NMAMIT WayFinder

A Mini Project Report Submitted by

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UNDER THE GUIDANCE OF

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in partial fulfilment of the requirements for the award of the Degree of

Bachelor of Engineering in
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from

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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CERTIFICATE

"NMAMIT WayFinder – College Route Map App" is a bonafide work carried out by Dhanya Rao (4NM20CS063), Durga Prasad R (4NM20CS067) and Harshitha J (4NM20CS077) in partial fulfilment of the requirements for the award of Bachelor of Engineering Degree in Computer Science and Engineering prescribed by Visvesvaraya Technological University, Belagavi during the year 2022-2023.

It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report. The Mini project report has been approved as it satisfies the academic requirements in respect of the project work prescribed for the Bachelor of Engineering Degree.

Signature of Guide
(Dr. Anisha P Rodrigues)

Signature of HOD

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ABSTRACT

Many college students face difficultly in locating and navigating to various departments and classes within the college premises. The interconnected nature of the college departments often makes it challenging for students to find their way around, leading to frustration and wastage of time. This application seeks to provide a solution to this problemby offering a navigation system that enables students to quickly and easily find their desired location and navigate to it from their current position. Our app will cover all such issues and make the entire process as relevant user friendly as possible.

The required data is stored and retrieved using firebase database. The app is coded in Java using Android Studio.

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CHAPTER 1

INTRODUCTION

1.1 Scope

The NMAMIT WayFinder Android application is to provide indoor navigation to college students within the college premises app is a customer-oriented user-friendly application

1.2 Importance

A WayFinder app is a valuable tool that helps users navigate and find their way in unfamiliar environments. It utilizes digital maps, GPS technology, and various features to provide users with directions. A WayFinder app simplifies navigation, saves time, enhances accessibility, and improves the overall user experience in indoor college environments. The application isimplemented on android platform which is linked to the Google firebase as a server for access of data.

1.3 Objective

The objective of this Android application is to provide indoor navigation to college students within the college premises. The application allows the user to search for a particular location and then provides navigation to that location from the user's current position. It also provides indoor maps for easy navigation within the departments. The main aim is to make it easy for students to locate and reach their desired destination within the college campus.

CHAPTER 2

SYSTEM REQUIREMENT AND SPECIFICATION

3.1 Introduction

Requirements are during early stages of a system development as a specification of what should be implemented or as a constraint of some kind of on the system. They may be a user level facility description, a detailed specification of expected system behavior, a general system property, a specific constraint on the system, and information on how to carry out some computation or a constraint on the development of the system. The end product of the requirement analysis phase is a requirement specification. The requirement specification is a reconstruction of the result of this analysis phase. Its purpose is to communicate this result to others. System requirements are more detailed descriptions of the user requirements. They may serve as the basis for a contract to the implementation of the system and should therefore be a complete and consistent specification of the whole system. They are used by software engineers as the starting point of system design. In principle, the system requirements should state what the system should do and not how it should be implemented. However, at the level of detail required to specify the system completely, it is virtually impossible to exclude all design information.

Natural language is often used to write system requirements specifications. Further problems with natural language can arise when it is used for more detailed specification:

1. Natural language understanding relies on the specification of the readers and writers using the same words for the same concept. This leads to misunderstandings because of the ambiguity of the natural language.
2. A natural language requirements specification is over-flexible. You can say the same thing in completely different ways. It is up to the reader to find out when requirements are same and when they are distinct.

3.2 Functional Requirements

The functional requirements are the statement of services the system should provide, how system reacts to particular inputs and how system should behave in particular situation. It describes the functionality that the system provides.

Our app requires:

I) Active internet connection.

II) A firebase console to store the data

3.3 User Requirements

Customer requires active internet connection to use the app.

3.4 Software Requirements

1. Operating System: Windows 7/8/10 (32-bit or 64-bit)
2. Android SDK
3. Android Studio
4. Firebase

3.4.1 Android SDK

The Android SDK provides you the API libraries and developer tools necessary to build, test, and debug apps for Android. The ADT bundle includes the essential Android SDK components and a version of the Eclipse IDE with built-in Android Developer Tools to streamline the Android app development. ADT bundle consists of following components for developing the application II. Eclipse ADT plugin.

- Android SDK Tools
- Android Platform-tools
- The latest Android platform
- The latest Android system image for the emulator

3.4.2 Android Studio

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on Jet Brains IntelliJ IDEA software and designed
Specifically, for Android development. It is available for download on Windows, macOS and Linux based operating systems. It is a replacement for the Eclipse Android Development Tools (ADT) as the primary IDE for native Android application development.

Android Studio was announced on May 16, 2013 at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. The current stable version is 3.3, which was released in January 2019.

3.4.3 Firebase

Firebase is a mobile and web application development platform developed by Firebase, Inc. in 2011, then acquired by Google in 2014.As of October 2018, the Firebase platform has 18 products, which are used by 1.5 million apps. Firebase provides a real-time database and backend as a service. The service provides

application developers an API that allows application data to be synchronized across clients and stored on Firebase's cloud. Firebase Storage provides secure file uploads and downloads for Firebase apps, regardless of network quality. The developer can use it to store images, audio, video, or other user-generated content. Firebase Storage is backed by Google Cloud Storage.

3.5 HARDWARE REQUIREMENTS

1. Minimum 4 GB RAM (8GB recommended).
2. 5GB free disk space
3. USB 2.0 or higher
4. Android Device

CHAPTER 3

SYSTEM DESIGN

Dashboard:

- User can search for place, user's current location, class.

Find your place:

User can find the required place in the campus by entering the category

- Banks
- Blocks
- Bus stops
- Clubs
- Colleges
- Departments and Halls

Current location:

- User is redirected to google maps to locate his/her current location.

Find Class:

- User can find the classroom in the campus by Entering the classroom number.
- The Floor and block important of the respective classroom are searched.

About app:

- The about app provide the app description and information about the creator

4.3 Database Design

The database is designed using Google Firebase Console in which data is stored in popular data structure known as JSON tree (JavaScript Object Notation). Every time when the data transfer happens from client end, the information given to the UI is converted into JSON tree structure which is efficient and faster way to retrieve and store data.

A snapshot of Firebase database:

CHAPTER 4

IMPLEMENTATION

5.1 SOLUTION APPROACH/METHODOLOGY

We are here using xml and java for the front end and firebase for the backend as a server.

5.1.1 FIREBASE

Firebase is considered as web application platform. It helps query for inserting, updating, deleting or adding data to it. It is the backend of a system that is used as a database for storing data.

Firebase real-time database feature is very easy to use. Once the Firebase and database dependency is added to the app, unstructured data can be added to database.

5.1.2 STORAGE

The files like images, audio, video etc can be stored in the app. The data stored is highly secured and is robust in nature means it resumes from the last point if any network error occurs.

5.1.3 FIREBASE AND ANDROID APP

An Android application has been developed for the demonstration of Firebase. In this app images along with strings are loaded to Firebase and retrieved from Firebase similar to Instagram. For the development of an Android app to demonstrate the use of Firebase, prototyping model has been followed.

Steps for connecting App to Firebase:

Step1: An account in the Firebase Login has to be created at

https://www.firebase.com/login/ using the Google account.

Step2: Creating a new application on Firebase. Firebase creates a new application when one logs in for the first time. Also, at the bottom left corner, one can find an option to create a new application on the Firebase server. The app URL has to be unique among all applications deployed on Firebase.

Step3: Next step is to add Firebase as a project dependency. Make changes to the following lines to the build.gradle file, which is located in the app's project folder, and not the root folder. After adding any dependency, one has to make sure to sync the application. If there is any build error complaint about duplicate files then one can choose to exclude those files by adding the packaging Options directive to the build.gradle file: android

Step4: Next, add permissions to Android application, add network permission to the app, the same way it has been done for parse earlier. Now add the following line to the AndroidManifest.xml file:
<uses-permission android:name="android.permission.INTERNET" / >
Firebase is a Backend-as-a-Service—BaaS—that started as an YC11 start up and grew up into a next-generation app-development platform on Google Cloud Platform.

5.1.4 Java

There are several ways to create apps for Android devices, but the recommended method for most developers is to write native apps using Java and the Android SDK. Java for Android apps is both similar and quite different from other types of Java applications.
If you have experience with Java then you will probably feel comfortable diving right into the code and learning how to use the Android SDK to make your app run.

5.2 IMPLEMENTATION CODE

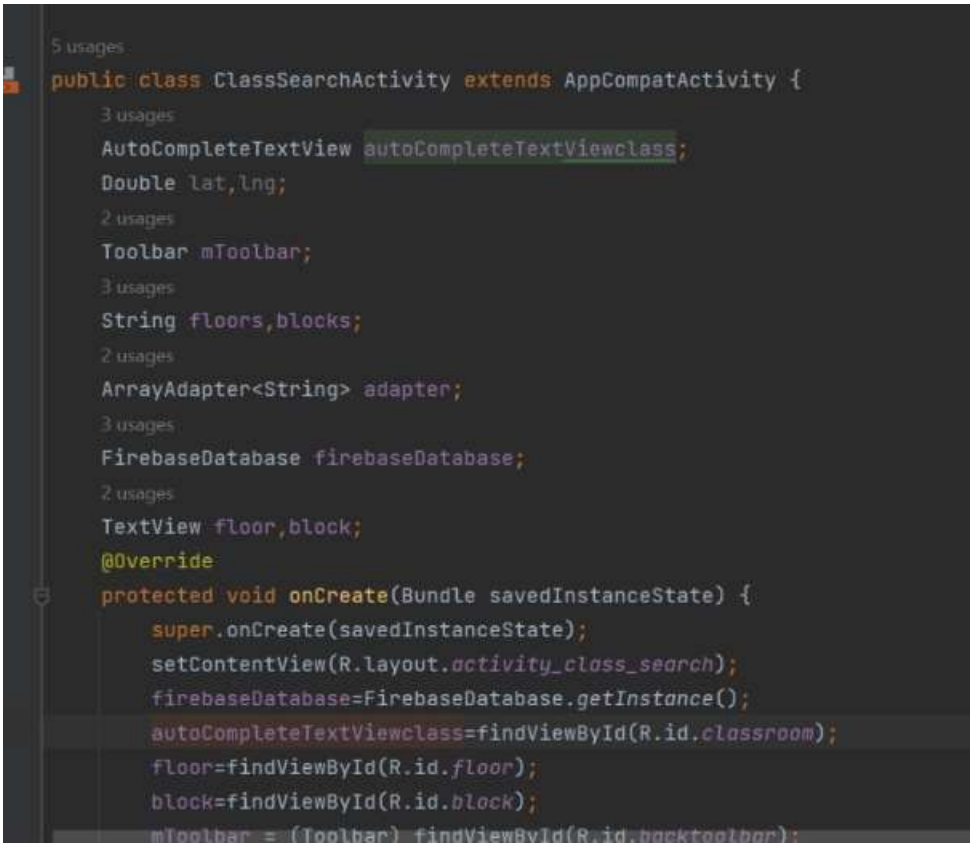
Splash Activity**:**

```
package com.example.nmamitwayfinder;

import ...

2 usages
public class SplashActivity extends AppCompatActivity {

    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_splash);
        Intent i=new Intent(getApplicationContext(),MainActivity.class);
        new Handler().postDelayed(new Runnable() {
            @Override
            public void run() {
                startActivity(i);
                finish();
            }
        }, delayMillis: 4000);
```

AboutCreators Activity:

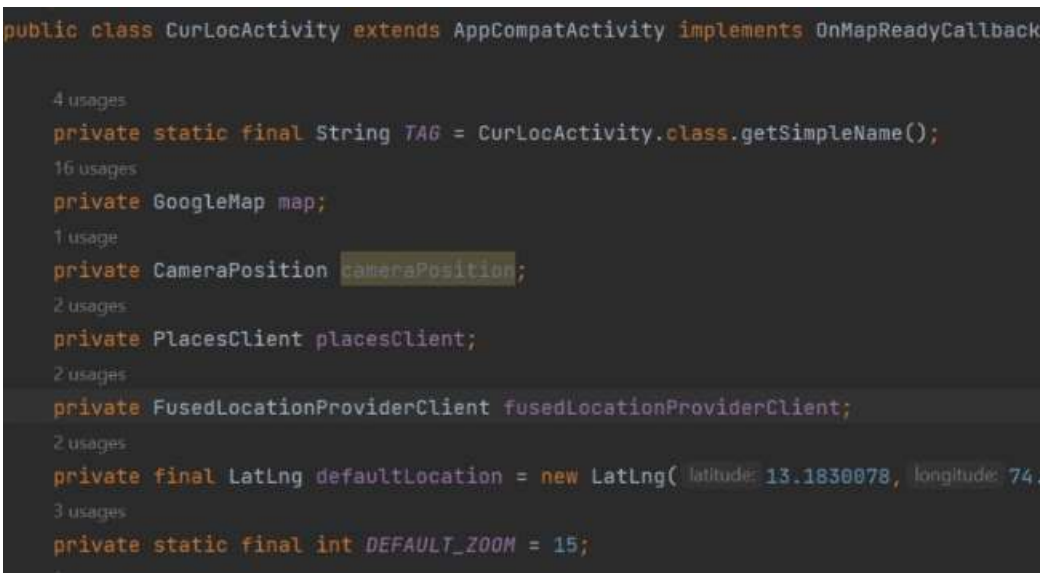
```
public class AboutCreatorsActivity extends AppCompatActivity {
    2 usages
    ImageButton dpinsta,dplinkdin;
    2 usages
    Toolbar mToolbar;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_about_creators);
        dpinsta=findViewById(R.id.instaDP);
        mToolbar = (Toolbar) findViewById(R.id.backtoolbar);
        setSupportActionBar(mToolbar);
        getSupportActionBar().setDisplayHomeAsUpEnabled(true);
        getSupportActionBar().setDisplayShowHomeEnabled(true);
        dpinsta.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                String url = "https://instagram.com/durgapr17";
                Intent i = new Intent(Intent.ACTION_VIEW);
                i.setData(Uri.parse(url));
                startActivity(i);
```

ClassSearch Activity:



```
5 usages
public class ClassSearchActivity extends AppCompatActivity {
    3 usages
    AutoCompleteTextView autoCompleteTextViewclass;
    Double lat,lng;
    2 usages
    Toolbar mToolbar;
    3 usages
    String floors,blocks;
    2 usages
    ArrayAdapter<String> adapter;
    3 usages
    FirebaseDatabase firebaseDatabase;
    2 usages
    TextView floor,block;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_class_search);
        firebaseDatabase=FirebaseDatabase.getInstance();
        autoCompleteTextViewclass=findViewById(R.id.classroom);
        floor=findViewById(R.id.floor);
        block=findViewById(R.id.block);
        mToolbar = (Toolbar) findViewById(R.id.backtoolbar);
```

Current Location Activity:



```
public class CurLocActivity extends AppCompatActivity implements OnMapReadyCallback

    4 usages
    private static final String TAG = CurLocActivity.class.getSimpleName();
    16 usages
    private GoogleMap map;
    1 usage
    private CameraPosition cameraPosition;
    2 usages
    private PlacesClient placesClient;
    2 usages
    private FusedLocationProviderClient fusedLocationProviderClient;
    2 usages
    private final LatLng defaultLocation = new LatLng( latitude: 13.1830078, longitude: 74.
    3 usages
    private static final int DEFAULT_ZOOM = 15;
```

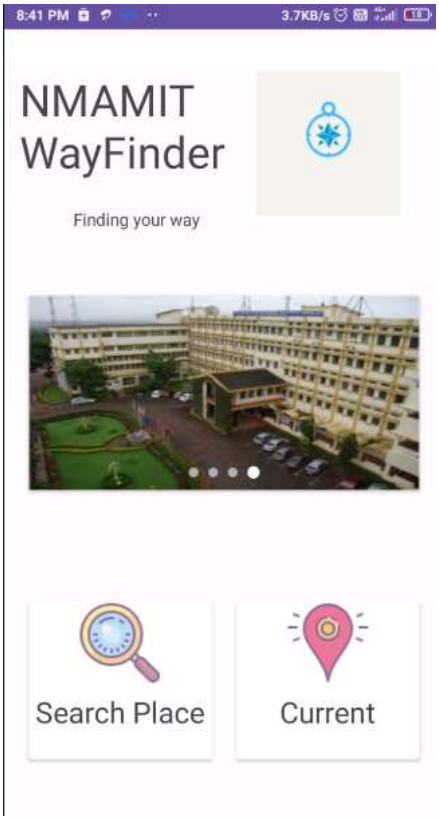
Main Activity(DashBoard):

```
public class MainActivity extends AppCompatActivity {
    2 usages
    ImageButton search,currentLoc,classLoc,info;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_main);
        search=findViewById(R.id.searchimg);
        info=findViewById(R.id.infoimg);
        currentLoc=findViewById(R.id.currlocimg);
        classLoc=findViewById(R.id.classlocimg);
        ImageSlider imageSlider=findViewById(R.id.imageSlider);
        ArrayList<SlideModel> slideModels=new ArrayList<>();
        slideModels.add(new SlideModel(R.drawable.college1, ScaleTypes.FIT));
        slideModels.add(new SlideModel(R.drawable.college2, ScaleTypes.FIT));
        slideModels.add(new SlideModel(R.drawable.college3, ScaleTypes.FIT));
        slideModels.add(new SlideModel(R.drawable.college4, ScaleTypes.FIT));
        imageSlider.setImageList(slideModels,ScaleTypes.FIT);
        CardView crdCur=findViewById(R.id.curCard);
        crdCur.setOnClickListener(new View.OnClickListener() {
```

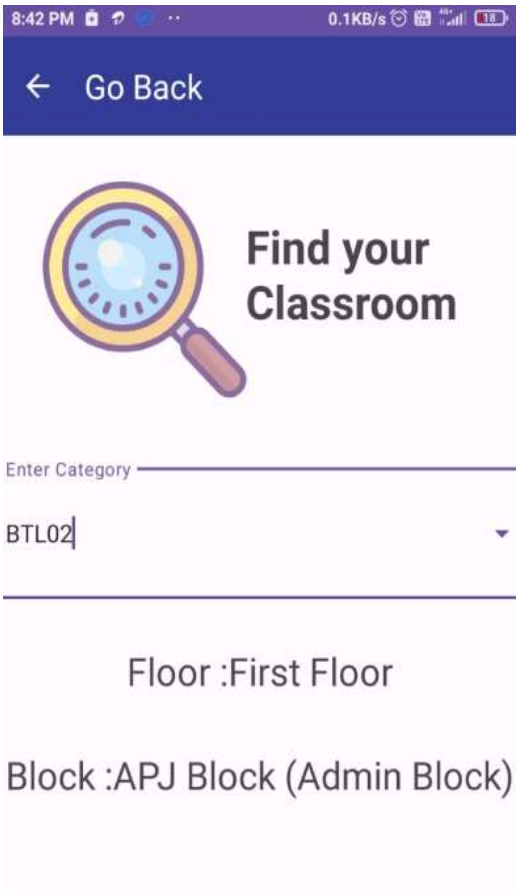
SCREENSHOTS

1. SPLASH SCREEN:

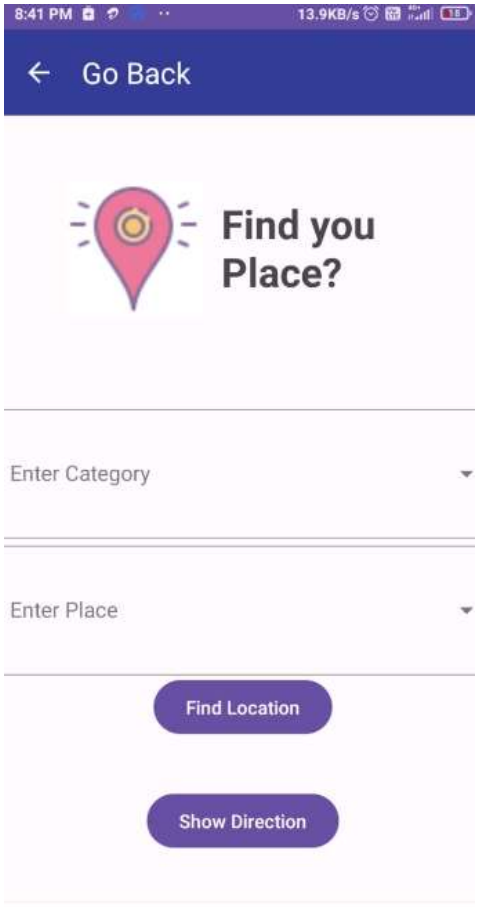
2.DASH BOARD:



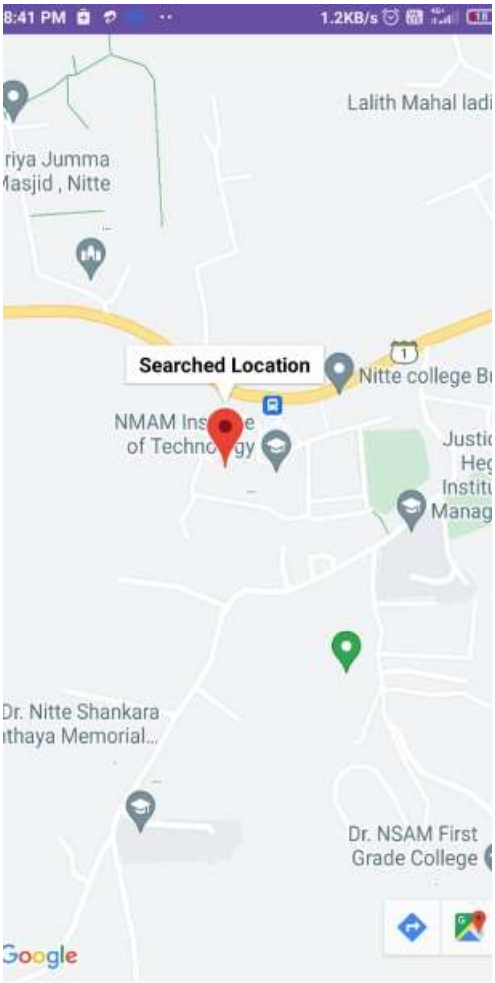
3.FIND YOUR CLASSROOM:



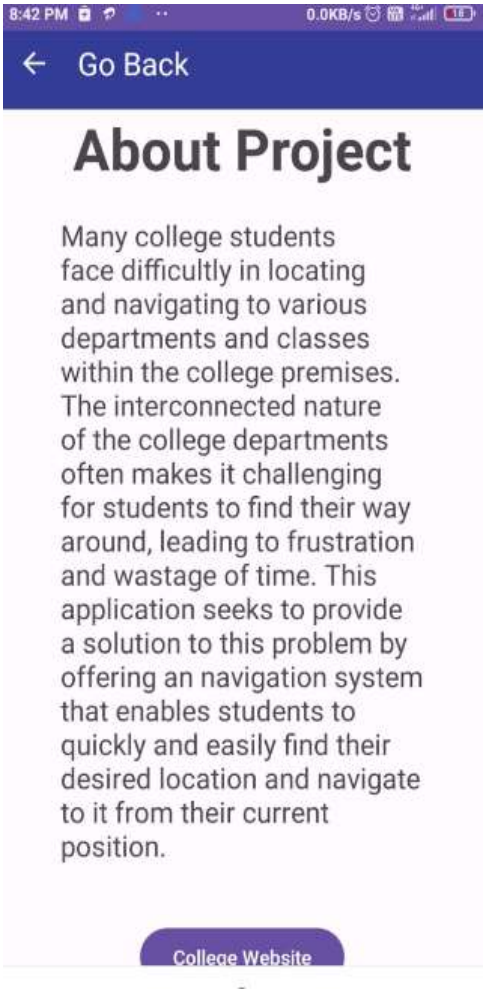
4. FIND YOUR PLACE:



5. SEARCHED LOCATION ON GOOGLE MAP



6. ABOUT PROJECT



7.1 Results/Conclusion:

- NMAMIT WayFinder is an android application for finding and navigating through the college.
- Different places around the college can be searched and located.
- Directions to the searched places can be found.
- Can search for classroom in the college.
- Can show our current location.

7.2 Future Works

In the future, we may extend this project by adding extra features to our android app like,

- Finding teacher cabins in the college.
- Getting updates about any college event being conducted.
- Indoor navigation within the building
- Real-time sharing location with other people

8 References

- "Overview Guides Reference Samples Libraries Support Go to console" Documentation Firebase, https://firebase.google.com/docs/
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