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QR CODE BASED NAVIGATION SYSTEM FOR CLOSED BUILDING USING SMARTPHONES

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Abstract— **Navigation applications for smartphones are quite useful in day-to-day life. There are lot of applications available in market which provides efficient and user friendly navigation to the users. Most of the applications are successful in assisting the user with his current location and providing direction to particular destination for outdoor location. In most of the cases this is achieved using GPS unit of smartphones but accurate navigation is still a challenge. There is limitation for smartphones to locate their exact position while in covered areas such as shopping malls, airports, apartments etc. There are indoor navigation systems available in market which uses Bluetooth, WI-FI, AGPS. But their reliability of navigation is still a challenge. In this paper QR code will be used for indoor navigation which will provide accurate location.**

Keywords— **QR Code, GPS, Indoor navigation**

I. INTRODUCTION

The main aim of this paper is to find the accurate navigation inside a closed buildings using QR Code[1]. There are lot of applications available in market which provides user friendly navigations to the users. Most of the applications are successful in assisting the user with the current location and providing directions to particular destination for outdoor locations. In most of the cases this is achieved using GPS but accurate navigation is still a challenge[2].

There are indoor navigations which is available in market which uses Bluetooth, WI-FI, AGPS or RFID. But the problem is that Bluetooth requires expensive receivers, WI-FI also demand expensive access points for indoor navigation, using AGPS technique. Accuracy is very much limited due to approximation and information provided by the system is 2D. RFID requires active tags for indoor navigation where accuracy is directly proportional to active tags used and these tags are costly.

II. NAVIGATION USING QR CODE

A.Using QR Code

QR Codes are two dimensional code where data is encoded in optically readable format.

For indoor navigation QR Code are used for two purposes:

- To provide user link to the map of indoor location
- To provide location detail to users.

Fig 1 shows the contents of QR Code

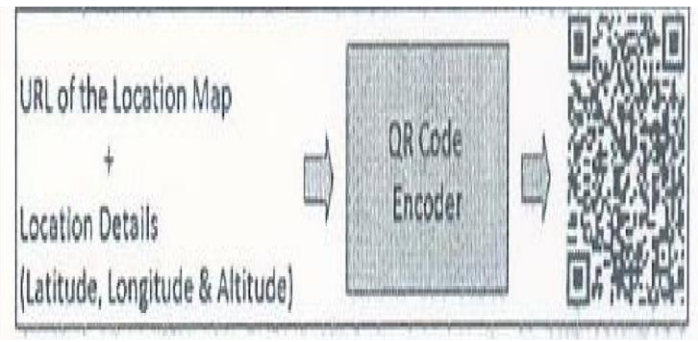

Fig 1: QR Codes Contents

B. Smartphone Navigation Application

The navigation application in mobile uses the camera to read frames continuously. The presence of QR Code within the frame is checked. Once the QR Code is detected then QR detector forwards the QR Code to QR decoder. QR decoder components decode the QR Code and obtain the code contents. This content is being accepted by content parser module. Floor plan handler module uses the URL to download floor plan. Once the floor plan is downloaded,

floor plan handler overlays the plan on top of geographical map using the location coordinates. The location details from the QR Code is used to provide the user his current location. The Smartphone Application Component is shown below in Fig 2.

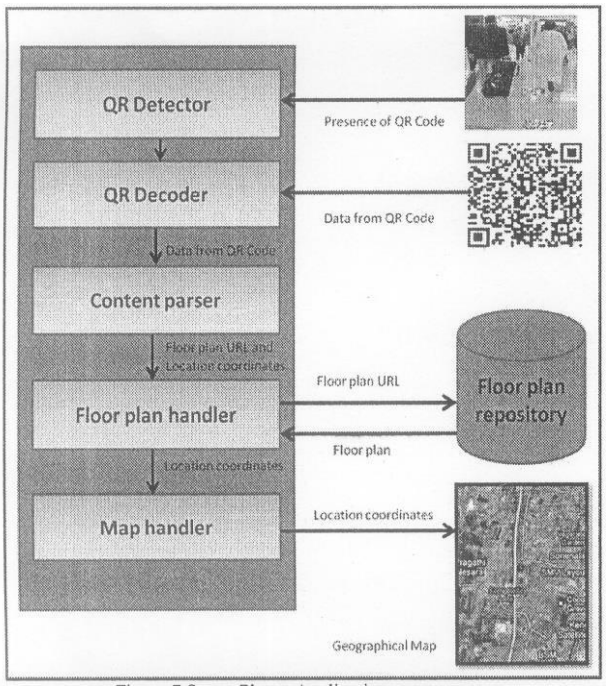

Fig 2: Smartphone Application Component

III. PROJECT OVERVIEW

EXISTING APPROACH:

The existing system gives the user his current location and also provide directions to particular destination for outdoor locations. This is achieved using the GPS of smartphones but the accurate navigation is still a challenge[2]. There is limitation for smartphones to locate their exact positions while in covered areas such as shopping malls, airports, apartments etc. The indoor navigation systems are available in the market but they are too expensive.

DISADVANTAGES OF EXISTING SYSTEM:

- Existing system is costly because it uses GPS unit of Smartphones.
- Existing system is too expensive because it is using Bluetooth, WI-FI, AGPS or RFID.
- Using AGPS technique accuracy is very much limited due to approximation.
- Getting accurate navigation with GPS is still a challenge.

PROPOSED SYSTEM:

The proposed system will provide quick and easy navigation as it is using QR code[1]. The proposed system will overcome all the disadvantages of existing system. The indoor navigation will be very accurate using QR Code. QR code will be used all across the building to carry information required for the navigation system. The mobile application will use the QR Codes to provide accurate indoor navigation for the users[1].

ADVANTAGES OF PROPOSED SYSTEM:

- Proposed system is very cheap because it is using QR Code.
- Getting accurate navigation with our proposed system is very easy.
- Proposed system will provide quick navigation and it will use QR scanner which will directly redirect the URL using camera.

IV. DESIGN APPROACH

This system has two application one is web application which is going to developed using J2EE technology in MVC architecture. Another application is android application which is developed with android SDK tools.

❖ WEB APPLICATION:

The web application has following three applications:

- ➢ Admin application
- ➢ Uploading application
- ➢ Downloading application

ADMIN APPLICATION:

- ➢ Admin is responsible for maintaining the cloud configuration and QR Code generation.
- ➢ He has the permission to edit or delete any users and he can able to maintain the building details and upload the images for buildings in the storage space.
- ➢ Once the admin logged in he has the following functions:
  - Login
  - Users details(View, Edit, Delete)
  - Cloud Storage Configuration(View, Edit)
  - Building Details with image upload(View)
  - QR Code generation for Building Image and download QR Code
  - Change password

Figure 3 shows the data flow diagram of admin session.

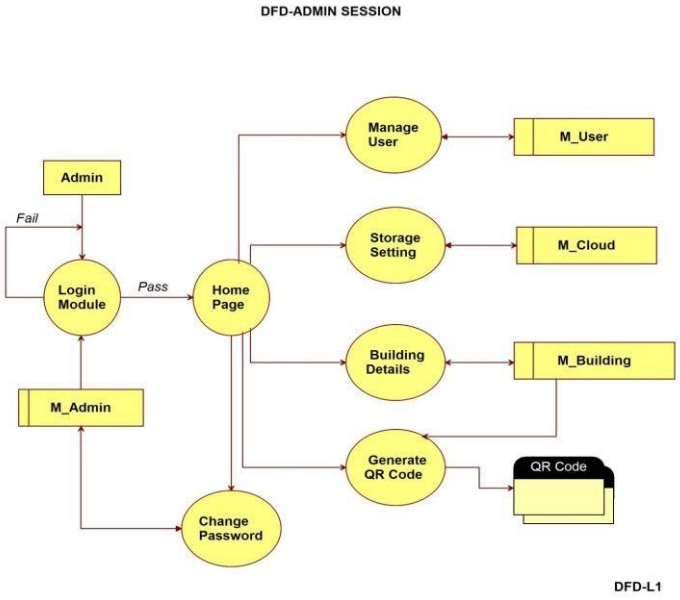

Fig 3: Admin session

❖ ANDROID USER APPLICATION

This is an android application which can be installed in any android based mobile phone. Fig 4 shows the DFD of android user session.

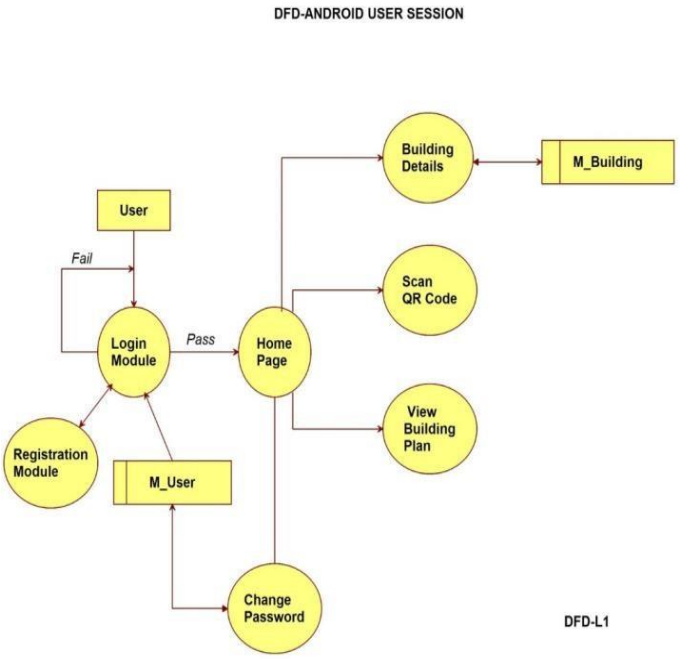

Fig 4: Android User Session

With the help of this application user can able to do following tasks:

- Users Registration
- Login
- View Profiles
- View Building Details
- Scan QR Code and download building images
- Change password

V. RESULTS AND DISCUSSION

The results are described below:

Android user has to download QR navigation system application for android to their mobile and then have to register and get their user id and password. Admin will add all the new building details, upload the building navigation image and he can request the system to produce QR Code for uploaded images. Android user has QR scanner option in the application, if they want the building navigation image then they have to scan QR Code.

The admin login page is shown in fig 5.

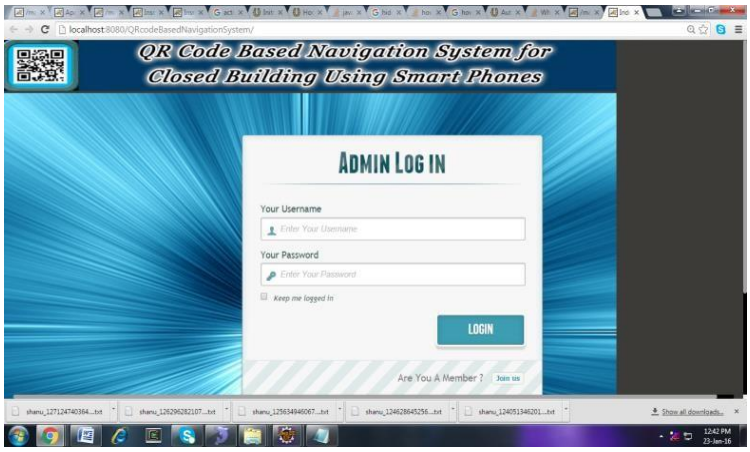

Fig 5: Admin login page

The admin home page is shown in fig 6 where he will add all the new building details, building navigation image and he can also change the password.

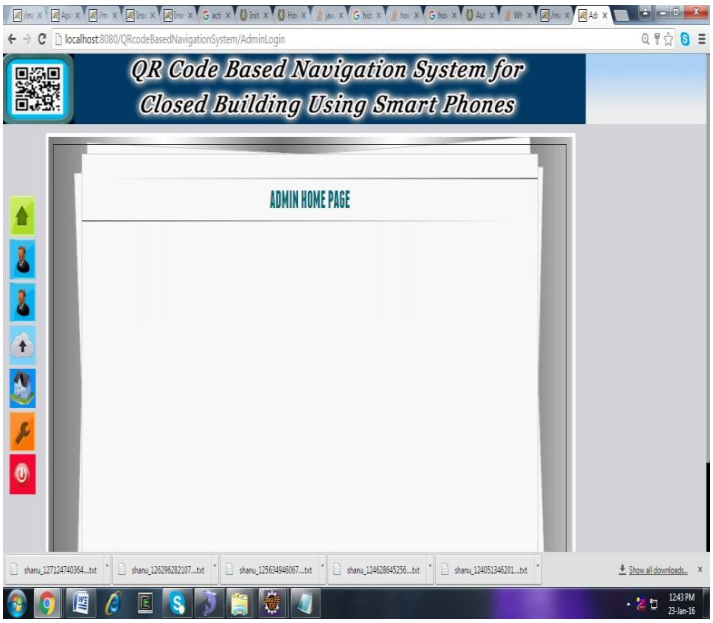

Fig 6: Admin home page

VI. CONCLUSION

The conclusion is that this approach is cost effective for service provider. Users do not have to make any investments for indoor navigaton. Complexity and time to implement is less. There is no additional configurations which the users have to maintain for indoor navigation. The main aim of this research is to give the exact location of covered areas.

VII. ACKNOWLEDGEMENT

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VIII. REFERENCES

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