OVERVIEW OF QUICK RESPONSE CODE (QR CODE) AND ITS USE IN LIBRARY

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QR Code

Abstract: - *The new technologies advent based on Digital Authentication. The condition of Digital Document Security is poor, especially in an education system. This paper aims to provide an overview on Quick Response (QR) codes with an emphasis on how libraries can apply them. Authors discuss how Quick Response code technology can be used to market library services innovatively by introducing them in a more flexible way. Suggestions for use include marketing of library services, strengthening bibliographic instruction, supplementing reader's advisory services, and enhancing online public access catalogue records.*

INTRODUCTION:

According to many recent surveys on current technology trends, libraries and library services remain out of sync with user expectations. With ever expanding digital resources, libraries must try to increase awareness of these new services and collections while making sure old formats are not being left behind. Many emerging technologies can be used to deliver and market library services. The Quick Response (QR) code was first developed in 1994 by Denso Wave Incorporated, Japan. From that point on, it came into general use as an identification mark for all kinds of commercial products, advertisements, and other public announcements. Now libraries are providing online services, references services and RFID-based circulation system. In recent past, the European countries have used QR code for their existing library system. The QR coder is the technology that can deliver to the user the information in a code. Quick Response Codes (QR Code) are two dimensional images that, when scanned by a smart phone's camera, prompt the smartphone to open a webpage or display an image, video, or text (Kumar, Chikkamanju and Mamtha 2014). QR is a bi-dimensional code composed by black and white pixels into a squared matrix, containing information to be enjoyed with the help of smart phones or similar devices. Scanning the code, which is usually printed on newspapers, posters, or captions, and processing it with ad-hoc software, users can obtain additional information and data on objects or services without extra searches. Considering the widespread circulation of mobile devices (such as smart phones) among users, many

libraries are experimenting the usage of the QR to deliver library services in a friendly and quick way. The Library are using the QR code to give their users access to guides, manuals, library map, audio and video files. A QR code is a matrix barcode readable by smartphones and mobile phones with cameras. They are sometimes referred to as 2d codes, 2d barcodes, or mobile codes. On most phones purchased in the United States, one must download a free app (application) in order to read the QR code, although some phones have one preinstalled.

The QR code typically appears as a small white square with black geometric shapes, though colour and even branded QR codes are now being used. QR codes can hold much more information than a regular barcode. The information encoded in a QR code can be a URL, a phone number, an SMS message, a V-card, or any text. They are referred to as *QR* because they allow the contents to be decoded at high speed. The development of mobile services and resources is made all the more urgent by the fact that smartphone sales and shipments are starting to outpace the sales and shipments of personal computers. According to Canalys estimates, smartphone manufacturers shipped 158.5 million units in the last quarter of 2011, and PC manufacturers shipped 120.2 million units during that same time frame which is a growth of 63% from the same quarter in2010 ("Smart phones overtake client PCs in 2011," 2012).

WHAT ARE QR CODES

QR codes are two-dimensional barcodes that can be scanned by a mobile device camera. The mobile device is then prompted to load a Web page or display text or other data contained in the code. Although this technology is now starting to catch on in the United States, it has been around for some time now. The technology was created by Denso-Wave, Japanese based Toyota subsidiary, in 1994 as a way to track manufactured parts (http://www.denso-wave.com/). Denso-Wave holds the patent rights to the QR code technology but, instead of exercising those rights, decided to make the technology freely available.

HOW ARE QR CODES GENERATED?

Creating a single QR code is a simple process. There are many free QR code generators available; this code generator allows four different content types, a URL, text, phone number, or SMS and a choice of four sizes—small, medium, large, or extra-large. Creating a code is as simple as choosing a content type, adding your URL or other data, and clicking the "generate" button. The QR code is immediately created and can be copied, saved, or embedded. An easy-to-use Google Chrome QR code extension allows one to create a QR code while visiting any URL in one easy click. A QR code is instantly generated and pops down from the corner of the browser's address bar, with an option to save to disk or share on Facebook.

USE OF QR CODES IN LIBRARIES:

Librarians and staff in large research universities, small liberal arts institutions, public libraries, and museums are experimenting and discovering useful ways to implement QR codes in both their physical and online libraries.

In the world of academia, libraries are using this same technology to promote their services and resources. Examples of services that can be provided using the QR code technology include contact information for librarians or the research desk, sending patrons to a librarian text/chat service, or directing users to mobile Web pages. Other uses include using the codes to provide step-by-step instructions in the use of equipment in the library, or to market library events and activities. In truth, the potential for QR Codes is limitless.

In these ways, libraries with mobile Websites can deliver context appropriate content on handheld devices through QR code technology. The advantage is that users do not have to spend time typing a URL on their phone keypads; they just scan a code affixed to a wall or wherever, and, within seconds, they have content delivered to their phone. An example would be a QR code poster in a printing area or by equipment with how-to instructions encoded.

While there are many free Web applications available to generate QR codes, most of these generators do not have the capability to track their usage. There are one or two generators that do have some kind of tracking system, but these also usually include embedded advertisements. These generators essentially put your data on a server, and then generate a URL that is encoded in the QR code. This URL is then linked to the expected-to-be-encoded data. The problem with this type of service is that if the company goes out of business you lose your data; your codes will not function anymore, and above all else, the service is not free.

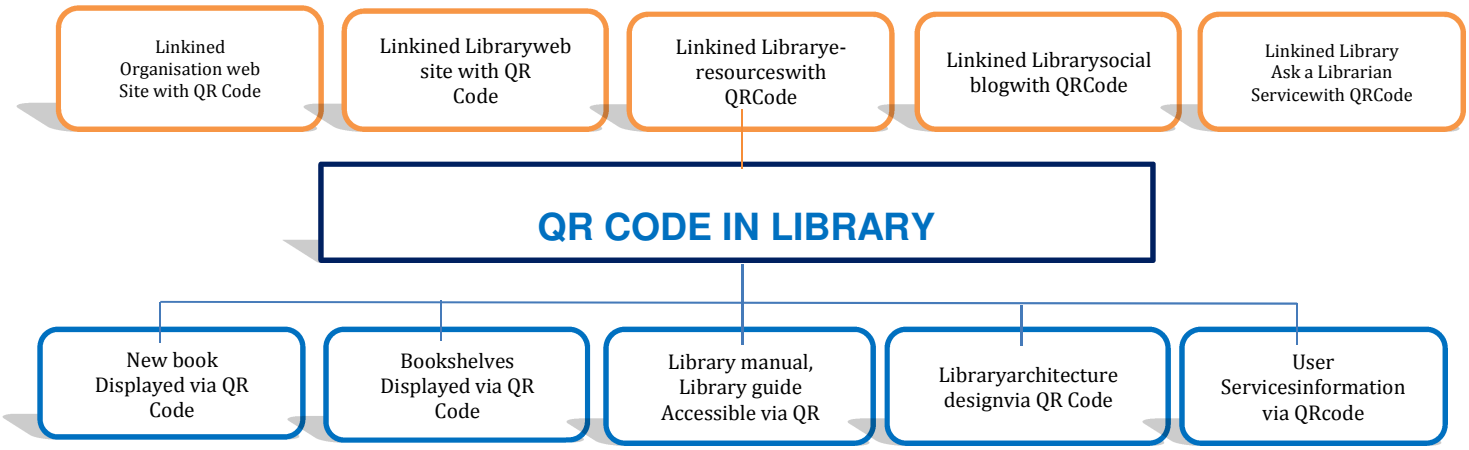

Figure: Some examples of QR code in Library practice

QR Codes are actually black modules in square patterns on white background. QR Codes

STRUCTURE OF QR CODE

consists of many areas that have specific importance.

1. Finder Pattern
2. Alignment Pattern
3. Timing Pattern
4. Quiet Zone
5. Data Area

Finder Pattern: This pattern can be used for detecting the position of QR Code. The position, size and angle of the QR Code can be determined with the help of the three position detection patterns (Finder Patterns) which are arranged at the upper left, upper right and lower left corners of the symbol. The patterns can be easily detected in all directions.

Alignment Pattern: The alignment pattern consists of dark 5x5 modules, light 3x3 modules and a single central dark module. This pattern is actually used for correcting the distortion of the symbol. The central coordinate of the alignment pattern will be identified to correct the distortion of the symbol.

Timing Pattern: The timing patterns are arranged both in horizontal and vertical directions. These are actually having size similar to one module of the QR Code symbol. This pattern is actually used for identifying the central co-ordinate of each cell with black and white patterns arranged alternately.

Quiet Zone: This region is actually free of all the markings. The margin space is necessary for reading the bar code accurately. This zone is mainly meant for keeping the QR Code symbol separated from the external area. This area is usually 4 modules wide.

Data Area: The data area consists of both data and error correction code words. According to the encoding rule, the data will be converted into 0's and 1's. These binary numbers will be then converted into black and white cells and will be arranged. Reed-Solomon error correction is also employed here.

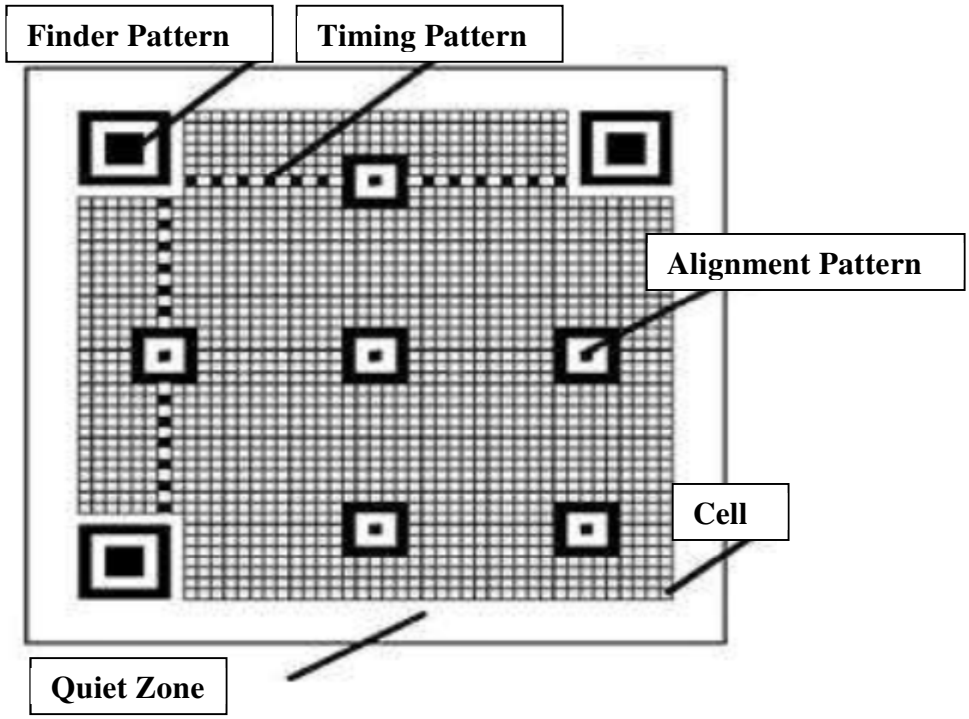

Fig - QR Code Structure

QR CODE BASICS:

A smartphone with a built-in camera, an Internet connection, and a QR code reader application is all that is required to use this technology. It works like this:

- ✓ The user opens the app on his or her phone.
- ✓ The user points the camera at the QR code and allows it to focus (this may take up to a few seconds and is usually accompanied by a buzz).
- ✓ The reader either automatically takes a photo of the code or the user manually takes the photo (depends on the how the app works).
- ✓ The phone decodes the data, executes it, and serves it. (More often than naught, a website launches.)

QR Encoding (Generation of QR code):

The normal encoding of data is done through various steps such as:

- ✓ Analyse the data to be encoded. Convert the data to symbol characters. Find out the error correction and detection level.
- ✓ Encode the data.
- ✓ Error Correction Coding.
- ✓ Add reminder bits and data masking patterns.
- ✓ Generate the format information and version information.

QR Decoding (Accessing the contains information through QR code)

QR reader enables a smart device to decode information embedded within a QR code. The software is designed to work flexibly with smart devices on multiple platforms and operating systems, which include, but are not limited to, Symbian, Android, Windows Mobile, BlackBerry, Java, and iOS. There are also several QR code applications available that do not require the use of a smart phone or mobile device. Bar Capture, a product of Jaxo Systems, can be used on a computer to capture and decode QR codes from Web sites.

Areas where libraries can use QR code:

Here are some areas where a library can use QR code for their services.

QR Code Link to e-Contents

- ✓ Linking to the online surveys
- ✓ Linking to Library Contests
- ✓ On Library Stacks, Journal Areas that point to online electronic holdings
- ✓ Linking to Library Audio tour for Orientations
- ✓ Linking to Library Blog, Websites
- ✓ Linking to Digital Library
- ✓ Linking to Library Maps
- ✓ Linking to Library Wi-Fi Network etc…..

BENEFITS AND CHALLENGES:

An initiative like this can make your content and services more discoverable. It also opens up the possibility for your local community to be an online community. In addition, it places the library in the position of a tech leader. One concern though is keeping pace with your user-base. An increasing number of benefits encourage the use of QR codes. Happily, there is no charge incurred for generation or implementation of this coded technology, which is available for use royalty-free. QR readers are now preinstalled on many smart devices and, if this option is not readily available for use on a newly purchased smart device, there are a plethora of freely accessible apps available for downloading. The core advantages of QR Code are **easiness of scanning**, using without license and free of charge.

Along with the benefits, there are challenges to consider. Awareness is likely to be a major challenge for the incorporator of the QR code; on first glance at a QR code, what is commonly seen is the phrase “Scan Here,” which supplies little direction to the potential user on how and why to scan the code. QR scanning programs are not preinstalled on most Indian mobile devices. Another issue is that the content being accessed may not be optimized for mobile devices. It can be tempting to use them for every project, but their impact can be lost if they are blanketing your library.

FUTURE SCOPE:

QR code can be used in many cases like Computer Aided Learning, Students Admission and Tracking, Academic Information including Geographical Locations, Feedback, Inspection of

Institute, Classroom Assessment and Attendance through various web based modules, continuous standard evaluation of entity performance and also degree evolution, Students fees account statement, Students activity records, Faculty Records, and Study Material as well.

Many ideas for further uses of QR codes came up in open discussion in different conferences and research symposiums.

CONCLUSION:

QR codes are free, easy to implement and use, and growing in popularity. With smartphone use on the rise, libraries have nothing to lose in trying to incorporate its use with library services, publicity and marketing campaigns, or around the library building or on the website to offer patrons a more interactive learning experience. Libraries would do well to increase connectivity between users and library resources and services through the use of QR codes, a freely available technology that offers a wide range of applications for libraries. This research paper analyse structures of QR code and process how it is work? A library user can easily get information regarding library collection, e-resource, library web site, Web-OPAC in a user-friendly environment. Number of libraries adopted this technological code to spread information worldwide. Library information professional using this technology without anydependency.In this regard, we feel that we have already had some level of success and look forward to offering what we have learned to other libraries exploring this technology.

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