SIGNIFICANCE OF ‖‖‖‖‖‖‖‖ IN LIBRARIES

Avinash Singh

HOD Library
Parthivi College of Engineering & Management
Sirsakala, Bhilai – 3,Dist. Durg Chhattisgarh – 490023

Abstract – *Use of Bar Codes in Libraries is a step ahead towards complete Library Automation. Bar coding helps all library modules to work efficiently. The paper briefly outlined the benefits and applications of Bar Coding Technology in libraries and impact of various hardware & software is explained. The figure images of Bar codes are real time images and gives realistic information while scanning.*

Keywords – Bar Code, Scanner, Printer, Labels, Database, Software.

I.   INTRODUCTION

Bar Coding works in a data transfer technique in synchronization with software & its database(s). Barcodes are systematically represented data by varying the width & spacing of parallel lines which referred as One Dimensional and Two Dimensional Codes. At beginning one type of barcodes are used in industries which are sponsored by the Association of Americana Railroads in the late 60's. Barcodes become commercially successful when they used to automate supermarket checkout system later on.

II.   BAR CODE GENERATIONS

Technically generation of Bar codes can be divided into two parts:

A. **First Generation** – 'One Dimensional' Bar codes are called the First Generation of Bar codes. It is made up of lines & spaces of various widths that create specific patterns.

Figure 1.

B. **Second Generation** – 'Two Dimensional' Barcodes are called Second Generation. It is a Two Dimensional way to represent the information. It can represent more data per unit area as compared with 'One Dimension' Bar codes.

Figure 2.

III.   BAR CODE SYMBOLOGIES

The mapping between message & Bar codes is called Symbology. There are more than 100 different bar code Symbologies. No single Bar code can store the data of universal business application i.e. every Bar code is ment for its

unique type of business use or application. So the use of Bar code varies from its usage. That's why user must find the symbology (Bar code technology) that works best for their specific job.

IV.   BAR CODE SYMBOLS

For making your Library material & database Bar coded there are two avenues available. The first avenue is North American De Facto Library Standard of a 14-digit label which uses the Coda bar symbol. It is broken down in following ways:
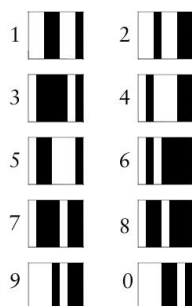
DIGIT #	DESCRIPTION
1	Either '2' or '3', where 2 signifies a Patron label and 3 signifies as a Title label
2	Four digit Library identifier
5 – 13	Consecutive Number
14	Check Digit

Table 1.

The second avenue is the Facto Stand and to simply identify Library materials with 5, 6 or 7 Digit Code 39 of Code 128 Symbology labels. As a rule the name of the Library is always printed on the top of the Bar code label to identify the institution/ owner.

V.   HOW BAR CODES REPRESENT THE NUMBERS 0-9

Each digit in a Bar code is represented by seven equal size vertical blocks. These blocks are colored in either black or white to represent the decimal number 0-9. Bar codes are designed to provide three type of information viz. First part tells the Country where it was issued, Second part tells the manufacturers of the product and the Third part tells about the product itself. This can be understood by the following figure:

Figure 3.

VI.   TYPES OF BARCODES

Bar codes can be divided according to their usage which is as follows:

TYPE	EXAMPLE	SYMBOLOGY	USE
LINEAR CODES	Code-39		LIBRARIES
POSTAL CODES	Australian Post Standard Customer		POSTAL DEPARTMENT
GS1 DATA BAR	GS1-Databar		HEALTH CARE INDUSTRY
EAN / UPC	EAN-13		RETAIL GOODS

2D CODES	QR-code		AUTOMOTIVE INDUSTRY
MOBILE TAGGING	Aztec Code		MOBILE INDUSTRY
ISBN CODES	ISBN-13		PUBLISHING INDUSTRY
BUSINESS CARDS	QR code VCard		BUSINESS CARD
EVENT BARCODES	Event QR code		EVENT MANAGEMENT
WI-FI BARCODES	QR code for WI-FI access		FOR WI-FI ACCESS

Table 2.

VII.   FEATURES OF BAR CODES

A.   Accuracy
B.   Data transfers at lightning speed.
C.   Time Saving
D.   Requires less Man power.
E.   Cost Saving / Less expensive technology.
F.   Complete Automation.

VIII.   HOW BAR CODE SCANNER WORKS

Bar code scanners are able to read the black and white lines within frictions of second & feed the information to computer which is identified immediately by a product database. Bar code scanners follow the following steps of procedure:

A.   Scanning head shines LED or LASER light into Bar code.
B.   Light reflects back off Bar code into light detecting receivers which are called Photoelectric Cell.
C.   The Photoelectric Cell generates a pattern of on-off pulses that correspond to the black and white stripes. So for white strip the cell represent on & for black strip the cell represents off. This means Pulse or No pulse to microprocessor.
D.   An electronic circuit attached to the scanner converts these on-off pulses into Binary digit i.e. Zeroes and Ones.
E.   The Binary digits are sent to computer attached to the scanner which converts these pulses into Binary codes 1101011.

IX.   TYPES OF BAR CODE SCANNER

BASICALLY there are four types of Bar code scanners:

SN	IMAGE	TYPE	ABOUT
1.		**PEN**	Pen Bar code readers are very durable, inexpensive & designed to use by single user. Due to its sleek & pen type design user may need some practice for perfect scan. It has LED light & photodiode in its tip. The user has to pass the pen tip over a Bar code to illuminate the bars.
2.		**LASER**	Laser scanners works in the same way as Pen scanners do except they use a laser beam used as the light source. Laser scanners are the most popular scanners in the world because they can scan the Bar code from the distance of 8 feet with high accuracy.
3.		**CCD**	The term CCD stands for Charge Coupled Device. It is also known as LED scanners because it uses hundreds of tiny LED bulbs arranged in a single row. CCD units can be very expensive but are highly accurate. It has some certain limitations like short range and limited scanning width which makes them less popular.
4.		**2D Camera**	These scanners are also known as Second generation scanners, capable to read second generation Two Dimensional Bar codes like QR codes, Aztech codes etc. which stores versatility of information. Likewise a camera these scanners take the pictures of Bar codes and send it to software for decoding the information.

Table 3.

According to their **USAGE** Bar code scanners are further classified in eight types:

1.   PEN TYPE BAR CODE SCANNERS
2.   LASER BAR CODE SCANNERS
3.   CCD BAR CODE SCANNERS
4.   2D CAMERA BAR CODE SCANNERS

SN	IMAGE	TYPE	ABOUT
5.		Fixed Mount	These scanners are known as Industrial Bar code scanners & are used to identify products used during manufacturing or logistics. These scanners are also used in Big Retail stores, Liquor Stores & Convenience Stores.
6.		Wireless or Cordless	This scanner uses Wi-Fi technology to transfer the scanned data to its console. This type of Bar code scanners are used in Factories, Warehouses, Shipping container Industries, Heavy metals & Tools industries where the product(s) are oversized and difficult to place on the counter at checkout point.
7.		Portable Data Terminals or PDA	Portable Data Terminals also termed as PDA's are hand held Battery operated Bar code readers. They store the scanned Bar code data in their memory chip for later uploading. It also have LCD display and a keyboard for required data punching.
8.		Wearable Bar code scanner	These scanners are very handy and user has to wear them in its finger or wrist. It activates when the user points them towards Bar code. While pressing the trigger it scans the Bar codes.

Table 4.

X. TYPES OF BAR CODE PRINTER

Printers plays very important role in Bar code technology. Your Bar coding is dependent on Bar code labels. Printers which used to print Bar code labels are called Bar code Printers. There are three types of Bar code Printers viz.
- A. Dot matrix
- B. Laser
- C. Thermal

SN	IMAGE	TYPE	ABOUT
1.		Dot Matrix	Dot Matrix printers also known as impact printers print much like the print mechanism of typewriter. The costing of Bar code printing in this printer is extremely low.
2.		Laser	These printers are known as High speed cost efficient printers as per the name it uses laser printing technology for fast printing. It uses Dry powder type ink which is permanent and waterproof. It gives long lasting impression to Bar codes for longer life & use.
3.		Thermal	These printers are very small in size which makes them compact and very handy like hand held devices even one can carry them in their hand bag. These printers are battery operated. It uses thermal imaging technology for Bar code printing on chemically coated labels or paper. But the impression of the print is of volatile type & can be used for short period of time.

Table 5.

XI. HOW THE USE OF BAR CODES ARE SIGNIFICANT TO LIBRARIES

The significance of Bar codes in Libraries is to achieve greater efficiency and accuracy in following Key Areas:

A. **Accession**: This is the initial phase where by a new Book/Journal/Magazine etc. is introduced into existing stock. After acquiring the material a unique accession number assigned to it. After record is created on a database, Bar code is generated & pasted on each & every piece of stock. Same procedure is adopted for Patron's Id cards or Library Cards.

B. **Circulation**: Circulation is the most important function of Library. With the help of Bar codes any Library material can be Issued/Renewed or Returned from Patron within Friction of Seconds hence saves the time of user and saves the time of Library staff & eliminates the possibilities of error creates from manual entry system. The details regarding transaction are recorded in the system.

C. **Stock Verification**: The traditional system of stock verification involves the Library personnel going around to each of the stock where the books are placed and taking note of all available books. This tabulated data is compiled along with the books already issued to find the final stock position. This process requires lot of mental pressure and consumes lot of man hours. Bar codes make this process of Stock verification much simpler & time effective. By using Hand Held terminals attached to a Bar code reader the verifier revolves around to each stack and scan the books. This data can be downloaded to the computer & after process it would give the details of the Stock position i.e. Book Issued, Books on Stack room etc. The discrepancies would give the details of missing books & list can be prepared for further procedure.

XII. HOW TO BAR CODE ANY LIBRARY

The following steps should be followed for Bar coding:

A. Convert the Stock Register, Patron's register etc into digital format because Library Automation is necessary for Bar coding i.e. Creation of Databases.

B. Install Library Software which supports Bar coding. Many software are available in market like:
    a) DEL PLUS
    b) SOUL
    c) KOHA
    d) LIBSYS
    e) LIBRARIAN CR2
    f) E-GRANTHALAYA
    g) LIBSYS etc.

C. Upload your database into Library Software.

D. Buy any Barcode Scanner and printer form open market.

E. Take the printout of Barcodes on Stickers / Labels and paste them on every library material as well as patron's card.

Now your Library is ready for Circulation and Verification.

XIII. PLACING BAR CODE LABELS

It is very important that in which position(s) you place your bar codes. So choose the best location & position for the labels so that it may not get damaged during circulation process. You may place the Bar code label in the following positions:

A. Vertical or Horizontal
B. Front or Back
C. Inside or Outside
D. Top of bottom.

But be sure that at least 3 labels must be placed on each book if 1 or 2 get damaged rest will help in recognition. You can cover the Bar code label with transparent Cello tape to avoid damage & long lasting appearance. You can also use Barcode protectors to avoid damage but it may cost you additional.

XIV. ADVANTAGE OF BAR CODING

The use of Bar code technology increases efficiency and reduces human errors as compared with manual data entry system. It increases the speed of operation in Circulation System. Some of the advantages of Bar code technology using in library is as follows:

A. It increases accuracy of Data Input (Almost Error Free).
B. It improves efficiency of Library staff and quality of service.
C. It increases user satisfaction & improves the image of Library.
D. It provides reliable statistics for Management Information System (MIS)
E. It provides real time data collection.
F. It saves the time of the reader/user.

G.   It saves the time of Library staff.
H.   It improves information availability.
I.   It makes the Stock Verification process easy.

XV.   CONCLUSION

Implication of Bar code technology to a Library is really a boon. Bar code technology is less expensive, very accurate & reliable and needs less service & maintenance. It is a technology which implies complete automation to any Library. Thus application of this technology not only improves the image of Library but develops a positive attitude of Patrons towards the Library.

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