needed to comply with local, state or federal regulations, such as inspection or expiration dates, permits or licenses.
- **Inventory Control**
  Document important information about equipment components or complex systems.
- **Emergency Contacts**
  Provide direct access to important departments and personnel via mobile-friendly technologies such as click-to-call, text messaging and email.

4.1 Marketing & Promotion Campaign

Business Card: Possibly the best place to get started using a QR Codes is on your business card. The empty back side of a business card is like free parking spot, so why not take advantage of the available real estate and drop on a QR Code?

Brochure:. By adding a QR Code, your 1 dimensional brochure actually becomes interactive.

Direct Mail: The goal of almost all direct mail campaigns is to get the recipients to take some sort of **action**. If the action has anything to do with delivering the recipients to a web address than a QR Code is really essential. Not only does it provide an alternate way to arrive at the desired URL (*no* typing required), but it also means that the recipient doesn't even need to have a computer to visit the landing page.

4.2 Educational Application of QR CODE

Book Reviews

One of the best ideas heard for using QR codes is in the school library. QR codes are created for specific books, linking to reviews, trailers or additional resources. The QR codes are then printed on to stickers and stuck inside the cover of the book. This is great as students can scan and learn more about the book before they choose to read it.

Multimedia Content

A popular use for QR codes in education is to add multimedia content to hard copy pages. It is kind of like a stepping stone on our way to fully digitized textbooks and worksheets. The below example is one of my favorites where the elements of the periodic table have been replaced with QR codes. Each code links to a YouTube video discussing the element in question.

Solutions and Tutorials

A practical and fun application for QR codes is a modern version of answers being written in

the back of the book. By placing answers to questions online and linking with QR codes, students can attempt their own solutions before using the code to review the correct answer.

V. RESULTS

I represent the methodology of QR code that provide the encoding and decoding capacity also use the stegnography then find the following result;

1. Integration of QR code resolve the capacity problem and store the max data as compare other conventional barcode.
   The QR code store the data both direction vertical and horizontal. So it can increase the capacity of storing the data. Mostly the QR code stores the numeric, alphanumeric, binary (8bit) data.
2. The QR code increases the security of data. When we want to send any massage or personal data then encode the data in QR code and then send it to the receiver side so it can be very confusions for access the data because we can see only the image but not data.
3. Integrate the two QR image. The first QR image as a cover images another can be use the original data.
   When integrate the QR image encode any data and now encode the data which will be very secure now encrypt and integrate using stegnography. Now if we want access the data then firstly stegno decrypt the QR and find the data.
   If we want to send any other data like; audio clip, video clip, word file etc; then we can use the stegno encryption and decryption and embed the data and encrypt now embed the data now send to the receiver side.
4. The QR code is very user friendly because the data can be access only single scan by using the smart phone.
   If we want to access the data from the QR image then we can use the smart phone using the android application and scan the image by capturing in camera and scan the image and find the data.
5. The QR code can be use in magazine, newspaper, busses and encrypted QR code can be use in driving license, shopping card etc.

VI. CONCLUSION

In this paper we outlined the QR Code, it's structure, working and it's various possible application and it's implementation in India. QR Codes. Since QR Codes gain increasing popularity through their use for marketing purposes, Furthermore, many mobile devices (e.g., smart phones) at present are able to decode QR Codes and access the URLs contained in them. QR codes put information at your fingertips with just one click. QR codes can be attached to any print media including brochures, presentations, programs or business cards. Most business owners include their web address on their business card.

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