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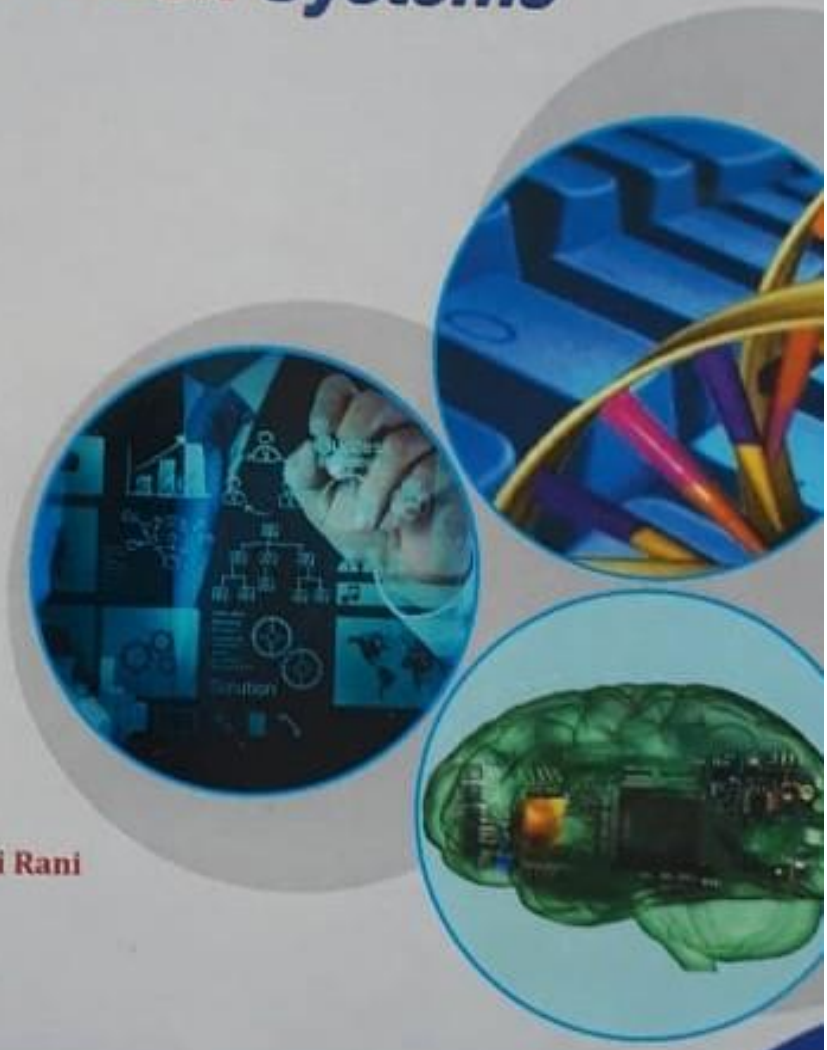

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Section IV: Information Security

Enhancing Data Security by Merging QR Codes and Steganography

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Abstract

In recent years data communication has been increased dramatically and the Internet has become effective and fast media for digital data communication. At the same time, communication over the has become susceptible to copyright, infringement, eavesdropping, hacking etc. So it is necessary to data in a secured way. Cryptography and Steganography play major role for secured data comm Steganography stands for concealed writing; it hides the message inside a cover medium. Cry conceals the content of a message by encryption. QR (Quick Response) Codes are 2-dimensional that encode text strings. They are able to encode information in both vertical and horizontal dire able to encode more information. In this paper a novel approach is proposed for secret commun combining the concepts of Steganography and QR codes. Experimental result shows that the method has high imperceptibility, integrity and robustness.

Keywords: *Steganography, QR code, BER*

I. Introduction

Cryptography, Steganography and Watermarking techniques can be used to obtain data security, secrecy, privacy and authenticity of data. Cryptography scrambles the data and makes it unreadable and unintelligent form called cipher. Steganography hides the data in a medium and conceals the very existence of the message in the medium. QR code is a two dimensional bar code capable of encoding different types of data like binary, numeric, alphanumeric, Kanji and control code. A piece of long multilingual text, a linked URL, an automated SMS message, a business card or just about any information can be embedded into the QR code.

QR codes (Quick Response codes) were introduced in 1994 by Denso-Wave, a Japanese company subsidiary of Toyota. Initially, these codes where conceived as a quick way to keep track of vehicle parts, being nowadays extremely popular in Asian countries like Japan, South Korea, China or Taiwan and becoming more and more popular in western countries by the day. [1] QR codes are capable of encoding the data both in horizontal and vertical direction, thus able to encode several times more data than the barcodes. The following table shows the maximum number of characters encoded in a QR code (version 40) with and minimum error correcting level L:

Table 1: Capacity of QR Codes

Sl. No.	Data Type	Characters
1	Numeric data	7,089
2	Alphanumeric data	4,296
3	8-bit byte data	2,953
4	Kanji data	1,817

Figure 1 shows a QR code and Error (EC) levels. [2] The technology of QR codes out to be successful even if the code damaged. This is feasible due to the error QR codes, which is based on the Reed-Sal There are four levels of error correcti which can tolerate up to 7% damage. Me tolerate up to 15% damage. Quartile (Q) up to 25% damage and High (H) can t 30% damage. The reason why the L correction level is preferred is that th correction levels raise the percentage used in error correction thereby d amount of data that can be stored in the black and white modules of the QR cod the encoded data. This information is human readable form hence an ind anticipate the information. Any sma built-in camera can capture the image QR Code and then decode the data prese

Fig. 1: QR Code and EC Leve

The advantages of steganograph are taken into consideration for algorithm to enhance data security.