A

Major Project

On

SMART CAMPUS

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

By

Rohith Tatamsetty	(177R1A05B3)
Pranav Kashyap	(177R1A0575)
Payal Singh	(17C21A0543)
Shivani Jasrotia	(17C21A0549)

Under the Guidance of

K. Murali

(Associate Professor)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

(Accredited by NAAC, NBA, Permanently Affiliated to JNTUH, Approved by AICTE, New Delhi)Recognized Under Section 2(f) & 12(B) of the UGC Act.1956,
Kandlakoya (V), Medchal Road, Hyderabad-501401.

2017-2021

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled "**SMART CAMPUS**" being submitted by **ROHITH TATAMSETTY (177R1A05B3), PRANAV KASHYAP (177R1A0575), PAYAL SINGH (17C21A0543) & SHIVANI JASROTIA (17C21A0549)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering of the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by him/her under our guidance and supervision during the year 2020-21.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

INTERNAL GUIDE
Mr. K. MURALI
(Associate Professor)

DIRECTOR
Dr. A. Raji Reddy

HOD
Dr. K. Srujan Raju

EXTERNAL EXAMINER

Submitted for viva voce Examination held on _____

ACKNOWLEDGEMT

Apart from the efforts of us, the success of any project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project. We take this opportunity to express my profound gratitude and deep regard to my guide

Mr. K.Murali, Assoc. Professor for his exemplary guidance, monitoring and constant encouragement throughout the project work. The blessing, help and guidance given by him shall carry us a long way in the journey of life on which we are about to embark.

We also take this opportunity to express a deep sense of gratitude to Project Review Committee (PRC) Coordinators: **Mr. J. Narasimha Rao, Dr. B. Krishna, Dr. Suwarna Gothane, Mr. K. Murali**, and **Ms. Najeema Afrin** for their cordial support, valuable information and guidance, which helped us in completing this task through various stages.

We are also thankful to the Head of the Department **Dr. K. Srujan Raju** for providing excellent infrastructure and a nice atmosphere for completing this project successfully.

We are obliged to our Director **Dr. A. Raji Reddy** for being cooperative throughout the course of this project. We would like to express our sincere gratitude to our Chairman Sri. **Ch. Gopal Reddy** for his encouragement throughout the course of this project

The guidance and support received from all the members of **CMR TECHNICAL CAMPUS** who contributed and who are contributing to this project, was vital for the success of the project. We are grateful for their constant support and help.

Finally, we would like to take this opportunity thank our family for their constant encouragement without which this assignment would not be possible. We sincerely acknowledge and thank all those who gave support directly and indirectly in completion of this project.

ROHITH TATAMSETTY (177R1A05B3)

PRANAV KASHYAP (177R1A0575)

PAYAL SINGH (17C21A0543)

SHIVANI JASROTIA (17C21A0549)

ABSTRACT

An android application with which the students can have access to certain smart services related to college like canteen orders, Lost and found, Cleanliness, Library, Bus tracking using GPS, Applying for events and placements, etc.

There are canteen admin, events admin, placements admin, etc to see the placed orders, post the events information and placements information which can be seen by students respectively.

There is one ML module that helps in computing feedback given by students on food and converts that feedback into the rating. All the negative and positive feedbacks of each item can be checked by canteen admin which helps them to improve the quality of the food with more negative feedback. This model was trained using the RNN algorithm. The accuracy of this model is turned out to be around 94%. This model is integrated with android using the TensorFlow Lite file converted from the Keras model.

LIST OF FIGURES

LIST OF SCREENSHOTS

TABLE OF CONTENTS

1. INTRODUCTION

1. INTRODUCTION

1.1 PROJECT SCOPE

The project titled as “Smart Campus” is a Android based application integrated with ML and IoT. This Application provides facility for college to live a smart life.. The Application can help the users to book the orders in few clicks so that the queues in canteen will be avoided. The Application can help the security guards directly turn in class lights using his phone. The Darkmode in this application will help the phones to consume less battery. The bus tracking module helps the users in some emergency conditions, according to the bus location the bus can be caught easily.

1.2 PROJECT PURPOSE

This has been developed to facilitate the services of college and not to confine any college app only to attendance and academics but also we are introducing new services which are equally important. The application is considered to be secure because we are not collecting any fingerprints or login details to promote privacy. The application is developed with many features according to android updates. This application is mainly used to avoid queues and complete the works faster.

1.3 PROJECT FEATURES

The Application is built with a minimal User Interface which can be very easy to understand. The Application has all the updated features of android like Dark Mode, Chatbot, Statistics, Real time location tracking, and Biometric authentication. The Application is given Dark mode to reduce the battery consumption, Chatbot for easy query resolving, Statistics to know the total number of calories consumed and how to burn those, location tracking to locate college buses, and biometric authentication for security purpose.

2. SYSTEM ANALYSIS

2. SYSTEM ANALYSIS

SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

All in one app where we can have complete smart services for college related to cleanliness, lost & found, canteen orders, event notifications, etc. Do you think standing in the queue for ordering food and then waiting for the food to get ready is wasting time? Yeah me too. How if we could just order the food after (after the lectures/before reaching the canteen) itself and the food gets ready before you get there. So, you’ve found an earphone and not sure where you’re supposed to report it? Found dirt in your classroom and don’t know the appropriate authority to report? Could we just directly report this in the app and the appropriate authority will take care of the situation. Electronic devices and appliances have become very common in the recent years of technology with the fast development in smartphones, so this technology can be used in controlling the lights of college.

2.2 EXISTING SYSTEM

Most of the colleges may have an app which only covers attendance, assignments, time tables etc. Those apps do not have updated features like dark mode, Chabot, health statistics, etc. And services like ordering food, registering for events, Cleanliness, Lost and Found, Controlling Lights using phone etc in the app.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

- Most of the applications look like legacy applications(Not a better UI)
- The existing apps do not get updated features according to the Android version.
- The existing apps do not have important services of college like canteen, cleanliness etc.
- The existing application doesn't give the user a better experience.
- The database used in existing application is not quick enough.

  To avoid all these limitations and make the working more accurately the system needs to be computerized.

2.3 PROPOSED SYSTEM

As smartphones are becoming more preferred companions to users than desktops or notebooks, they can be considered to speed up the some services in college.

Our idea is regarding an application which balances all the needs of campus like

1. Place food orders from users on /before a break which avoids queues and also includes food intake statistics along with more popular items section based on user feedbacks.
2. Event notification includes all the information regarding present and upcoming events.
3. Reporting lost and found items so that every person will be aware of his/her belongings.
4. CGPA calculator
5. Placement Related Activities
6. Scan Book's QRCode and ID card's Barcode to get the book which avoids queues in library.
7. College Bus Live Tracking
8. Security Guards can control lights using their Android Phone
9. Cleanliness
10. Virtual Assistant etc

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features

- This application also has a feature called dark mode which increases the user's phone battery efficiency.
- This application has fingerprint feature for user security.
- This application has statistics for the food consumed.
- This application has made faster and richer in UI.
- This application can be used to automate the orders of canteen so that it reduces the time to deliver the food.
- This application can be used to calculate GPA and it has TTS feature.
- Minimum time required.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company.

Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.4.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication of the system is economically possible for development.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.4.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- Processor : Intel i3 or more.
- Hard disk : 160GB and Above.
- RAM : 4GB and Above.
- Hardware for IOT : NodeMCU ESP8266 with WIFI Module, LEDs, BreadBoard

2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements,

- Operating System : Windows 10 or MAC
- Languages : Java, Python, XML, Embedded C
- IDE : Android Studio, Arduino, Jupyter Notebook
- Library : TensorFlow Lite
- Database : Firebase(Cloud), SQLite

3. ARCHITECTURE

3. ARCHITECTURE

3.1 PROJECT ARCITECTURE

This project architecture describes about modules of project and how the data will be stored in database. The detailed architecture is explained below.

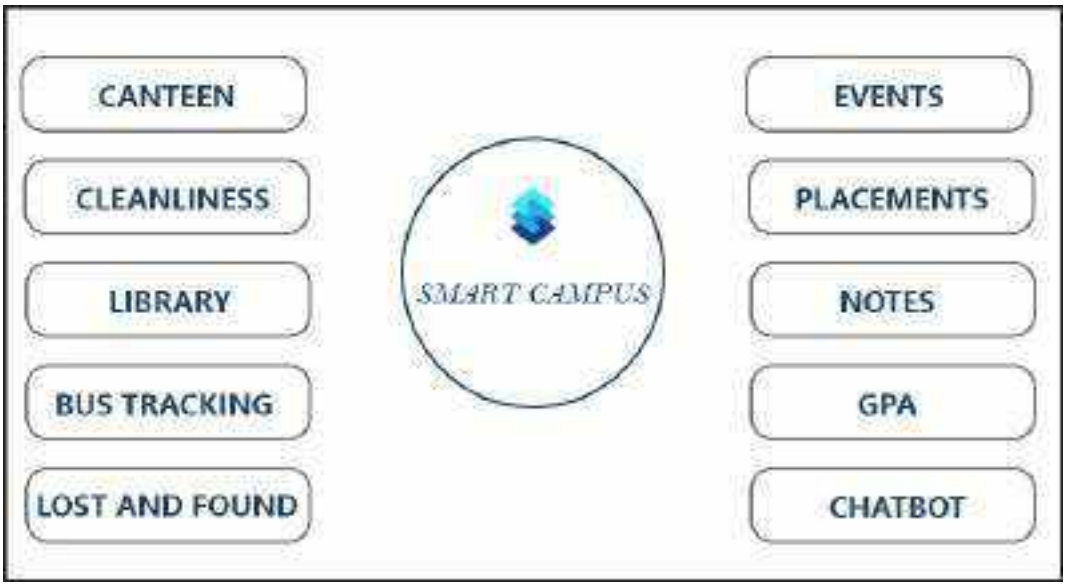


Fig. 3.1 Project Architecture of Smart Campus

3.2 MODULES DESCRIPTION

Modules

- Main Admin
- User
- Canteen Admin
- Cleanliness Admin
- Events Admin
- Placements Admin
- Bus Incharge
- Bus Drivers
- Security Admin

3.2.1 USER

- Canteen: This module allows the users to place orders from canteen and also check the statistics after payment and the user can give the feedbacks to his orders.
- Cleanliness: This module allows the users to upload a picture of dirt in the application so that it is sent to cleanliness admin can see that and he will take care of that situation.
- Lost and Found: This module allows the users to upload his/her lost items in the college and if any other person finds it they can call, message and WhatsApp them from that application itself.
- Library: This module allows the users to scan the barcode on the book and after scanning all the required books the user needs to scan the barcode on the ID card so that the books are issued to him which helps in avoiding the queues.
- Bus Tracking: This module allows the users to get the location of any bus driver and catch the bus. This module also allows the users to see notifications sent by Bus Incharge. The location of bus driver is shared continuously which is called real time tracking
- Events: This module allows the users to view the events posted by events admin with a link so that the users can register with that link and can attend it.
- Placements: This module allows the users to apply for companies which are posted by placements admin and can attend the drive.
- GPA: This module allows the users to compute their GPA and a feature is added for this module to speak out GPA post computation.
- Notes: This module allows the users to store important messages and photos like timetables etc.
- Chatbot: All the Chatbot queries asked by user are stored in database which is processed by admin.

3.2.2 ADMINS

CANTEEN ADMIN

- View Orders: This module allows the canteen admin to view the placed orders.
- View All Items: This module allows the canteen admin to view the items of canteen and he can change the availability of items and also he can view the feedback given by users which is converted to rating using ML.
- Add New Items: This module allows the canteen admin to add new items.

CLEANLINESS ADMIN

- View Requests: This module allows the cleanliness Admin to view the requests and also delete that post completion.

EVENTS ADMIN AND PLACEMENTS ADMIN

- View Events or Placements: This module allows the Events Admin or Placements Admin to view the events or placements posted by them.
- Add Events or Placements: This module allows the events admin or placements admin to add new events or placements.

BUS INCHARGE

- Send Updates: This module allows the bus incharge to send notifications to students regarding bus transport.
- View Location: This module allows the bus incharge to view location of buses.

BUS DRIVER

- Share Location: This module allows the bus driver to share location of bus through GPS.

SECURITY ADMIN

- Control lights: This module allows the security admin to control lights of college and they are arranged by floors.

MAIN ADMIN

- Add Other Admins: This module allows the admin to add above admins in to db.

3.3 USE CASE DIAGRAM

In the use case diagram we have basically two actors who are the user, and the admin. The user has the rights to login, access to resources and to view any details uploaded by any admin. Whereas the admin has the rights to login, access to resources of the users and also the right to add or delete any information, and he can also view the existing information like items in canteen, events, etc.

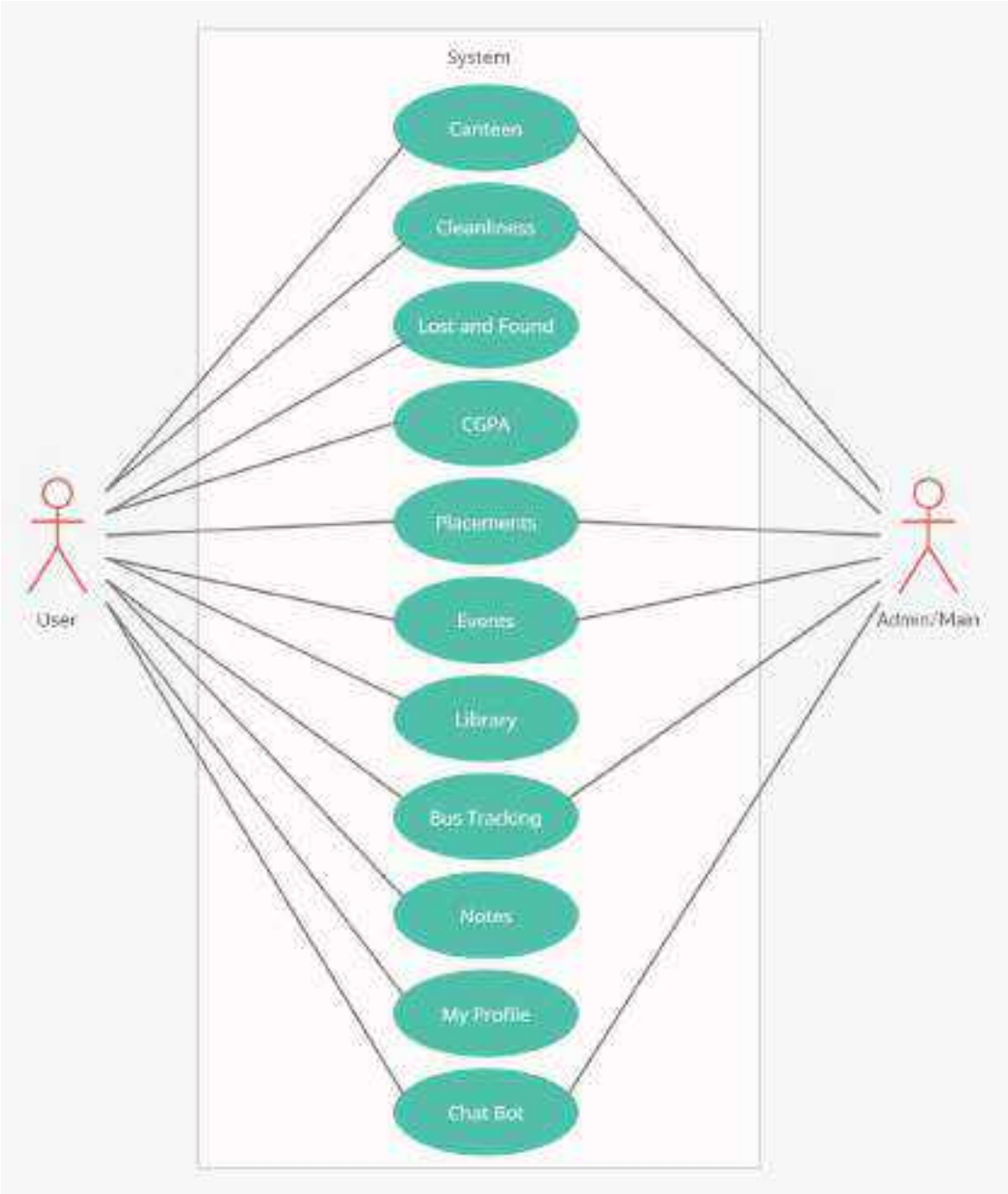


Fig. 3.3.4 Use Case Diagram for User, Admin for Smart Campus

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

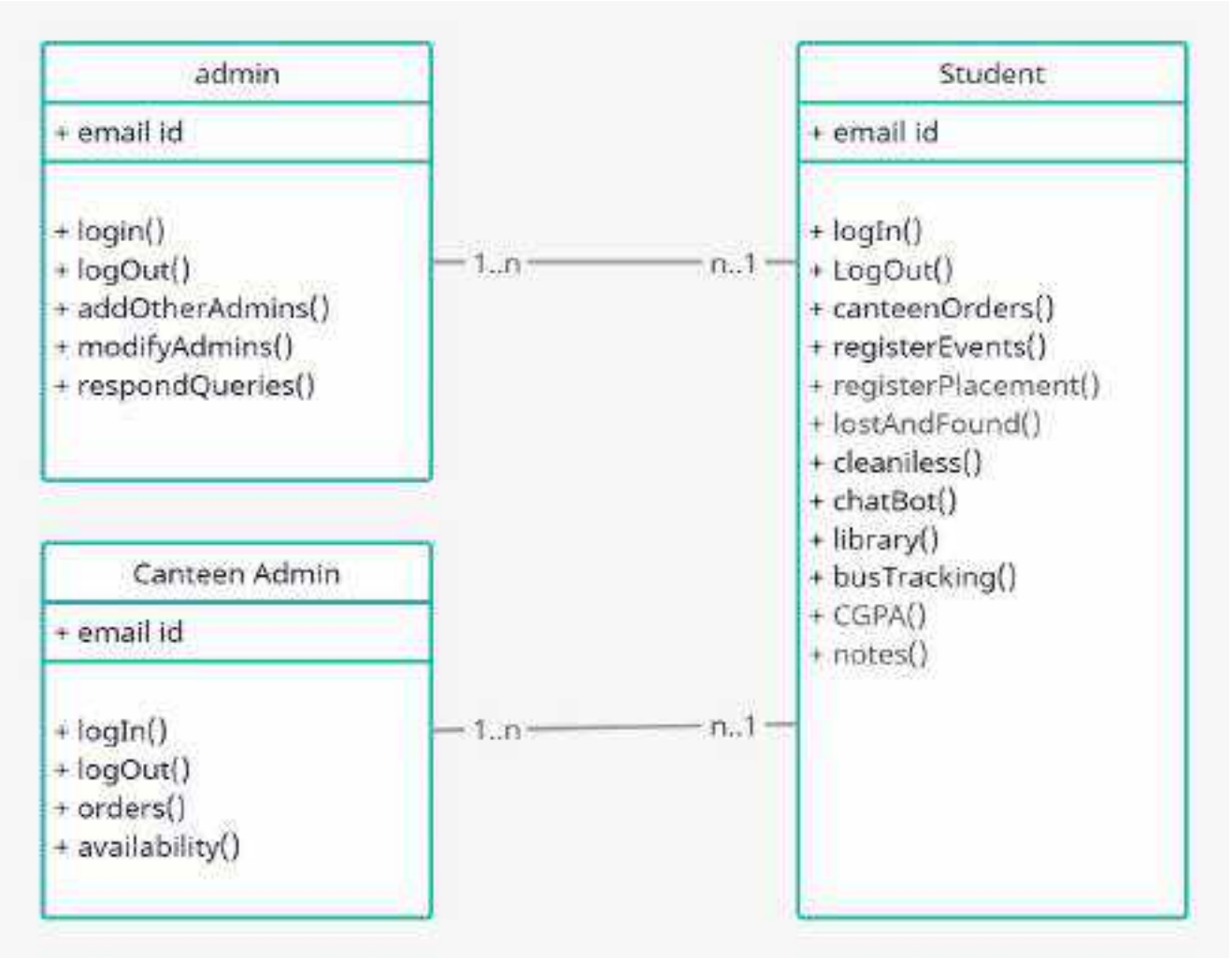


Fig. 3.3 Class Diagram for CANTEEN ADMIN USER and MAIN ADMIN FOR SMART CAMPUS

3.5 SEQUENCE DIAGRAM

The user posts the queries to the hostel and the admin will perform the task and he will give response to those queries.

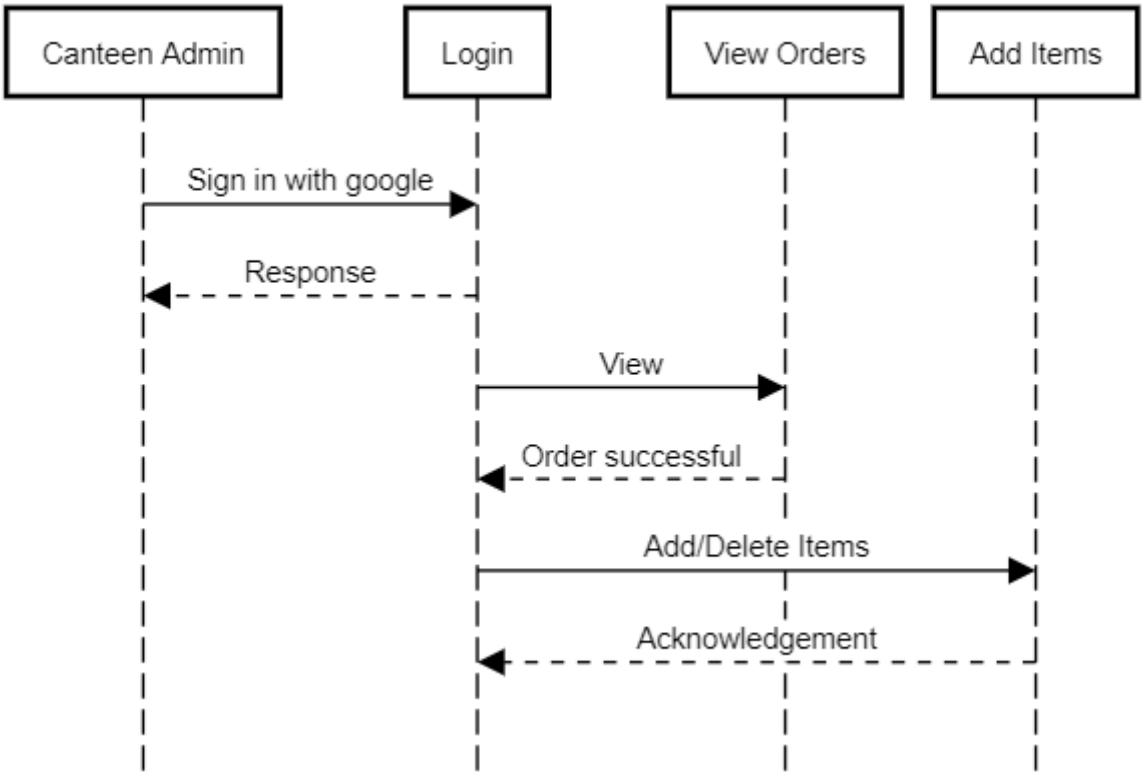


Fig.3.4 Sequence Diagram for SMART CAMPUS

3.6 ACTIVITY DIAGRAM

It describes about flow of activity states.

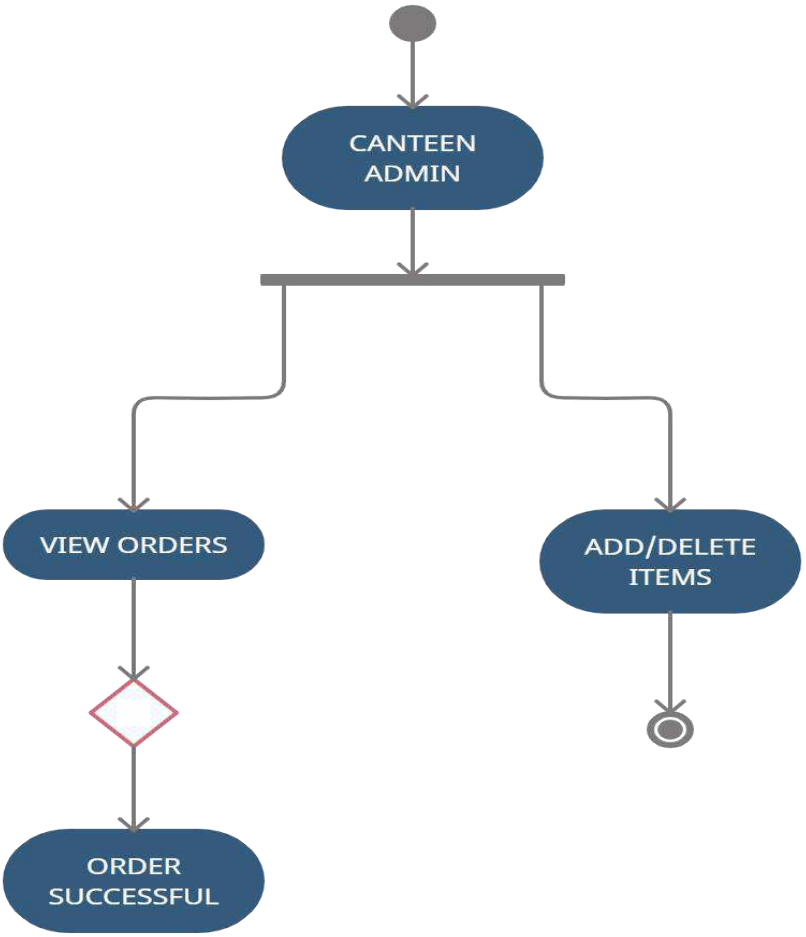


Fig. 3.5 Activity Diagram for Canteen Admin for SMART CAMPUS

4. IMPLEMENTATION

4. IMPLEMENTATION

4.1 SAMPLE CODE

Dashboard.java:

```
package com.example.smartservices;
import androidx.annotation.Nullable;
import androidx.appcompat.app.AppCompatActivity;
import androidx.appcompat.app.AppCompatDelegate;
import androidx.cardview.widget.CardView;
import android.app.ActivityManager;
import android.content.Intent;
import android.graphics.Color;
import android.os.Build;
import android.os.Bundle;
import android.os.SystemClock;
import android.view.View;
import android.view.Window;
import android.view.WindowManager;
import android.view.animation.AnimationUtils;
import android.widget.ImageView;
import android.widget.LinearLayout;
import android.widget.TextView;
import com.blogspot.atifsoftwares.animatoolib.Animatoo;
import com.bumptech.glide.Glide;
import com.bumptech.glide.request.RequestOptions;
import com.example.smartservices.activities.NotesActivity;
import com.google.android.gms.auth.api.signin.GoogleSignIn;
import com.google.android.gms.auth.api.signin.GoogleSignInAccount;
import com.google.android.gms.auth.api.signin.GoogleSignInClient;
import com.google.android.gms.auth.api.signin.GoogleSignInOptions;
import com.google.firebase.firestore.EventListener;
import com.google.firebase.firestore.FirebaseFirestore;
import com.google.firebase.firestore.FirebaseFirestoreException;
import com.google.firebase.firestore.QueryDocumentSnapshot;
import com.google.firebase.firestore.QuerySnapshot;
import java.util.HashMap;

public class DashBoard extends AppCompatActivity {
    CardView lostandfound,clean,events,placements,bustrack,library;
    LinearLayout canteen,calcgpa,myprofile,chatbot,notescard;
    long mLastClickTime = 0;
    GoogleSignInClient googleSignInClient;
    TextView textView;
    @Override
    protected void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);
        setContentView(R.layout.activity_dash_board);
        canteen=findViewById(R.id.canteen);
        lostandfound=findViewById(R.id.lostandfound);
        bustrack=findViewById(R.id.bustrack);
        calcgpa=findViewById(R.id.calcgpa);
        library=findViewById(R.id.librarycard);
        textView=findViewById(R.id.nameacct);
```

```
        notescard=findViewById(R.id.notescard);
        ImageView img=findViewById(R.id.userpicdash);
        GoogleSignInOptions gso = new
GoogleSignInOptions.Builder(GoogleSignInOptions.DEFAULT_SIGN_IN)
                .requestIdToken(getString(R.string.default_web_client_id))
                .requestEmail()
                .build();
        googleSignInClient = GoogleSignIn.getClient(this, gso);
        GoogleSignInAccount acct = GoogleSignIn.getLastSignedInAccount(this);
Glide.with(this).load(acct.getPhotoUrl()).apply(RequestOptions.circleCropTransform())
.into(img);
        textView.setText(acct.getDisplayName());
        clean=findViewById(R.id.clean);
        myprofile=findViewById(R.id.myprofile);
        events=findViewById(R.id.events);
        chatbot=findViewById(R.id.bot_card);
        placements=findViewById(R.id.placement_card);

        bustrack.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
                Intent intent=new Intent(DashBoard.this,BusTracking.class);
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateSlideUp(DashBoard.this);
            }
        });
        library.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
                Intent intent=new Intent(DashBoard.this,LibraryQR.class);
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateSlideUp(DashBoard.this);
            }
        });
        notescard.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
               Intent intent=new Intent(DashBoard.this, NotesActivity.class);
```

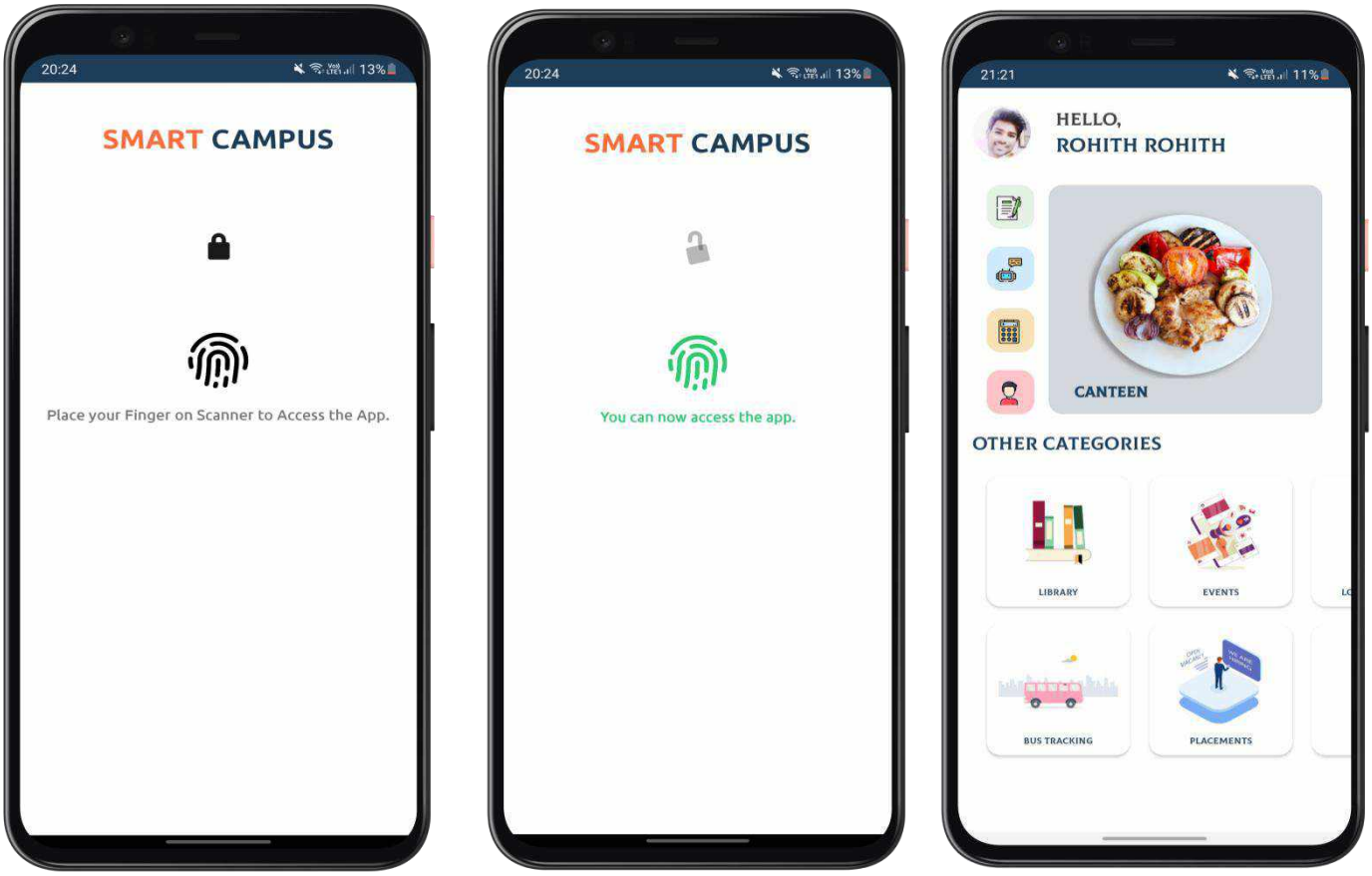
```
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateSlideUp(DashBoard.this);
            }
        });
        canteen.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
                Intent intent=new Intent(DashBoard.this,MainActivity.class);
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateZoom(DashBoard.this);
            }
        });
        events.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
                Intent intent=new Intent(DashBoard.this,EventActivity1.class);
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateSlideUp(DashBoard.this);
            }
        });
        calcgpa.setOnClickListener(new View.OnClickListener() {
            @Override
            public void onClick(View v) {
                if (SystemClock.elapsedRealtime() - mLastClickTime < 1000){
                    return;
                }
                mLastClickTime = SystemClock.elapsedRealtime();
                Intent intent=new Intent(DashBoard.this,InsideGpa.class);
                intent.putExtra("email",acct.getEmail());
                intent.putExtra("name",acct.getDisplayName());
                intent.putExtra("image", acct.getPhotoUrl());
                intent.putExtra("id", acct.getId());
                startActivity(intent);
                Animatoo.animateSlideUp(DashBoard.this);
            }
        });
    }
```

5. SCREENSHOTS

5. SCREEN SHOTS

5.1 DASHBOARD PAGE

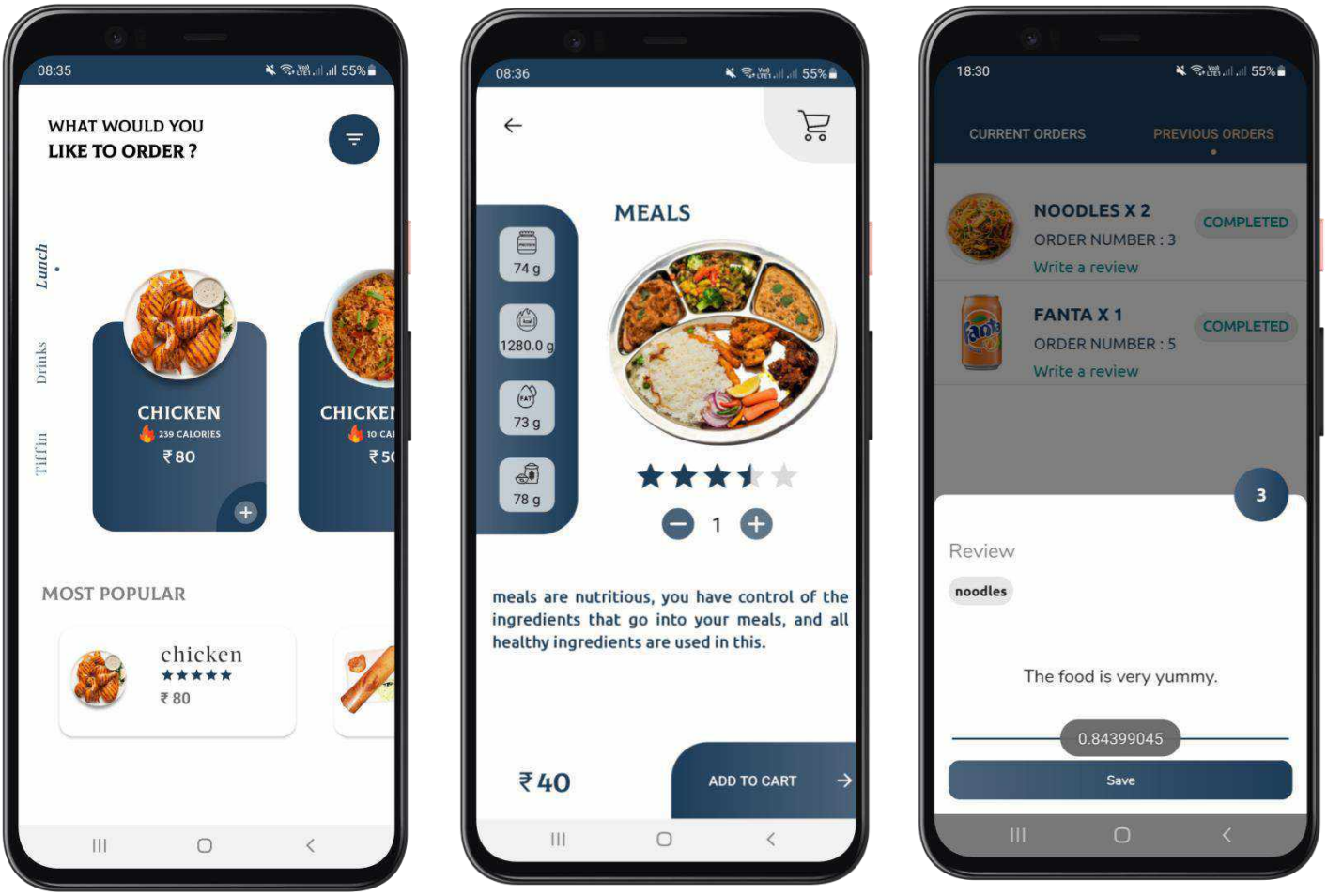
This is Dashboard Page where user can easily access every resource of the application.



5.1. Screenshot: Dashboard Page of Smart Campus

5.2 CANTEEN PAGE

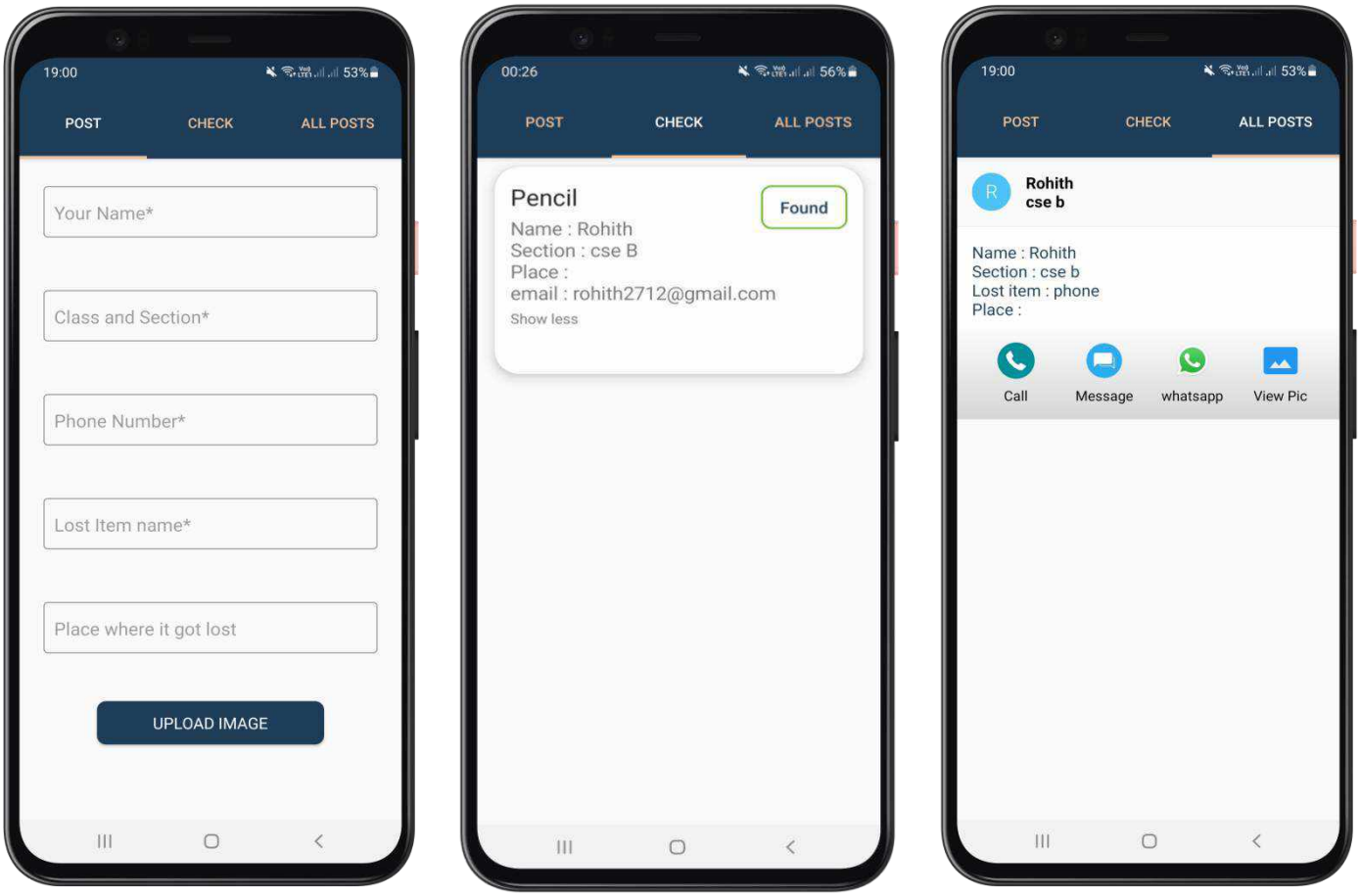
This screenshot shows the canteen pages.



5.2. Screenshot: Canteen Pages of SMART CAMPUS

5.3 LOST AND FOUND

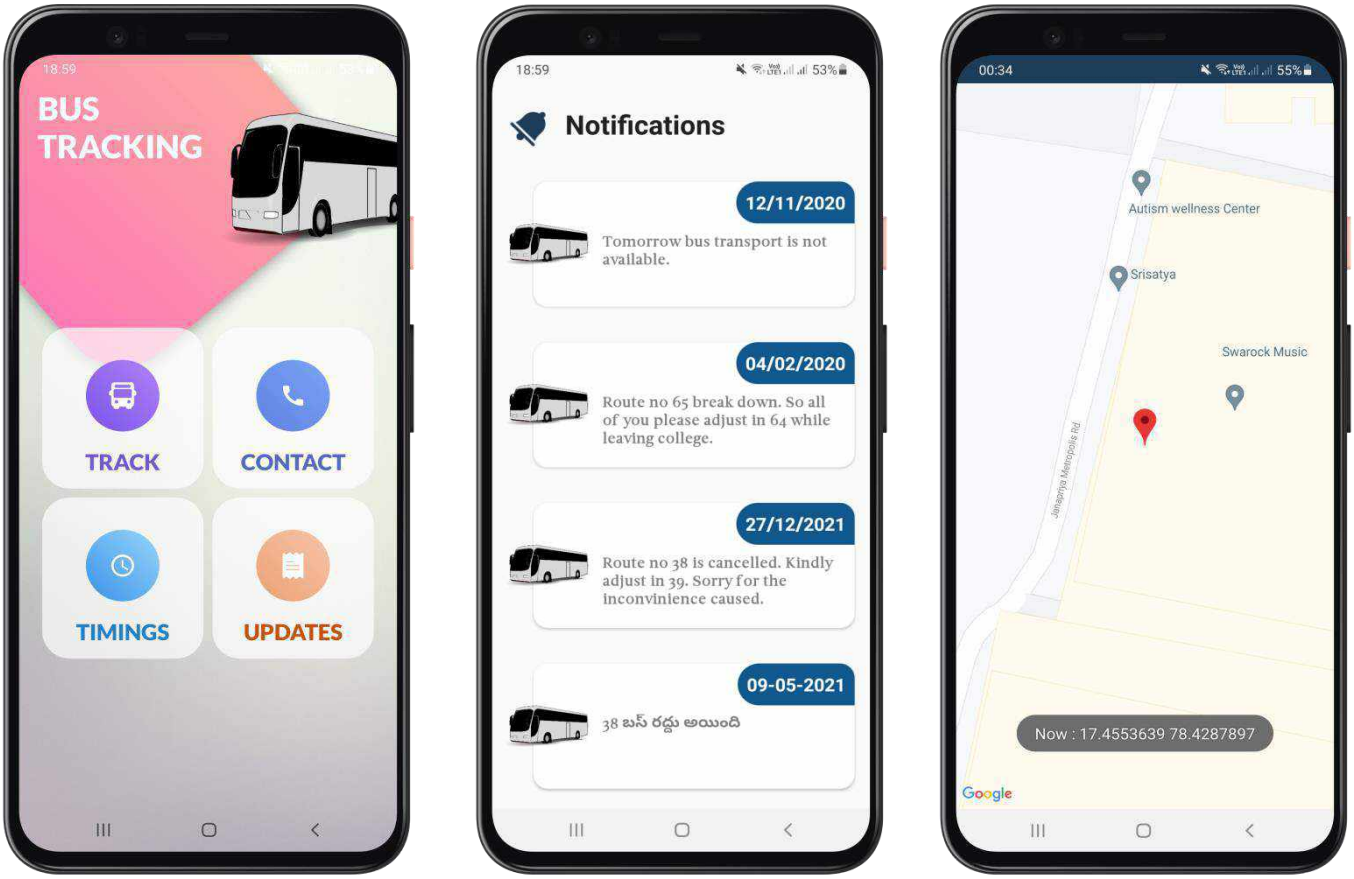
In this screenshot Lost and Found page is opened.



5.3. Screenshot: Lost and Found Page of SMART CAMPUS APP

5.4 BUS TRACKING PAGE

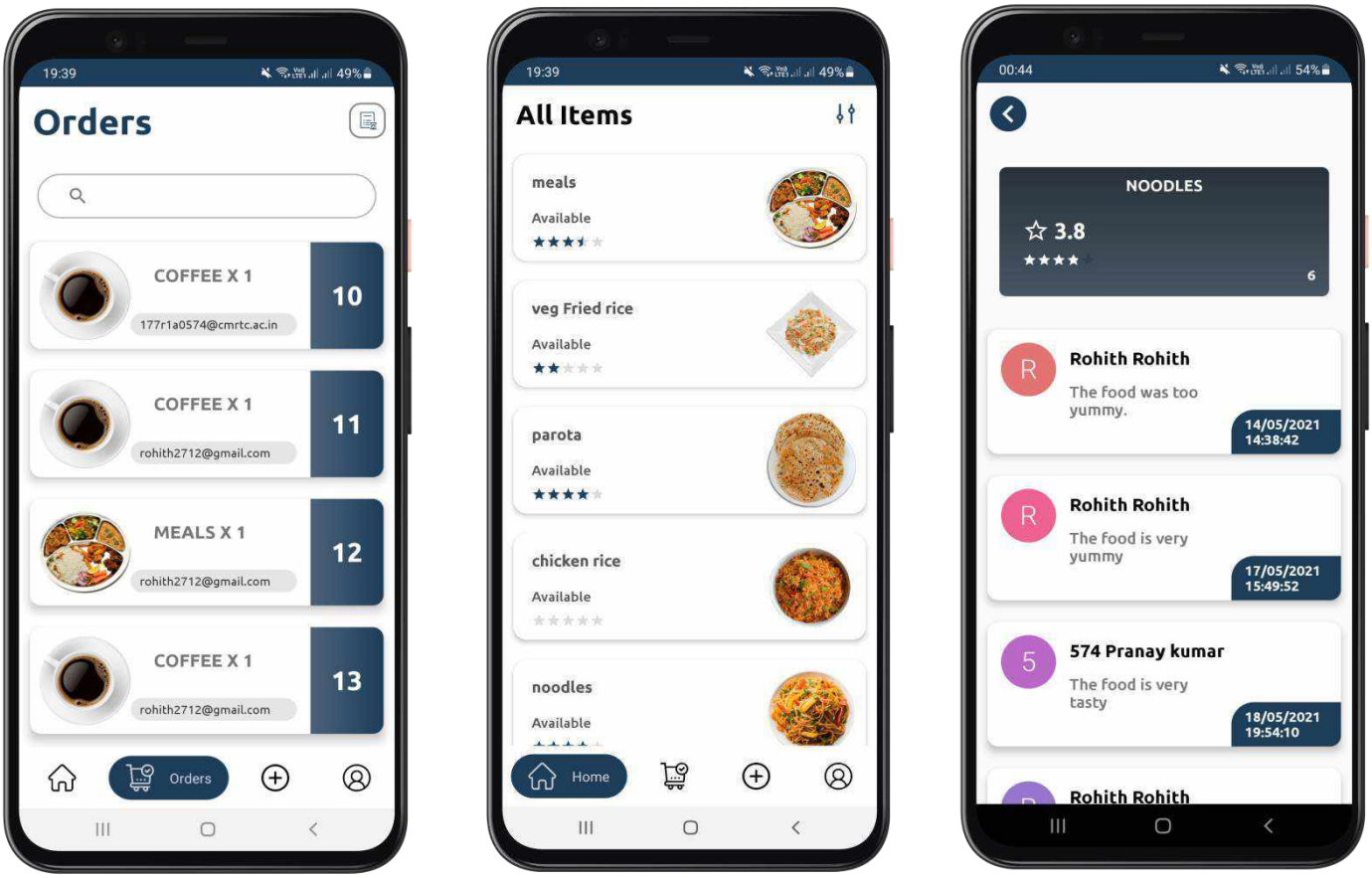
When a user wants to track college bus then this page can be opened.



5.4. Screenshot: Bus Tracking Page of SMART CAMPUS APP

5.5 CANTEEN ADMIN PAGE

In this screenshot we can see the Canteen Admin home page.



5.5. Screenshot: Canteen Admin Page of SMART CAMPUS APP

6. TESTING

6. TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

6.3 TEST CASES

6.3.1 NEW USER ID CREATION

Test case ID	Test case name	Purpose	Test Case	Output
1	New User ID1 creation	Creating a User ID1 for a user	The user logins with his desired email id which is evaluated from the database.	User ID1 for the user has been successfully Created
2	New User ID2 creation	Creating a User ID2 for a user	The user logins with his desired email id which is evaluated from the database.	User ID2 for the user has been successfully Created

3	New User ID3 creation	Creating a User ID3 for a user	The user logins with his desired email id which is evaluated from the database.	User ID3 for the user has been successfully Created

6.3.2 LOGIN PAGE

Test case ID	Test case name	Purpose	Input	Output
1	Login page	To check if the login page performs its task	The email address of the user.	The Dashboard of user is opened.
2	Login page	To check if the login page performs its task	Incorrect email address of any admin.	The Dashboard of any admin is not opened.
3	Login page	To check if the login page performs its task	The email address of main admin.	The Dashboard of respective admin is opened.

6.3.3 ADMIN LOGIN

Test case ID	Test case name	Purpose	Input	Output
1	Admin Login	To verify the Admin Page	The already allocated Email address for admin	Display admin control panel

2	Admin Login	To verify the Admin Page	The misallocated email address for admin	The Dashboard of user is opened
3	Admin Login	To verify the Admin Page	The already allocated Email address for admin.	The Dashboard of admin is opened.

7. CONCLUSION

7. CONCLUSION & FUTURE ENHANCEMENTS

7.1 PROJECT CONCLUSION

Our study on this project revealed that, the services like canteen, cleanliness, lost and found, Placements, cgpa calculation, controlling lights with phone etc can make the users to live a smart life. We are using sign in with google which doesn't require any passwords to remember and also promotes privacy. For payments through the app, the app is made fast and secure in payments by enabling only two options i.e, PayTM and Google pay. This app also has a Chatbot for help and if the Chatbot do not solve the problem he/she can contact the support team directly. This app also uses Machine Learning modules and IOT Module to collect feedback from users in canteen and through the feedback the Most Popular section is created and controlling lights for security through his mobile respectively.

7.2 FUTURE ENHANCEMENTS

In future we can use Machine Learning algorithms for CC cameras to directly take the pic of dirt in cleanliness section. We can enhance the current chatbot. We can add the videos of events so that the users can view them. We can add more payment gateways for user convenience. User Interface can be made simpler and attractive so that the users can easily understand and can have better user experience.

Based on future security issues, security can be improved using emerging technologies. IOT modules can be added to control every electric item in college. The Application will have updated features according to android updates.

8. GITHUB LINK

https://github.com/Rohith27-Developer/SmartServices.git

8. BIBILOGRAPHY

8. BIBILOGRAPHY

8.1 References

1. https://developer.android.com/docs
2. https://www.vogella.com/tutorials/android.html
3. https://www.edureka.co/blog/android-tutorial/
4. https://firebase.google.com/docs/android/setup
5. https://dribbble.com/learn
6. https://helpx.adobe.com/in/xd/tutorials.html

Android Application for Smart Services in College Integrated With IOT and ML

K. Murali[1], Rohith Tatamsetty[2], Pranav Kashyap[3], Payal Singh[4], Shivani Jasrotia[5]

[1]*Associate Professor, CSE, CMR Technical Campus, Hyderabad, India*

[2]*Student, CSE, CMR Technical Campus, Hyderabad, India*

[3]*Student, CSE, CMR Technical Campus, Hyderabad, India*

[4]*Student, CSE, CMR Technical Campus, Hyderabad, India*

[5]*Student, CSE, CMR Technical Campus, Hyderabad, India*

***Abstract*: An android application with which the students can have access to certain smart services related to college like canteen orders, Lost and found, Cleanliness, Library, Bus tracking using GPS, Applying for events and placements, etc. There are canteen admin, events admin, placements admin, etc to see the placed orders, post the events information and placements information which can be seen by students respectively. There is one ML module that helps in computing feedback given by students on food and converts that feedback into the rating. All the negative and positive feedbacks of each item can be checked by canteen admin which helps them to improve the quality of the food with more negative feedback. This model was trained using the RNN algorithm. The accuracy of this model is turned out to be around 94%. This model is integrated with android using the TensorFlow Lite file converted from the Keras model.**

***Keywords*: RNN ML Algorithm, IoT software, Real- Time GPS, TensorFlowLite.**

1. Introduction

Most of the colleges may have an app that only covers attendance, assignments, timetables, etc. Those apps do not have updated features like dark mode, Chabot, health statistics, etc. and services like ordering food, Registering for events, Cleanliness, Lost and Found, Controlling Lights using phone etc in the app.

[1] Most of the applications look like legacy applications(Not a better UI)

[2] The existing apps do not get updated features according to the Android version

[3] The existing apps do not have important services of college like canteen, cleanliness, etc.

[4] The existing application doesn't give the user a better experience.

[5] The database used in the existing application is not quick enough.

This App named Smart campus helps the students to live a smart life by using all the services provided by the college in few clicks. The User Interface is made user-friendly. The user needs to login with google which promotes privacy as well as the user need not remember login credentials.

The ML model being discussed in this paper was trained on around 3lakh reviews using the SimpleRNN Algorithm and tested on around 1lakh reviews. The dataset used in this application is Amazon fine food reviews. These are further discussed in detail in the following sections.

2. Proposed System

As Smartphones are becoming more preferred companions to users than desktops or notebooks they can be considered to speed up the some services in college. We have come up with an idea that every individual will have his/her own account where he/she can sign in with the help of google account. Our idea is regarding an application which balances all the needs of campus like Place food orders, Event notification, Reporting lost and found items, GPA calculator, Placement Related Activities, Smart Library, College Bus Live Tracking, Cleanliness, Control lights, Virtual Assistant, etc.

The app also contains some privacy features like fingerprint authentication, Dark mode, Food statistics, Generating Most popular section from the feedbacks given by users on each item. The user needs to scan his fingerprint after opening the app and the dark mode is for enhancing the battery usage of the phone. The dark mode can decrease the battery consumption of the phone. The health statistics are the stats provided to the user which draws a pie chart between healthy food vs junk food. As per our analysis, junk food is something which has more than 18% of fats in it. The app also provides the total number of calories consumed and the time required to burn those calories by running and cycling only after successful payment for the order. After a successful payment, the order is sent to canteen admin and he can see that and prepare the food before he reaches the canteen itself which saves the time and also avoids the queue.

The app contains a Chatbot section in which if the user has any query he can chat with the Chatbot and if the query still persists the user can contact the team.

The app contains a Canteen section where the user can place the orders and complete the payment easily through GPAY and PAYTM.

The user can write feedback for the item they took which is converted to rating with the help of the ML algorithm. The RNN model was adopted for text classification. The proposed model was evaluated based on Amazon Fine Food Reviews Dataset, which achieved around 94% accuracy.

This ML model consists of three major parts:

[1] Sentimental analysis of feedback given by the customers using RNN.

[2] Integration of machine learning model in android application.

[3] Ranking each food item in the menu based on the feedback given by the users.

The references are mentioned at the end of the paper.

3. Methodology

A. System Analysis

This application is developed using Android Studio. Android is an open-source mobile operating system. Android studio includes an SDK file. SDK file contains many libraries. Android programs are written in Java and XML and run through a JVM that is optimized for mobile devices. Here java is used for the backend and XML is used for the frontend.

This application is integrated with ML and IoT devices. Jupyter Notebook and Arduino are used to write ML and IoT code (Embedded C).

Block diagram representing basic design of Smart Campus shown in Fig 1.

Fig. 1: Block diagram

B. Modules Description

The app also has a **Cleanliness** section which allows users to upload a picture of dirt in the application so that it is sent to cleanliness admin and he will take care of that situation.

The app has a **Lost and Found** section which allows users to upload his/her lost items in the college and if any other person finds it they can call, message, and WhatsApp them from the application itself.

The app contains a **Library** section which allows the students to scan the barcode on the book and after scanning all the required books the user needs to scan the barcode on the ID card so that the books are issued to him which helps in avoiding of queues.

The app contains a **Bus Tracking** module where the bus drivers open the app and shares his location which is stored in database and then retrieved to users. The location of bus driver is shared continuously which is called real time tracking.

The app contains **Events** section in which all the events are posted by admin with a link so that the users can register with that link and can attend it.

The app contains **Placements** section in which all the placements happening in and out of the college are posted by admin and is registered by the users and they can attend the drive.

The app contains **GPA** section which computes GPA of student and also speaks out the GPA.

The app contains **Notes** section in which the user can store import online class links, timetables, important pdfs, etc.

The app contains a **Canteen** section where the user can place the orders and take the food which helps in avoiding queues and the user can also provide feedback. The tflite is used to integrate ML with android. The tflite file acts as a bridge between ML and android.

The app contains **Security admin** module which gives access to security guards in controlling lights of college through his phone.

The app contains **Canteen admin** module which allows canteen people to check the orders and deliver them, view the items and change the availability of the items and also upload the new items.

The app contains **Cleanliness admin** module which allows cleanliness staff to view the pics of dirt uploaded by the user.

The app contains **Events admin** module which allows events admin to upload and view the events.

The app contains **Placements admin** module which allows placements admin (TPO) to upload and view the placements or drives happening in and out of the college.

The app contains **Bus Incharge admin** module to upload bus driver details and also can send notifications to students regarding availability of buses.

The app contains **Bus Driver** module to share location of bus to students.

The app contains a **Chatbot** module to report any issues with the app and if the issue not mentioned in that section he can type the issue so that the issue is sent to Main Admin.

The user will login using his google account and after successful login, it will take to a prescribed page i.e, if that email with which user signed in is set as canteen admin in database the app opens canteen admin page and same with other admins. The students can use email provided by college.

C. Database

In any system storing of data is very important part. In this application for the storing data firebase connectivity is provided. In addition to this SQLite is also used to store some data in user internal storage. Firebase is an online platform to store data, documents like text, images, video file, PDFs, etc.

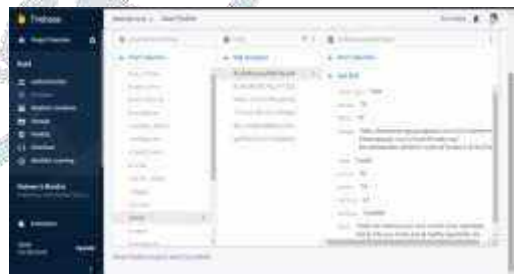


Fig. 2: Firebase Database

D. Machine Learning

The Dataset used for this project was Amazon Fine Food Reviews.

Out of the 5,68,454 reviews 3lakh were used for training the model. The ML model was trained using the Machine Learning SimpleRNN ML Algorithm on around 3lakh reviews and tested on around 1lakh reviews.

SimpleRNN(Recurrent Neural Networks) algorithm is designed for text classification. The activation function used for this project is tanh.

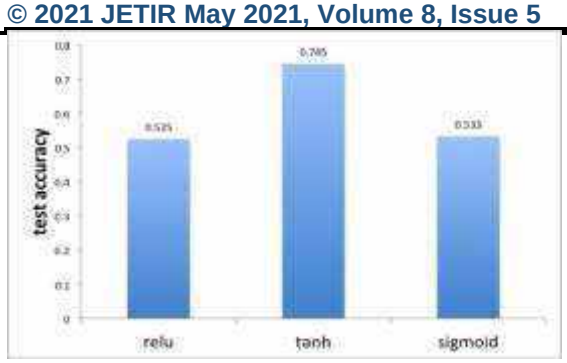


Fig. 3: Activation Function Comparison

tanh function has the highest test accuracy. Therefore, we chose tanh function in our best model.

The Amazon Food Review dataset has 568, 454 samples. Out of which

52268 reviews have a score of 1
29769 reviews have a score of 2
42640 reviews have a score of 3
80655 reviews have a score of 4
363122 reviews have a score of 5

.

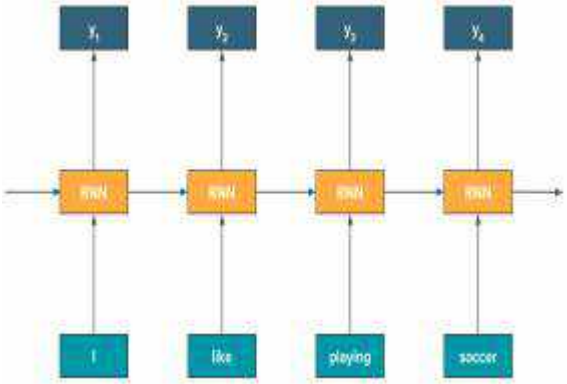


Fig. 4. Algorithm Diagramatic Representation

TensorFlow Lite is an open-source Deep Learning Framework for on device inference.

The steps in TensorFlow Lite are [1] Train a model. [2] Convert TensorFlow model to TensorFlow Lite model. After converting, a new .tflite file is generated stored in local storage. Take the file and put that file in assets folder of android studio. So that it is not required to train the model every time which takes less time to perform computation and gives the output.

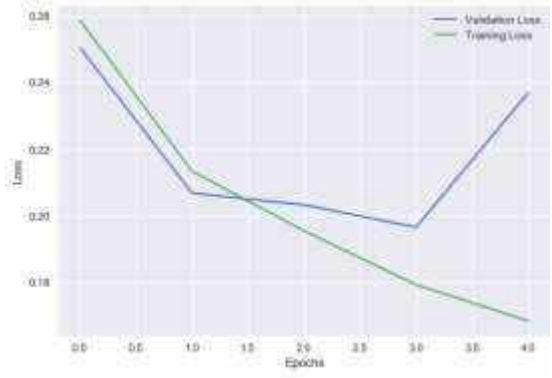


Fig. 5: Loss of the Machine Learning Model

The accuracy of this model is around 94% and it takes around 3min for each epoch.

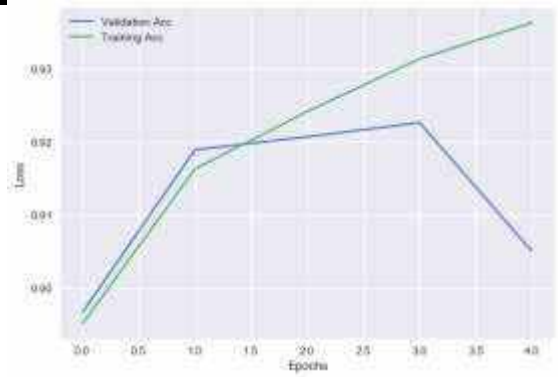


Fig. 6: Accuracy of the model

4. Results and Discussion

The user will login using his google account (Gmail account) and after signing it will take to the prescribed page i.e, if the given mail is canteen admin then it takes the user to canteen admin page and same for all other pages.

Fig. 6: Fingerprint Security

Fig.7: Google Sign in

After Successful login the Student gets navigated to Dashboard.


Fig.8: Dashboard


Fig.9: Canteen Page

From the Dashboard we can see multiple modules and from the modules if the student selects Canteen then Fig.9 is opened. And From Canteen page if any item is selected then student can view health statistics of that item and price and rating of that item and he can also select the quantity and add them to cart and after payment the control is sent to Orders page which has two tabs i.e, Current orders and Previous orders.


Fig.10: Items info page


Fig.11: Current Orders

When the User navigates to previous orders he can give the feedback of the items which he ordered and delivered. After giving the feedback the positive percentage of the text is displayed.

Fig.12: Previous Orders

Fig.13: Review (Feedback)

The next module is Bus tracking where the user will have four options i.e, Track, Contacts, Timing, Updates. Whenever the user clicks on track it prompts for route no and then the map is displayed along with directions. And next contacts section has contact numbers of all bus drivers and the next one is Timing in which a pdf is displayed with routes and timings of each bus and the last one is updated in which notifications are displayed.

Fig. 14: Bus Tracking

Fig. 15: Notifications

The next module is Lost and Found which helps the users if they lost any items in the college. They can post their details and the item in the application so that if any other people find it they can call them, message them from the application itself.

Fig. 16: Lost and Found

Fig. 17: All Posts

The above modules are for students. The next modules are for admin purposes.

The first module is Canteen Admin who can view orders, add new items, View feedbacks of each item and Delete the items.

The Canteen Admin Page after successful login is shown below in Fig. 18.

Fig.18: All Items

Fig.19: Orders

The next module is Security admin who can control the lights of the college from the application itself. The hardware used in this module is NodeMCU WIFI module ESP8266, Breadboard and LED. After successful login the app checks if the mail is security admin and if it is true it shows the console of security admin and they are provided with room numbers with floors for easy access as shown in Fig 20.

Fig.20: Security Admin

A Part from the above mentioned admins there are few more admins like Events Admin, Placements Admin, Cleanliness Admin, Bus Incharge, Bus Drivers etc whose activities are mentioned in the modules description section.

5. Conclusion

Our Study on this project revealed that the services like canteen, cleanliness, lost and found, Placements, GPA calculator, Controlling lights with phones, etc can make the users live a smart life. We are using Sign-in with Google which doesn't require any passwords to remember and also it promotes privacy. For payments through the app we are using PAYTM and GPAY which are considered to be the secure payment apps these days. The app also uses ML and IOT to generate the most

popular section in the canteen and control the lights respectively.

6. References

[1] Hirsch B, Ng JW (2011) Education beyond the cloud: anytime-anywhere learning in a smart campus environment. In: 2011 International conference for internet technology and secured transactions (ICITST), pp 718–723.

[2] Liu YL, Zhang WH, Dong P (2014) Research on the construction of smart campus based on the internet of things and cloud computing. Appl Mech Mater 543:3213–3217

[3] J Chen Z, Xia F, Cheng R, Kang J, Li C (2012) Oncampus: A mobile personal assistant for college students. In: ICCE, p 22

[4] Chandrashekar, S. (2014). Android application for school of art and design. Dissertations & Theses - Gradworks, 23(2), 88-90

[5] Bo, P. (2008) Opinion Mining and Sentiment Analysis, Foundations and trends in information retrieval, 2(1–2): pp. 1–135. doi:10.1561/1500000011

[6] Mikolov, T., Karafiát, M., Burget, L., Cernocký, J., & Khudanpur, S. (2010, September). Recurrent neural network based language model. In INTERSPEECH, Vol. 2, pp. 3.

[7] Chung, J., Gulcehre, C., Cho, K., & Bengio, Y. (2015). Gated feedback recurrent neural networks. arXiv preprint arXiv:1502.02367.

[8] McAuley, J. J., & Leskovec, J. (2013, May). From amateurs to connoisseurs: modeling the evolution of user expertise through online reviews. In Proceedings of the 22nd international conference on World Wide Web (pp. 897-908). International World Wide Web Conferences Steering Committee.

[9] Rutuja Ekatpure & DevendraIngale2016, "Android based Interactive Home Automation System through Internet of Things" International Journal of Science and Research (IJSR) Vol. 5, No. 4.

[10] N S. Tiwari and R. Gedam, "A Review Paper on Home Automation System Based on Internet of Things Technology," Int. Res. J. Eng.Technol., pp. 1187–1190, 2016.

[11] S. Sawidin, D. S. Pongoh, and A. A. S. Ramschie, "Design of Smart Home Control System Based on Android," Proc. - 2018 Int. Conf.Appl. Sci. Technol. iCAST 2018, pp. 165–170, 2018, doi: 10.1109/iCAST1.2018.8751226.

[12] Sanket Anil Vora & Kendre S.S 2014, "Wireless Control System for Automating Home Appliances and Security Using Android Application" International Journal of Engineering Sciences & Research Technology.

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Rohith Tatamsetty

In recognition of the publication of the paper entitled

Android Application for Smart Services in College Integrated With IOT and ML

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 8 Issue 5 , May-2021 | Date of Publication: 2021-05-31

Parisa P

EDITOR

EDITOR IN CHIEF

JETIR2105879 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2105879 Registration ID : 310096

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Pranav Kashyap

In recognition of the publication of the paper entitled

Android Application for Smart Services in College Integrated With IOT and ML

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 8 Issue 5 , May-2021 | Date of Publication: 2021-05-31

Parisa P

EDITOR

EDITOR IN CHIEF

JETIR2105879 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2105879 Registration ID : 310096

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Payal Singh

In recognition of the publication of the paper entitled

Android Application for Smart Services in College Integrated With IOT and ML

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 8 Issue 5 , May-2021 | Date of Publication: 2021-05-31

Parisa P

EDITOR

EDITOR IN CHIEF

JETIR2105879 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2105879 Registration ID : 310096

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

Shivani Jasrotia

In recognition of the publication of the paper entitled

Android Application for Smart Services in College Integrated With IOT and ML

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 8 Issue 5 , May-2021 | Date of Publication: 2021-05-31

Parisa P

EDITOR

EDITOR IN CHIEF

JETIR2105879 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2105879 Registration ID : 310096

Journal of Emerging Technologies and Innovative Research
An International Open Access Journal Peer-reviewed, Refereed Journal
www.jetir.org | editor@jetir.org An International Scholarly Indexed Journal

Certificate of Publication

The Board of

Journal of Emerging Technologies and Innovative Research (ISSN : 2349-5162)

Is hereby awarding this certificate to

K Murali

In recognition of the publication of the paper entitled

Android Application for Smart Services in College Integrated With IOT and ML

Published In JETIR (www.jetir.org) ISSN UGC Approved (Journal No: 63975) & 7.95 Impact Factor

Published in Volume 8 Issue 5 , May-2021 | Date of Publication: 2021-05-31

Parisa P

EDITOR

EDITOR IN CHIEF

JETIR2105879 Research Paper Weblink http://www.jetir.org/view?paper=JETIR2105879 Registration ID : 310096