An Effective Technique to Protecting Sensitive Information Using 2d Data Matrix

Mr.L.S.Khedekar[*], Dr.A.S.Alvi[**]

[*] Information Technology, PRMIT & R,Badnera
[**] HOD,Information Technology, PRMIT & R,Badnera

Abstract- Today barcode system is very popular to protecting sensitive information. Many organizations are using this technique for protecting sensitive information. This paper presents an algorithm for hiding of data using 2D matrix code for high level of security.

The proposed algorithm uses some modified definition of support and confidence so that it would hide any desired sensitive association rule without any side effect. Actually the enhanced technique is using the same method (as previously used method) of getting association rules but modified definitions of support and confidence are used

Data Matrix is a matrix (2D or two-dimensional) bar code which may be printed as a square or rectangular symbol made up of individual dots or squares. This representation is an ordered grid of dark and light dots bordered by a finder pattern. The finder pattern is partly used to specify the orientation and structure of the symbol. The data is encoded using a series of dark or light dots based upon a pre-determined size. The minimum size of these dots is known as the X-dimension.

Index Terms- Barcode, Confidence, Data hiding, 2D Data Matrix and Support.

I. INTRODUCTION

This proposed paper is related with many government agencies, businesses and non-profit organizations in order to support their short and long term planning activities, they are searching for a way to collect, store, analyze and report data about individuals, households or businesses. Information systems, therefore, contain confidential information such as social security numbers, income, credit ratings, type of disease, customer purchases, etc. that must be properly protected.

Automatic identification systems provide a fast and efficient identification of products. Among the most frequent are certainly the barcodes, which we encounter daily on the majority of retail products. Even though they enable a quicker identification of products their drawback is that they can encode only small amounts of (usually numerical) data and their size is not suitable for labeling small items. The concept of 2D codes is based on coding the data in both horizontal and vertical directions. Its development enabled the encoding of much larger quantity of numeric or alphanumeric data, up to 70 times compared to conventional barcodes, on a smaller area. This enabled the labeling and identification of even the smallest products. In addition, 2D codes are more and more used in different types of advertising and information management. 2D codes can encode the link to web pages and other types of information accessible by mobile phone capturing. 2D codes can be printed on different packaging and thus give to the customer additional information about the product or can be linked to the producer`s web page or other content. The customer scans the code with a mobile phone camera, software in the mobile phone decodes the 2D code and the decoded message is visible on the mobile phone display

II. GENERAL STRUCTURE

2-D bar code consists of a certain white and black geometric modules that alternately arrange in the vertical and horizontal directions according to certain rules see Figure, and it is a symbol with large capacity for storing information. As the 2-D bar code with smallestsize in the world, data matrix code is widely applied to electronic product components. 2-Dbar code recognition technology shows great commercial value, and at present, most COTS (commercial of the shell) recognition algorithms are proprietary and protected by patents, so the 2-D bar code recognition technology is in a great demand for researching. Figure Datamatrix structure shows the principle of a Datamatrix barcode.

The image shows an annotated Datamatrix where the finder and synchronization patterns have been highlighted.

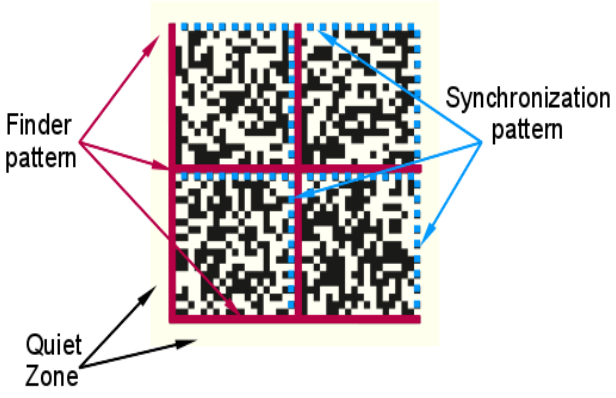

Figure Datamatrix structure.

III. ENCODING

Encoding is the process of converting data from one form to another. While "encoding" can be used as a verb, it is often

used as a noun, and refers to a specific type of encoded data. There are several types of encoding, including image encoding, audio and video encoding, and character encoding.

Media files are often encoded to save disk space. By encoding digital audio, video, and image files, they can be saved in a more efficient, compressed format. Encoded media files are typically similar in quality to their original uncompressed counterparts, but have much smaller file sizes.

Figure shows the principle of Datamatrix encoding process.

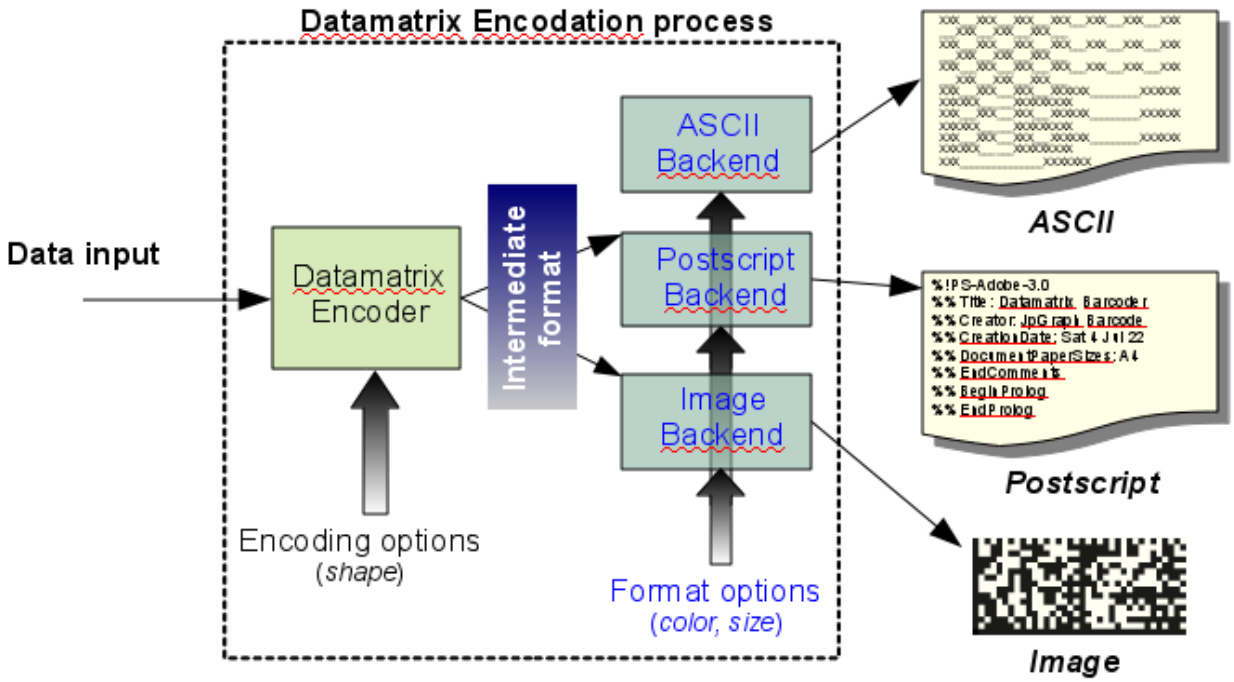

Figure Datamatrix encodation principle

IV. CODE READERS

Code readers operate on the principle of contrast between the code (printing ink) and the background (printing substrate). For code decoding various code readers are used and, in addition to readers, 2D codes can be decoded also with certain types of mobile phones.

Camera-Based readers

Camera-based readers are the newest type of code readers. This type of readers uses a small video camera to capture an image of the code. Sophisticated digital image processing techniques are then used to decode the code. Video cameras are equipped with the same CCD (Charge Coupled Device) technology as in a CCD code readers except that instead of having a single row of sensors, a video camera has hundreds of rows of sensors arranged in a two-dimensional array so that they can generate an image(Taltech, n.d.). Camera-based reader is the one used in capturing the codes with mobile phone camera.

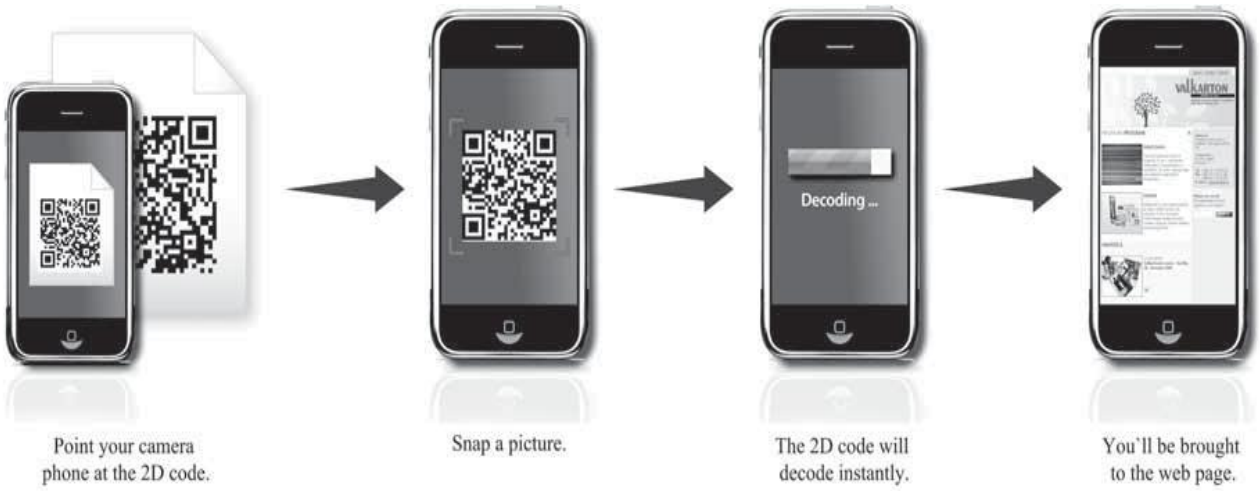

Figure. 2D Code reading using mobile phone.

V. PROBLEM DEFINITION

When user will store the sensitive information the unique ID will be generated. This Unique ID will be Tier 1 identification for the sensitive information. Entering this Unique ID as an Input to our Selective algorithm will generate a unique Image for that particular ID. This Unique image will act as Tier 2 identification for sensitive information. This image will be hash mapped to the User Unique ID and both will be used to identify sensitive information. When identifiers are used solely within a database, their generation should be left to the database itself.

VI. PROPOSED APPROACH

Internet communication technology has made this world very competitive. In their struggle to keep customers, to approach new customers or even to enhance services and decision making, data owners need to share their data for a common good. Privacy concerns have been influencing data owners and preventing them from achieving the maximum benefit of data sharing. Data owners usually sanitize their data and try to block as many inference channels as possible to prevent other parties from finding what they consider sensitive. Data sanitization is defined as the process of making sensitive information in non-production databases safe for wider visibility. However, sanitized databases are presumed secure and useful for data mining, in particular, for extracting association rules.

Figure represents protecting sensitive information and accessible to authorized user. In this system consists of 11 stapes to get sensitive information to the authorized user.

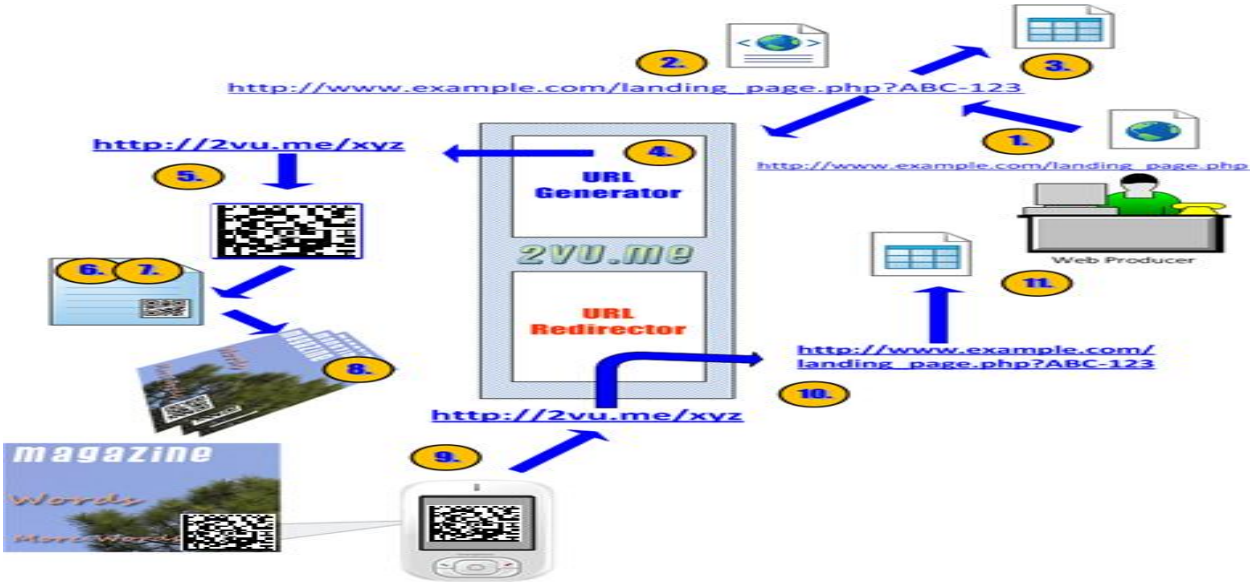

Figure. System

VII. RESULT ANALYSIS AND CONCLUSION

Example of data encoding

According to the ASCII encoding procedure, to encode numerical values of two digits, 130 should be added to the number. Encoding of numbers >>1<<, >>2<<, >>3<<, >>4<<, >>5<< and >>6<< is presented below.

ASCII encoding converts
6 characters to 3 bytes:
>>12<< = 12 + 130 = 142
>>34<< = 34 + 130 = 164
>>56<< = 56 + 130 = 186

After a short calculation each "result" is represented with followed decimal numbers: 142, 164 and 186. The binary values are then put into code words and inserted into the code matrix.

So it is clear that this approach is hiding all the given sensitive rules successfully without any side effect in small as well as large databases.

ACKNOWLEDGEMENT

First & foremost, I would like to express my sincere gratitude towards Dr.A.S.Alvi for his valuable guidance, encouragement, and optimism. I feel proud of his eminence and vast knowledge, which will guide me throughout my life. I wish to acknowledge with thanks to all the faculty members of Information Technology Department who has directly or indirectly helped me in the research paper work.

Last but not the least; I would like to express my sincere thanks to my institute Prof. Ram Meghe Institute of Technology & Research, Badnera. For providing me all the needful facilities during the research paper work.

REFERENCES

Journal paper

[1] A new approach Data hiding in 2D data matrix and tilt correction algorithm Kimmy ghanaiya1 gagandeep kaur2

[2] An Efficient Technique for Protecting Sensitive Information Devilal Birla #1, Mr. B L Pal #2

[3] Multi-color 2D datamatrix codes with poorly readable colors Urška Bogataj 1, Tadeja Muck 2, Branka Lozo 3, Arjana Žitnik 4

Book

[4] GS1 Data Matrix

Chapter in book

[5] Chapter 26. Datamatrix (2D-Barcode) Part VI. Barcodes

AUTHORS

First Author – Mr.L.S.Khedekar, Information Technology PRMIT&R,Badnera, lokeshkhedekar@gmail.com, 9850981749
Second Author – Dr.A.S.Alvi, HOD,Information Technology, PRMIT&R,Badnera