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APPLICATION OF QR CODE TECHNOLOGY IN THE LIBRARIES FOR RESOURCE SHARING PURPOSE

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Abstract

Resource sharing is one of the foremost activities for any academic, special or research Libraries. In the post-Covid era remote access to Library resources has become a prime concern for every Library. Libraries are taking various measures to reach its users effectively. Previously it was the Library websites which were used effectively to serve the users in case of remote access purpose. Recently the QR codes (Quick Response CODE) has emerged as one of the effective technologies as a tool for remote access . The chapter will analyse the QR Code technology, its usage, benefits and drawbacks with a practical usage experience.

Keywords: Quick response code, Libraries, Website, remote access

Introduction

Remote access service provided by the Libraries allows patrons to access library resources & services from the outside of physical library building. These services are particularly useful for individuals who are unable to visit the library in person, such as distance learners, researchers or individuals with physical limitations. Here are some common remote access services offered by libraries.

1. **Online catalogue & resource discovery:** Libraries provide online catalogues that can be accessed remotely. Patrons can search for books, journals, multimedia materials & other resources using keyword, author names, or subject headings. They can check availability, place holds, & request materials for pickup & delivery.
2. **E-Books & digital resources:** Libraries often offer EBooks, Audio books, Digital Magazines & other digital resources through online platform. Patrons can browse & borrow these resources remotely using their Library accounts. The materials can be access on E readers, tablets, smartphones or computers.

3 Research Databases and Online Journals: Libraries subscribe to various research databases and online journals, which provide access to scholarly articles, research papers, and other academic resources. Remote access allows patrons to search, accessed, and download these resources using their library credentials.

Virtual Reference Services: Libraries offer virtual reference services, such as online chat, email, or video conferencing, to assist patrons with research inquiries, reference questions, or general assistance. Patrons can interact with librarians remotely and receive personalized support.

Interlibrary Loan (ILL): Interlibrary Loan services enable patrons to request materials that are not available in their library's collection. Through remote access, patrons can initiate ILL requests online, and libraries can facilitate borrowing or lending materials from other libraries on behalf of their patrons.

Online Renewals and Account Management: Patrons can remotely manage their library accounts, renew borrowed items, view due dates, and track reading history. These services can be accessed through library websites or dedicated library apps.

Online Programs and Events: Libraries organize virtual programs, workshops, book clubs, and events that patrons can participate in remotely. These events may include author talks, educational sessions, or community engagement activities conducted through online platforms.

Libraries employ various technologies and online platforms to provide these remote access services securely and efficiently. Patrons typically need valid library cards or login credentials to access these services remotely, ensuring

that they remain accessible to authorized users.

What is QR code

QR code technology is a type of two-dimensional barcode that can store information in a visually scan able format. The term "QR" stands for Quick Response, reflecting the code's ability to be quickly decoded by a scanning device or smartphone.

QR codes consist of a grid of black squares on a white background, typically arranged in a square shape. They can store a wide range of data types, including text, URLs, contact information, Wi-Fi network details, app store links, and more.

Here are some key features and uses of QR code technology:-

Encoding Information:QR codes can encode various types of data, including alphanumeric characters, numeric data, binary data, and Kanji characters. This versatility allows QR codes to store different kinds of information based on the specific application.

Scanning and Decoding: QR codes can be scanned and decoded using smartphones or dedicated QR code scanning apps. The scanning device captures the QR code's image using its camera and uses image processing algorithms to extract the encoded data.

Quick and Convenient: QR codes can be scanned quickly and easily, making them a convenient method for accessing information or performing tasks. Users can simply point their smartphone's camera at a QR code, and the associated action or information is usually presented on their device.

Mobile Interaction: QR codes are often used in mobile marketing campaigns, allowing users to access websites, promotions, or additional information by scanning the codes with their smartphones. This technology enables seamless interactions between offline and online content.

Advertising and Marketing: QR codes are commonly used in advertising materials, product packaging, posters, billboards, and other promotional items. Scanning the QR code may lead to product details, special offers, discounts, or interactive experiences.

Authentication and Security: QR codes can be used for authentication and security purposes. For example, they can be implemented in two-factor authentication systems, where users scan a QR code to verify their identity or gain access to secure systems.

Ticketing and Payments: QR codes are increasingly utilized for ticketing and mobile payments. Scanning a QR code on a ticket can grant entry to events, public transportation, or provide proof of purchase. Similarly, QR codes can facilitate mobile payments by linking to payment information or transferring payment details to a merchant.

Inventory Management: QR codes are employed in inventory management systems to track and manage products. Each item can be assigned a unique QR code, which allows for easy identification, stock control, and efficient inventory processes.

QR code technology has gained widespread popularity due to its ease of use, versatility, and compatibility with smartphones. It has found applications in various industries, including retail, advertising, logistics, healthcare, education, and more.

Elements of QR Code

A QR code (Quick Response code) consists of several key elements that enable it to store and convey information. Here are the main components of a QR code:

Finder Patterns: These are the large square markers present at three corners of the QR code. They help scanning devices locate and orient the QR code. Finder patterns consist of smaller squares arranged in a specific pattern.



QR CODE

Alignment Patterns: These are smaller square patterns present inside the QR code, typically near the three corners. Alignment patterns provide additional reference points for scanning devices, ensuring accurate reading of the QR code.

Timing Patterns: These are horizontal and vertical rows of alternating dark and light modules present between the finder patterns. Timing patterns assist in decoding the QR code by defining the size and structure of the modules.

Quiet Zone: The quiet zone is a clear area surrounding the QR code. It separates the QR code from any surrounding elements, such as text or images. The quiet zone ensures that scanning devices can distinguish the QR code from its surroundings.

Data Modules: These are the individual black and white squares that make up the body of the QR code. Data modules represent the encoded information, such as

text, URLs, or other data. The arrangement and pattern of these modules encode the data.

Format and Version Information: This is optional information present in certain QR codes. It provides details about the format and version of the QR code, allowing scanning devices to interpret the code correctly.

Error Correction Coding: QR codes include error correction coding, which allows them to remain scannable even if they are partially damaged or obscured. The error correction coding provides redundancy, enabling scanners to reconstruct the original data even in the presence of errors.

These elements work together to form a QR code that can be scanned and decoded by a compatible device or application, allowing the user to access the encoded information quickly.

Usage of QR codes

QR codes have a wide range of applications across various industries and use cases. Here are some common uses of QR codes:

Product Information and Marketing: QR codes can be placed on product packaging, labels, or marketing materials to provide users with detailed product information, promotional offers, or links to additional content like videos or reviews.

Mobile Payments: QR codes can facilitate mobile payments by allowing users to scan a code to make a payment. Payment apps generate a unique QR code for each transaction, and users can scan it with their smartphones to complete the payment.

Ticketing and Event Management: QR codes are widely used for ticketing purposes, including events, concerts, movies, public transportation, and more. Scanning the QR code on a ticket grants access or serves as proof of purchase.

Contactless Menu Ordering: Restaurants and cafes use QR codes on tables or menus, enabling customers to scan the code and access a digital menu on their smartphones. This contactless ordering system can provide convenience and promote safety.

Authentication and Security: QR codes can be implemented as part of two-factor authentication systems. Users scan the QR code to verify their identity, access secure systems, or complete authentication processes.

Virtual Business Cards: QR codes can be used to create digital business cards. When scanned, the code transfers the contact information directly to the recipient's phone, making it convenient for networking and sharing contact details.

Loyalty Programs and Coupons: QR codes are often used in loyalty programs

to track customer purchases or provide rewards. They can also be used to redeem digital coupons or discounts by scanning the code at the point of sale.

Public Wi-Fi Access: QR codes can simplify the process of connecting to public Wi-Fi networks. Scanning the code takes users directly to the network login page without the need to manually enter login credentials.

Library Resources: Libraries can use QR codes to provide easy access to resources. Scanning a QR code on a book or catalog can direct users to its availability, additional information, or allow them to place a hold on the item.

Virtual Tours and Exhibitions: QR codes placed in museums, art galleries, or tourist attractions can provide visitors with virtual tours or additional information about exhibits, artifacts, or points of interest.

These are just a few examples of the numerous applications of QR codes. QR code usage continues to expand as businesses, organizations, and individuals find innovative ways to leverage this technology for enhanced user experiences, information sharing, and seamless interactions between physical and digital realms. Application of QR code technology in Library: QR codes can be used in several ways for providing remote access service in Libraries. As the QR codes are easy to build and these can be generated for almost all e resources, these can help to build one access point for sharing of resources. Here our Libraries have done effective usage of QR codes for sharing; as our Library has created a question bank of previous years question papers and uploaded them in a “Google Drive”. Later we have created QR Code of that google drive to provide remote access to the users. Similarly the Library has created QR codes for EBooks, Databases, RX LIST and other E resources. The QR codes are dynamic in nature so any change in the resource point can easily be reflected in the search results.
Even the Library can use the QR codes to give one point login access to user Library account and so on.



Share point access

Benefits of QR code Technology

QR codes offer several benefits that make them a popular and useful technology:
Easy and Quick Access: QR codes provide a simple and efficient way for users to access information or perform tasks. Scanning a QR code takes just a few seconds, allowing for swift access to relevant content or actions.

Versatility: QR codes can store various types of information, including text, URLs, contact details, Wi-Fi network configurations, app store links, and more. This versatility makes them suitable for a wide range of applications across different industries.

Cost-Effective: Generating and printing QR codes is generally a cost-effective solution. Creating and distributing QR codes requires minimal resources compared to alternative methods such as printing physical materials or implementing complex technologies.

Enhanced User Experience: QR codes enable a seamless transition between offline and online experiences. They provide users with immediate access to additional information, interactive content, special offers, or convenient actions, enhancing their overall experience.

Increased Engagement: QR codes can be used to engage and interact with users effectively. They can prompt users to take specific actions, participate in surveys or contests, provide feedback, or share content on social media platforms.

Trackable and Measurable: QR codes can be tracked and analyzed, providing valuable data on user engagement, scanning behavior, and campaign performance. This data allows businesses and organizations to measure the effectiveness of their QR code initiatives and make informed decisions.

Contactless and Hygienic: QR codes have become particularly valuable in contactless environments, promoting hygienic interactions. They eliminate the need for physical touch or handling of printed materials, which are especially relevant in areas such as menu ordering, ticketing, or payment processes.

Improved Marketing and Promotions: QR codes offer opportunities for targeted marketing and promotions. Businesses can use QR codes in advertising campaigns, product packaging, or marketing materials to provide users with exclusive offers, discounts, or personalized content.

Enhanced Security: QR codes can be encrypted or incorporate security features to ensure the integrity and authenticity of the information they store. This makes them suitable for applications requiring secure access, authentication, or payment transactions.

Easy Implementation: QR codes can be easily generated and incorporated into various mediums, such as printed materials, websites, or digital displays. Implementing QR codes does not require extensive technical expertise, making it accessible to a wide range of users.

Overall, QR codes offer convenience, efficiency, and flexibility in accessing information, performing tasks, and engaging with users. Their widespread adoption and ease of use have made them a valuable tool across industries, providing benefits to businesses, organizations, and individuals alike.

Limitations of QR Code

While QR codes have numerous benefits, they also have certain limitations that should be considered:

Device and App Dependency: QR codes require a compatible scanning device, typically a smartphone or dedicated QR code scanner, along with a QR code scanning app. Users must have the necessary hardware and software to scan and decode QR codes, which may limit accessibility for some individuals.

Internet Connectivity: QR codes often link to online resources or webpages. Users need an internet connection to access the information or perform actions associated with the QR code. Lack of internet connectivity can hinder the functionality of QR codes in certain situations.

Limited Data Storage: QR codes have limited data storage capacity compared to other technologies. While they can store a significant amount of information, including URLs, text, and contact details, they may not be suitable for storing large amounts of data or complex information.

Scanning Distance and Angle: QR codes need to be scanned from an appropriate distance and angle to ensure successful decoding. Poor lighting conditions, low-quality printing, or improper scanning techniques can hinder accurate scanning and decoding of QR codes.

Error Correction Capability: QR codes typically incorporate error correction techniques that allow for successful decoding even if the code is partially damaged or obscured. However, there are limits to the amount of damage that can be corrected, and severely damaged or distorted QR codes may become unreadable.

Visual Space Limitations: QR codes require sufficient space to be printed or displayed clearly. In situations where available space is limited, such as small printed materials or physical objects, the size of the QR code may need to be reduced, potentially impacting its scanning and decoding effectiveness.

Lack of Standardization: While QR codes have become widely adopted, there is still some lack of standardization in terms of scanning apps and code readers. Different scanning apps may have varying levels of compatibility or functionality, leading to inconsistent user experiences.

Security Risks: As with any digital technology, there is a potential risk of QR codes being used maliciously. Scanning a QR code can lead to unintended consequences, such as directing users to malicious websites or triggering actions without user consent. Users should exercise caution when scanning QR codes from untrusted sources.

It's important to consider these limitations and take them into account when implementing QR code solutions. Despite these constraints, QR codes remain a versatile and widely utilized technology for information access, engagement, and interactive experiences.

Conclusion

In conclusion, QR code technology has become an integral part of our daily lives and has proven to be a versatile and effective tool for various applications. Its widespread adoption can be attributed to several key factors.

Firstly, QR codes provide a quick and efficient way to share information. They can store a significant amount of data, including text, URLs, contact information, and more. With a simple scan using a smartphone or other QR code reader, users can

instantly access the encoded information, eliminating the need for manual input or typing.

Secondly, QR codes offer enhanced security and reliability. They can be encrypted and authenticated to prevent tampering or unauthorized access, making them ideal for applications such as digital payments, ticketing, and identity verification. Their robust error correction capabilities ensure that even if the code is partially damaged or obscured, it can still be successfully decoded

Furthermore, QR codes have proven invaluable in marketing and advertising campaigns. They can be easily integrated into print materials, products, and displays, allowing businesses to provide additional information, promotions, or interactive experiences to consumers. This technology enables seamless bridging of the physical and digital worlds, enabling businesses to engage with their customers in new and creative ways.

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