

# Campus Mapping and Indoor Way-finding using QR Code

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**Abstract** - As universities often consist of a range of buildings and campuses spread across cities, the evolution from the outdoor world and into a building is a essential part of a university indoor way-finding solution. Students and staff or visiting people can get a route directly from the comfort of their home to any point of interest on campus. It can be anything from the nearest parking slot to a classroom or a specific vending machine or office.

**Key Words:** indoor maps, QR code, Android Studio, Server

## 1. INTRODUCTION

Changing lecture plans, locating classrooms or even just discover the nearest printer are some of the many challenges that students face in each semester. If we offer a digital indoor way-finding solution to visitors and future students, so we ensure that they get a great first impression of our university as being proactive and as modern as the world we live in. New students, or visitors unfamiliar with the university and all the new faces, it will benefit immensely from being provided with a campus navigation platform. The assistance and security will allow them to explore campus and its many facilities without the risk of getting lost.

Current students will also benefit greatly from digital university way-finding. Finding their way to new parts of the campus in minimum time and locating new classrooms will be easier than ever.

Scenario of the nervous student discomfort around an unfamiliar building trying to find a principal, lecturer Office. If guest lecturer who is 10 minutes late to a lecture, because he got lost on his way to find the auditorium and

Also have an everyday scenario at universities around the globe. By offering a digital indoor way-finding solution to students and staff, it can make the issue of navigating vast campus areas history and improve everyday life for both students and staff.

Campus and universities are rapidly changing environments; new buildings are added to accommodate expansion. It is a very costly situation to maintain traditional university signage throughout the campus and to create new campus maps. A digital university way- finding solution is easy and highly.

Fig.1.1 Building block diagram of CMIW

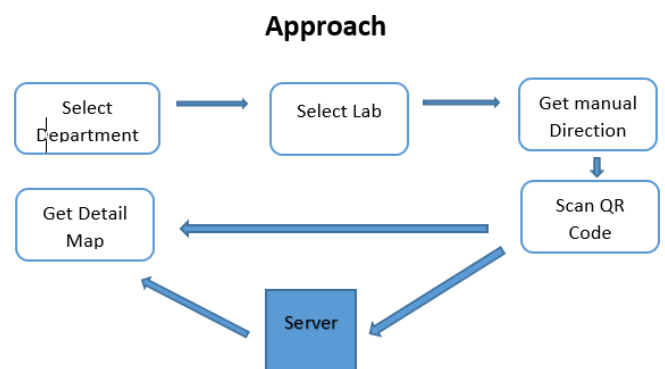


Fig.1.1 shows CMIW (Campus Mapping indoor Finding) will help the new visitor to find his destination in less time.

## Proposed Work

CMIW is basically an android application. The android application is designed using different elements of frontend design of XML. Various animations are used to make it attractive and user friendly. The indoor maps are also made using different tools. The technical details of application are as follows:

## 2. Frontend Technologies

### 2.1 Splash Animation

When we open the app the first screen that we see is a splash screen. When any app is opened, we can see screen which appears for constant and specific period of time. Some basic introductory information such as the company logo, content can be shown using Splash screen just before the app loads completely.

### 2.2 Fragments

The behavior or a portion of user interface in a Fragment Activity is represented by fragments in android studio. Multiple fragments can be combined in a single activity to reuse a fragment in multiple activities and build a multi-pane UI. If we think of a fragment as a modular section of an activity, which has its own lifecycle, receives its own input events, and which we can add or remove while the activity is running. It is more like a "sub activity" that we can reuse in different activities. The fragment's lifecycle is directly affected by the host activity's lifecycle. For example, all fragments are paused when the activity is paused, and all fragments are destroyed when activities are destroyed. However, we can add or remove each fragment independently when the activity is in resume lifecycle state. We can also add it to a back stack that's managed by the activity—each back-stack entry in the activity is a record of the fragment transaction that occurred. To reverse a fragment transaction i.e. to navigate backwards back stacking can be used by pressing the Back Button.

### 2.3 Card View

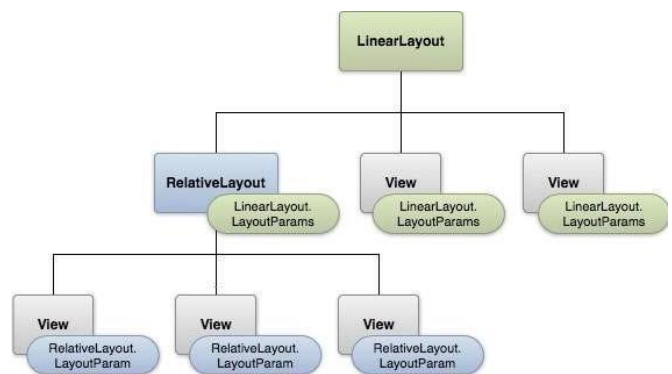
A card is a sheet of material is used to focus on more detailed information of the object. They may contain a photo, text, and a link representing a single subject. Card are used to represent content containing elements of

varying size, such as photos with captions of variable length. We have used following dependencies:

```
Dependencies
{
    compile 'com.android.support:cardview-
```

### 2.4 Layout

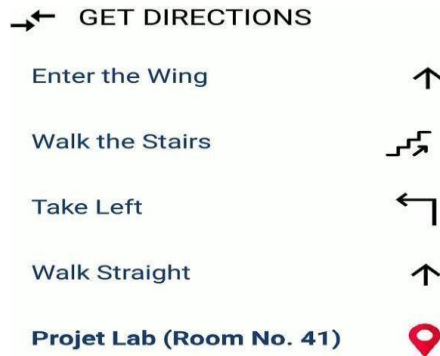
View Object is the basic building block of user interface which is created from the View class. View Object is represented by rectangular area on the screen. Event handling and draing of various elements on the screen is possible due to view objects. Widgets is a super class of Vlew, which are used to create interactive UI components like buttons, text fields, etc. The ViewGroup is a subclass of View. It provides invisible container that hold other ViewGroups or other Views and define their layout properties. We have different layouts which are subclasses of ViewGroup class and a typical layout defines the visual structure for an Android user interface .View/ViewGroup objects are used to create this visual structures otherwise one can also use different layouts. In our project we have used linear, relative and grid layout, which is located in the res/layout folder of project.



Different layouts like linear layout, grid layout relative layouts are used to make the user interface of the application.

### 2.5 Bottom Sheet

Bottom sheet pops up from the bottom of the screen. It reveals more content when they're integrated with the app to display supporting content. It can be implemented using **BottomSheetBehaviour** and **BottomSheetDialog**.



The "Get Direction Message" is used in the form of bottom sheet.

### 2.6 QR Code

QR (abbreviated from Quick Response code) was first designed in 1994 for the automotive industry in Japan and was a trademark for a type of matrix barcode (or two-dimensional barcode). A barcode is a machine-readable optical label. In practice, QR codes mostly used for representing data for a locator, identifier, or tracker that points to a website or application or any normal data can be represented. Standardized encoding modes like numeric, alphanumeric, byte/binary, and kanji are used to store data efficiently; extensions may also be used. The Quick Response system became popular outside the automotive industry. As compared to standard UPC barcode it provides greater readability and storage capacity. For example: item identification, product tracking, document management, time tracking, and general marketing. A QR code consists of black squares arranged in a square grid with white background. The image is often represented in vertical and horizontal patterns. From this pattern the data can be extracted. We have used QR code to embed the information of our detailed map which will be shown to the visitor after scanning the QR code. The image is store on the server. The image is created after editing it in Adobe XD and Adobe Illustrator thus it is heavy and stored on server.

### 2.7 Adobe XD

Adobe XD is a vector-based user experience design tool. It is published by Adobe Inc. Adobe XD creates user interfaces for mobile and web apps. Many features in XD were previously either hard to use or non-existent in other Adobe applications like Illustrator or Photoshop.[5]

Repeat grid: For the repeating items such as lists, and photo galleries in application grid can be created using repeat grid.

Prototype and animation: Animated prototypes can be designed through linking artboards. These prototypes can be previewed in the supported mobile devices.

Interoperability: The files from Illustrator, Photoshop, Photoshop Sketch, and After Effects are supported by XD and the can be opened using XD. Adobe XD provides Adobe Creative Cloud, but in addition to this XD can also connect to other tools and services such as Microsoft and Slack teams to collaborate. XD is portable i.e. it can be conveniently moved from windows to macOS or macOS to Windows. It provides security feature thus it is possible to protect the prototype using password and protect from any misuse of data.

Voice design: It provides excellent feature of voice design in that virtual assistant can be used to make the app. The developed design can be previewed as well. Symbols: Logos and buttons can be represented by symbols. Various operations can be performed on this symbols like we can drag and drop the items in artboard.

### 2.8 Adobe Illustrator

Adobe Illustrator or Illustrator is one of the most popular and premium application in designing logos, blueprints, clipart and other precise resolution-independent applications.

We have used Adobe XD tool and Adobe Illustrator to make the images of detail map from the blueprint of our campus building.



The image is made and edited using Adobe XD and Adobe Illustrator

### 3. CONCLUSION

We are able to make an application for our college which can be used by the visitors visiting our college. In this way we are able to contribute something to our college using the programming knowledge that we have. Also, this will improve the college service in terms of technology.

### 4. Scope

The CMIW can be implemented in the big hospitals where the way to destination is confusing and patient have to suffer a lot. Also, the old aged person will be most benefited by this application. We made our research and developmental study to deploy "Artificially Intelligent path finding technique" for android smartphone.

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