

# ***QR-BASED INVENTORY MANAGEMENT SYSTEM (QR-IMS) OF PASSENGER LUGGAGE USING WEBSITE***

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**Abstract**— This research is an attempt to optimize web content in the m-flight environment. It provides the design and implementation of a travel booking system based on a paperless mobile network that can be delivered via QR codes. This article implements a web page that can be accessed through a mobile device browser. The site will provide travel schedules for all company flights and an online reservation system that will allow customers to purchase tickets electronically with a valid debit/credit card and have access to web applications via the Internet. In this project, QR codes are used to monitor and update passengers' luggage in this system. The airport department can easily obtain passenger information using QR codes. At the same time, at the airport, separate QR codes were assigned to store products, indicating that the QR codes can be used to easily track the available locations and owner of products.

**Keywords**—QR Coding, Inventory Management System, Luggage tracking, Passenger, Travel with luggage

## **I. INTRODUCTION (HEADING 1)**

One of the most popularly used technologies for reading specifically designed data are bar codes. This is primarily because of their ability to read accurately, quickly and with better functionality. These bar codes can be further categorized into 3D, 2D and 1D. The 3D barcodes are said to have thickness and depth that can be used in a product to be engraved. A 2D barcode will hold information in vertical and horizontal direction while a 1D barcode will be able to express information in a horizontal direction. This indicates that a typical 3D barcode will be able to hold 100 times more information than that of a 1D barcode. As the need and use of bar codes became a more convenient data that could be used for tracking packages, couriers and luggages, a demand for improving the codes capability to store more character types and information also increased. However, this improvement in

the bar codes also resulted in increasing the printing cost, complicating reading operations and further enlarging the bar code area. To address these issues, 2D codes became a more convenient and useful methodology that could address the issues faced by the 1D codes. These 2D codes or two-dimensional codes were initially developed in 1994 by Denso Wave. The QR code that we are using in this proposed work is a type of 2D barcode. The QR codes that we have incorporated can be used as a means to identify the travel booking details that have been booked by a particular person. The QR codes take up minimal space when compared to the 1D barcodes and can also be used as a database. A typical QR code will be able to hold larger amount of information when compared with the 1D bar code. This data can be in the form of binary data, alphanumeric data or numeric data which can hold a maximum of 2953 bytes of information. A small portion of the QR code will be able to contain the error correction information along with the actual data. A major portion of the QR code is used to define the version as well as the data format of the information to ensure proper timing, alignment and positioning. The smallest element or dot in the QR code is called as the module. The area that is surrounding the QR code is ideally empty for about 4 modules wide known as the quiet area. Using proper encoding techniques, examination certificates can also be issued using the QR. In this paper, we present a QR based ticket booking system that can be used in the airports to track the passenger's luggage based on the schedule of the passenger from the information gathered through the online reservation system and company flights.

## **II. LITERATURE SURVEY**

The conventional 1D barcode system of tracking have already passed and the QR codes have been used fervently due to their ability to hold a larger amount of data than the

conventional 1D. A typical QR code can hold data in both vertical and horizontal direction, indicating its ability to represent information of upto 7089 characters. Moreover, using encoding, QR code will be able to encapsulate the same amount of data as that of the 1D code, but with a space reduction by one-tenth. While using QR code, it is not necessary for the user to scan it using a particular angle. In fact, irrespective of the positioning of the scanner, the QR code can be read conveniently. Even if a partial part of the QR code is tampered with, it is still possible to read the information with the help of error correction, which is not possible in the 1D barcode.

In [7] an analysis of optimising m-commerce network where mobile devices are accessible is conducted. It enables QR-Code based ticket-less web-based booking. These web pages are also accessible in mobile. This system enables access of credit and debit cards to book tickets electronically which will schedule the travel. These are also accessible through mobile devices with the help of internet. The authors of [8] used physical access methods for authentication are not very secure and are does not have a retrieval of data. Thus, they implemented an efficient QR code-based authentication system which can be accessed with the help of mobile phones. It stores the secret information from the OTP in the form of QR code. They implemented OTP and QR code together because OTP is very secure and QR code stores large amount of information. Therefore, it enhances the security over physical systems. In [9] the teaching methods of how to use QR code in classrooms are detailed. QR code is an abbreviation of quick response code which is helpful in accessing information from texts, URLs and Links. QR code can be scanned from 360 degrees. By implementing QR code in education it increases the interest among students in latest technologies. This increases education standard. This makes learning possible even outside the classroom. The study in [10] is based on augmented reality that uses 2D barcode to help students to improve their proficiency in English. This system consists of a data base which contains information regarding English learning which can be accessed using mobile app. A survey was conducted to examine this project and received positive response from students and was proved that it was useful for English language learning. [11] aims at merging private information into a public QR code to provide data of a particular context. It decodes and translates the input data based on the language used by the user on their machine. It is a system for booking tickets electronically for public transports. It analyses different viewpoints for developments in e-ticketing platform.

### III. QR CODE

#### A. Structure of the QR Code

The QR codes are basically square patterns represented in black modules on a white backdrop. In recent years, much work has been carried out by the researchers to implement the coloured QR code. The following are the parts of a QR code which holds specific meaning:

1. Data Area
2. Timing Pattern
3. Alignment Pattern
4. Finder Pattern

Every QR will have two regions allocated for function patterns and encoding region. The function pattern comprises of alignment, timing and finder patterns which do not contribute towards data encoding. A quiet zone surrounds the symbol on the four sides making it possible to read the QR code in a more convenient manner. The size of the QR code can be any range from 21x21 cells to 177x177 cells.

- The timing patterns are arranged in the vertical as well as the horizontal direction. Here these patterns are said to be similar to that of the QR code symbol. The black and white patterns in this format are arranged such that they can be identified in the central co-ordinate of every cell.
- The alignment pattern is made up of a single central dark module, 3x3 light modules and 5x5 dark modules. It can be used to correct the symbol's distortion, if any. To correct the symbol distortion, a central coordinate is used in this pattern also.
- The angle, size and position of the system can be detected using the finder pattern of the QR code. There are three position detection patterns that are allocated in the lower left, upper right and upper left corners of the QR code.
- The data area will hold the error correction code words as well as the data. The data used is converted into 1's and 0's with the help of encoding. The binary numbers are then converted into white and black cells that can be arranged. In this proposed work, Reed-Solomon error correction is implemented.
- Free marking are not used in the quiet zone. This space is used to ensure that the bar code is read in an accurate manner. Moreover, this zone also provides a separation of the bar code from external area. A typical quiet zone is said to be 4 modules wide.

#### B. Data Capacity

A QR code will hold a storage capacity that is more than 100 times greater than that of a 1D barcode. Depending on the type of information that is to be encoded, the number of characters that can be represented in the QR code will vary. The volume of the QR code and the different information types that can be used are represented in the Table 1.

Information type	Volume of Data
Kanji Characters	1817
Binary Data	2953

Numeric Characters	7089
Alphabets and Symbols	4296

### C. Data Compression

Bit-rate reduction, source coding and data compression are techniques used in computer science to reduce the original information into fewer bits of information. There are two major categories of data compression namely lossless and lossy compression. In lossless compression of data, there is no loss in the data when it is compressed, and compression occurs by deleting statistical redundancy bits. On the other hand, lossy compression will eliminate information which are identified as marginally important, in order to compress the bits. Thus, data compression proves to be an important step in decreasing the transmission capacity as well as the data space used to represent the information. However, there are some trade-offs that need to be considered for data compression such as distortion level introduced, degree of compression and the number of computational resources required to compress and uncompress the data. In the proposed work, we make use of the lossless data compression strategy in order to represent the required information in a more precise manner.

## IV. PROPOSED SYSTEM

In the proposed framework, for traveler's unique id will be accommodated for flight ticket booking, baggage carried by them is checked utilizing the QR-Code without any problem. This QR-Code will be labeled with each luggage's and their weight can be checked easily. In the event that they carry past the breaking point additional charges must be paid by the passenger. This QR-Code tag [12-14] is checked in the store management, so for every item a QR-Code is allocated so that in the event that it enters every division a section can be made. Traditionally, web-content were being conveyed to cell phones in a contradictory work area design which the resultant impact is delay - moderate speed in getting to and showing of web pages. This is especially significant in a non-industrial nation like Nigeria, where often the network connection is slow and thereby rendering ineffective delivery of the full desktop version on a mobile device and the user experience could become poor. This web application is a versatile based framework that permits existing clients enquire data about the organization and make appointments conceivable by means of the web when all is said in done and through Cell phone's specifically [15].

Subsequently, this article uses a web-page program to carry out a portable e-ticketing travel framework. The website will provide all the rules for organizing transportation and web-based booking framework that will allow customers to purchase tickets during the web installation page Regarding the current investigation various warning should be headed. In the proposed system, for passenger's unique id will be provided for flight ticket booking, luggage carried by them is monitored using the QR-Code easily. This QR-Code will be tagged with every luggage's and their weight [16] can be

monitored easily. if they care beyond the limit extra payment has to be paid by the passenger. This QR-Code tag is monitored in the store management, so for each product a QR-Code is assigned so that if it enters each department an entry can be made.

### A. Admin Module

In the administrator module, flight details, employee enlisting, traveler data gathering, store related data can be observed as shown in Fig.1. QR-Code is utilized as the unique id and monitored utilizing that for traveler data and store data as well.

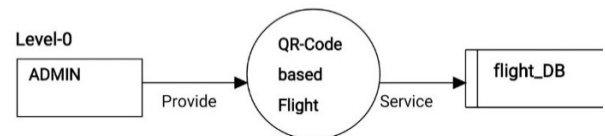


Fig 1 Initial level of the process

### B. Passenger Module

In this module, traveler can enlist, login, book flight, and can see the flight status as well. For booked ticked an unique code will be developed using the algorithm shown in Fig.2. Traveler must have the QR-Code as ticket for Flight, for luggage entry purpose, additionally. Client can also see the situation of the luggage with respect to the travelling conditions as well.

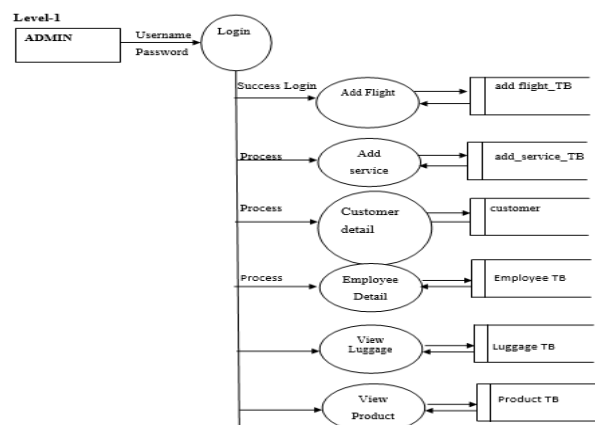


Fig 2 Passenger login

### C. Store Keeper Module

In this module, vendor can add the item accessible with them and QR-Code will be relegated for every item. It takes minimal effort to effectively replicate the tag if it is missed. For sending Item to different office the item QR-Code will be scanned and updated. Thus, the item last took care of by can be effortlessly checked by vendor and by administrator as well as shown in Fig.3.

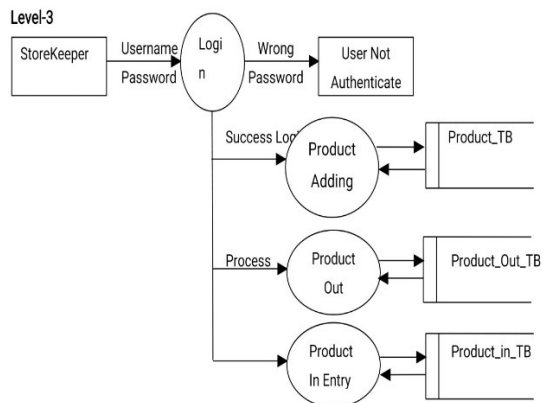


Fig 3 Storekeeper login.

#### D. Reception and Report Module

In this module, assistant work is to filter the QR-Code of booked flight ticket, enter the baggage arranged data. Assuming the luggage weight went past the breaking point, it will be observed and for that charges will be raised accordingly. Then the Item situated QR-Code will be dealt with once enters the specific office as observed in Fig.4.

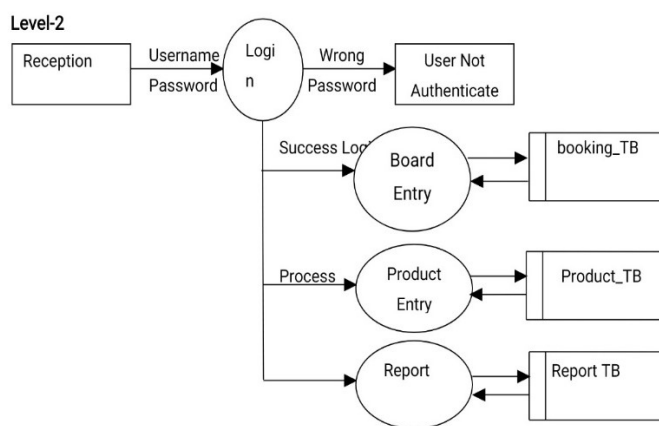


Fig. 4 Reception login

Using the administrator, vendor can easily screen the item accessibility in the report design. Traveler can screen the movement subtleties and luggage carried with them.

## V. RESULTS

The user registration module in Fig. 5 is designed for a new user who books ticket for the first time in this website. The user is requested to enter his details for further access. After completing this procedure, the user will be able to login directly from the user login page. A new user can only login after this registration process.

Fig.5. User Registration

Similarly, an Admin module is created as seen in Fig.6 for the key controller to access information of the other modules. The admin can also edit the existing feature and add new features to the modules.

Fig.6.Admin Login

In Fig.7, the user has to enter their relevant details required for the booking. Based on this information the QR code is generated and stored in the local file. This can be browsed further to check the ticket details

**Fig.7 Flight Details of the Passenger**

The complete data base of the passengers as well as the location of the respective luggage can be tracked using the login data base by the passenger and the inventory data base by the controller as shown in Fig.8 and Fig.9 respectively.

#	Name	Datatype	Length/Set	Unsigned	Allow N.	Zerofill	Default	Comment	Collation	Expression	Virtuality
1	id	INT	11				NULL				
2	flightid	VARCHAR	50				NULL				
3	frame	VARCHAR	50				NULL				
4	source	VARCHAR	50				NULL				
5	designation	VARCHAR	50				NULL				
6	amount	VARCHAR	50				NULL				
7	moast	VARCHAR	50				NULL				
8	tamount	VARCHAR	50				NULL				
9	name	VARCHAR	50				NULL				
10	email	VARCHAR	50				NULL				
11	contact	VARCHAR	50				NULL				
12	qrcode	VARCHAR	50				NULL				

**Fig. 8 Login Data Base**

#	Name	Datatype	Length/Set	Unsigned	Allow N.	Zerofill	Default	Comment	Collation	Expression	Virtuality
1	id	INT	11				NULL				
2	flightid	VARCHAR	50				NULL				
3	frame	VARCHAR	50				NULL				
4	source	VARCHAR	50				NULL				
5	designation	VARCHAR	50				NULL				
6	amount	VARCHAR	50				NULL				
7	moast	VARCHAR	50				NULL				
8	tamount	VARCHAR	50				NULL				
9	name	VARCHAR	50				NULL				
10	email	VARCHAR	50				NULL				
11	contact	VARCHAR	50				NULL				

**Fig.9 Inventory Data Base**

## VI. CONCLUSION

By using mobile Web-based applications, companies and individuals can make appropriate adjustments to their needs, and will save a lot of time in tracking the location of their luggage as they travel. When a transportation company fully adopts a ticketless mobile network travel system, it will not only allow passengers to buy tickets online, but will also reduce paper tickets for public transportation, thereby promoting the development of green information and communication technologies. It will also improve the user experience and increase convenience. In this project, future research will be conducted to mine data related to e-tickets by obtaining statistical data of operators. Information collection will be very valuable for analyzing travel modes that can be used to enhance policies, planning, etc. for effective management. This strategy can also be useful in enabling passengers to keep track of their luggage when they connect to other flights mid-way through their travel, making it hassle-free.

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