National
College of
Ireland

Final Report

Android AI Companion App

Alexander Owens

x12446158

alexanderowens@outlook.com

BSc (Hons) in Computing

Software Systems

11/05/2016

Declaration Cover Sheet for Project Submission

SECTION 1 *Student to complete*

Name: Alexander Owens
Student ID: x12446158
Supervisor: Paul Stynes

SECTION 2 Confirmation of Authorship

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When referring to the work of another author within the text of your project you must give the author's surname and the date the work was published. Full details for each source must then be given in the bibliography at the end of the project

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- that the student be deemed not to have passed the assignment
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Further penalties are also possible including

- suspending a student college for a specified time,
- expelling a student from college,
- Prohibiting a student from sitting any examination or assessment.,
- the imposition of a fine and
- The requirement that a student to attend additional or other lectures or courses or undertake additional academic work.

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Executive Summary

The objective of the project is to demonstrate my IT skills on design development of an application for my final year project.

The Results of a Survey on Artificial Intelligence on mobile devices has shown that there is an interest in an AI Related assistant that could help out with small everyday tasks for start and then more complex task as the app would get more developed.

The project is always be limited by the amount of the devices it can run properly because this is just how the development for Android System goes. Different operating systems have different Android API calls and different features. Older models of android devices might not have the same features and might function differently.

In order to get the app running in the background with higher priority on android operating system without a sudden shutdown is creating the app into a service. The goal is to give the device a bit of a mind of its own or at least simulate it.

1 Introduction

The Main Objective is to Research, Design and Develop an Artificial Intelligence App for Android Mobile Devices Platform and see what the capabilities are available and what can be possible to achieve with the tools that Android provides. This project is more or less of an experimentation based on a potential original idea for future a technology. The app will start up being simple and only over time it will rise to become more complex as additional code and algorithms get added. Portable technology is around everywhere at this day and age and its only becoming more and more popular. What if the technology had a bit of a mind on its own and become peoples personal assistant just sitting in your pocket ready to help. This could become a profitable a completely original idea if the research and experimentation pays off.

To achieve this task will require enormous amount of research and testing. How can a mind be created for a simple device and what are the capabilities of it? Would it really help in everyday lives of people? Along this journey of this project I might discover new ideas in what ways and directions I can take this project towards.

1.1 Background and Aims

Android Artificial Intelligence Companion App – is an idea for an application build for the Android Platform compatible with phones and tablets, which has multiple purposes, to gather important information from the phone locally and online wise and display it to the user at the most appropriate time the app chooses to. The app should be intelligent on being able to act on its own will and allow the user to believe the their mobile device has intelligence of its own, therefore the app makes their device become the users number 1 companion/friend who will be providing useful information to user at its own will and at the right time.

Some of the functions and abilities will include:

- Reading devices information on Battery life/ Memory drainage of other app and allowing user to shut down background tasks.
- App would run as a service above all other apps so it remains active (example: Facebook Chat-heads)
- Allow access to online APIs like Traffic, Weather and others
- To be able to be self-learning, to improve the service to the user by knowing what topics he/she likes and dislikes
- Provide a sort of entertainment, to be able to keep the user company by using friendly actions or mini-games.
- Make the usage of a device easier for people who aren't good at technology

The main purpose of the project is to find out how far it is possible to take the artificial intelligence on android platform and see what kind of possibilities are out there for such development.

1.2 Technologies

The idea is based around Android Platform so a lot of technologies and development environment are resolved around android development.

- Java: is used to as primary language for Android programming code.
- Android Studio: IDE used to program application for Android mobile devices.
- SourceTree: software application used to establish Version Control to code.
- Git: is an essential package used to power SourceTree.
- Android SDK Manager: Application used to download and install different Android Operating System APIs.
- MySql: Database storage.
- Sublime: to program PHP.
- Android mobile phones and tablets: For testing purposes.

2 System

2.1 Requirements

2.1.1 Availability requirements

User Story

As a user I want to be able to access the app at any time I wish.

Description and Priority

The app shall be accessible at any time of the day on any day of the year. *High priority*.

2.1.2 Physical requirements

User Story

As a user I want to be able to access the app from anywhere.

Description and Priority

The app shall work on mobile devices. *High priority*.

2.1.3 Portability requirements

User Story

As a user I want to be able to access the app from any type of smart device.

Description and Priority

The system shall be a cross platform mobile application which should be compatible on all modern mobile operating systems. *High priority*.

2.1.4 Time requirements

The time constraint as to which the project must be completed. *High priority*.

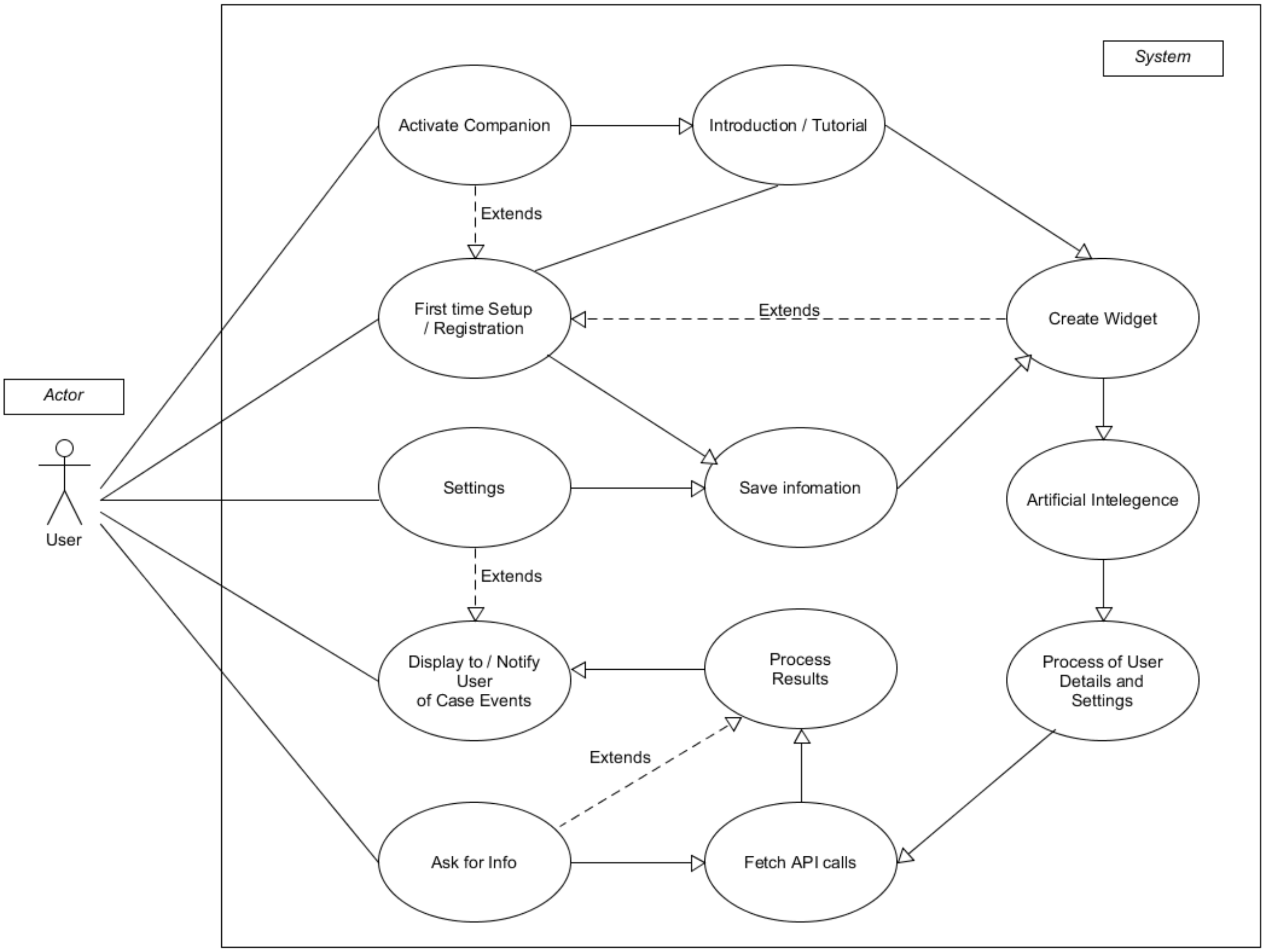
2.2 Design and Architecture

The Project will be built into an Android App, which can be easily installed and needs no other downloads or manual installation. On the first use the app User will be requested to allow certain permissions and small registration and configuration so that the app knows the user. The registration is yet to be decided on how to proceed with it because Google account API should be able to provide all the information that the app needs as long as the user gives his/hers permission. When the app started up the user has to activate the Service with the start-up button and that will switch the intent to the Background Service Activity which will be run in the background of the device.

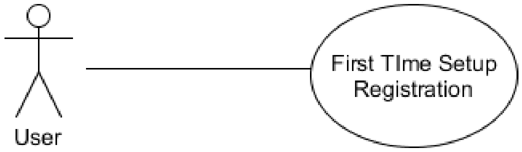
The unique part of the app is that the App while the background service is active is able to run as a form of a Chat Head Icon floating on users screen and it cannot be blocked by other apps or menus. It's always there which makes the app and its functionalities easily accessible.

Once the Applied AI is able to interact with a user in a form of a bot, the development of ability to use the gathered information and help the user with certain tasks.

2.2.1 Use Case Diagram



2.2.2 Requirement 1 User Identification



2.2.2.1 Description & Priority

User Identification is important for the project because AI will need to treat the user like a human being, by calling the user by name and using other details to access certain online API features. This can also be referred as First time Registration

2.2.2.2 Use Case

Scope

The scope of this use case is to establish a registration for the user for the app.

Description

This use case describes the user first time Registration

Use Case Diagram

Diagram should highlight actors and uses cases that allow user to register

Flow Description

Precondition

The system is in initialisation mode when the user runs the app for the first time after installation

Activation

This use case starts when a user gets prompted to enter his ID after app launch.

Main flow

1. The system displays GUI with input box asking for name and etc. input.
2. The User enter his/her details into input boxes and submits
3. Systems configures given information and prompts error if there is error(See A1)

Alternate flow

A1 : Failure to specify ID

1. The system prompts user if his/hers registration details were wrong or incorrect by the app standards.
2. The user gets returned to main flow step 1

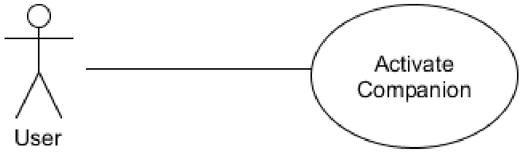
Termination

The system presents the next step if user exists the app.

Post condition

The system goes into a wait state

2.2.3 Requirement 2 Activate Companion



2.2.3.1 Description & Priority

After the first time installation user is required to activate his/hers companion to. In order words do they agree with their system configuration and are they ready to proceed.

2.2.3.2 Use Case

Scope

The scope of this use case is to activate formation of widget by taking in user’s permission

Description

This use case describes the how the user activates the companion.

Use Case Diagram

Diagram should highlight actors and uses cases on how user activates the app

Flow Description

Precondition

The system is in initialisation mode user is prompted with a button

Activation

This use case starts when a User finishes registration

Main flow

1. User is displayed a button with description of rules and that he agrees to them when he presses the button which will activate the companion.
2. User Agrees to the regulations and presses the button
3. Widget get created depending on user configurations

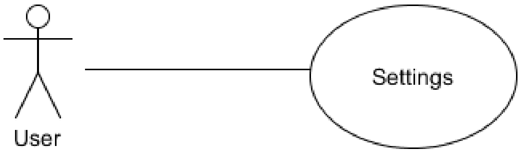
Termination

The system presents the next step if the user doesn’t press the button or shuts down the app.

Post condition

The system goes into a wait state if the user doesn’t accept the button

2.2.4 Requirement 3 Change Settings



2.2.4.1 Description & Priority

The use cases specifies how the user would change the settings of the app.

2.2.4.2 Use Case

Scope

The scope of this use case is to show how user would change settings

Description

This use case describes the user changes settings

Use Case Diagram

Diagram should highlight actors and uses cases on how user would change his/hers app settings so the functionality of AI works different.

Flow Description

Precondition

The system is in initialisation mode when user starts the app.

Activation

This use case starts when a user clicks on the settings button in the action bar of the app.

Main flow

1. The system identifies the user is in settings menu
2. A list of adaptable settings is prompted to the user
3. User can change any setting by ticking on certain features.(See A1)
4. User prompted to save changes

Alternate flow

A1: Switching features off

1. User can easily ticks off a feature
2. User prompted to save changes

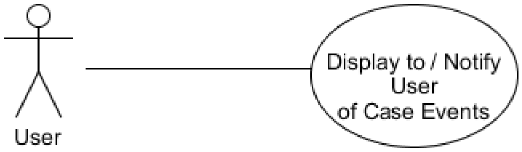
Termination

The system presents the next step until user save changes or cancels them if they are not saved

Post condition

The system goes into a wait state until user comes back in to settings menu

2.2.5 Requirement 2 App Notification Display



2.2.5.1 Description & Priority

User gets notified by the app’s artificial intelligence on the events and API fetch calls received.

2.2.5.2 Use Case

Scope

The scope of this use case is to verify how users receive information from the app

Description

This use case describes the display of notifications

Use Case Diagram

Diagram should highlight actors and uses cases that display the information

Flow Description

Precondition

The system is in initialisation mode when app has been activated.

Activation

This use case starts when a user receive a notification on his device

Main flow

1. The system notifies the user of the received information
2. User reads or ignores

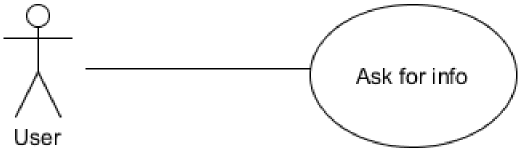
Termination

The system terminates when the user tabs out from information

Post condition

The system goes into a wait state until new information will come in.

2.2.6 Requirement 2 Retrieve information asked by the user



2.2.6.1 Description & Priority

This use case describes how the user is able to ask the app for a specific information without having to wait for a notification.

2.2.6.2 Use Case

Scope

The scope of this use case is to allow user to ask for particular information.

Description

This use case describes the how user retrieves his/hers demanded information

Use Case Diagram

Diagram should highlight actors and uses cases allow user to retrieve information

Flow Description

Precondition

The system is in initialisation mode when the app is already running

Activation

This use case starts when a user click on the widget

Main flow

1. User is prompted a list of items he would like to receive further information on
2. User clicks and an item on the list
3. User is provided more information (See A1)

Alternate flow

A1: Failure to receive information

1. The user is prompted an error and choice of retry or return (See E1)
2. The User clicks retry (See A1)
3. The User clicks return (1)

Exceptional flow

E1: Error

1. The system tries to reconnect to the internet and retrieve the required information

Termination

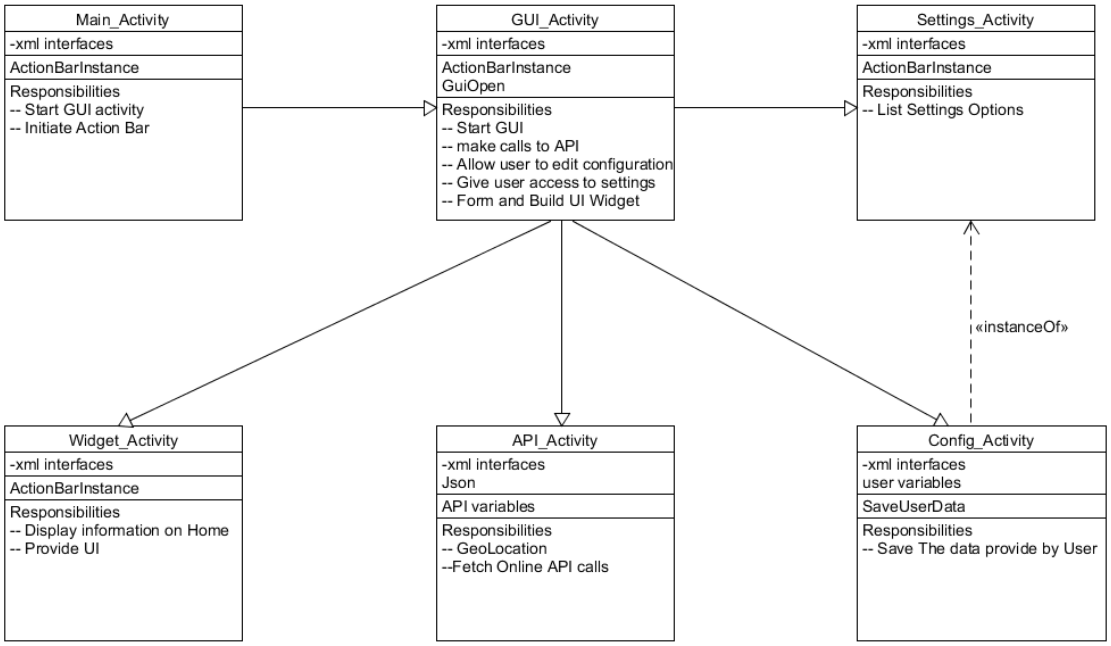
The system stops if user closes the application

Post condition

The system goes into a wait state after the information has been displayed.

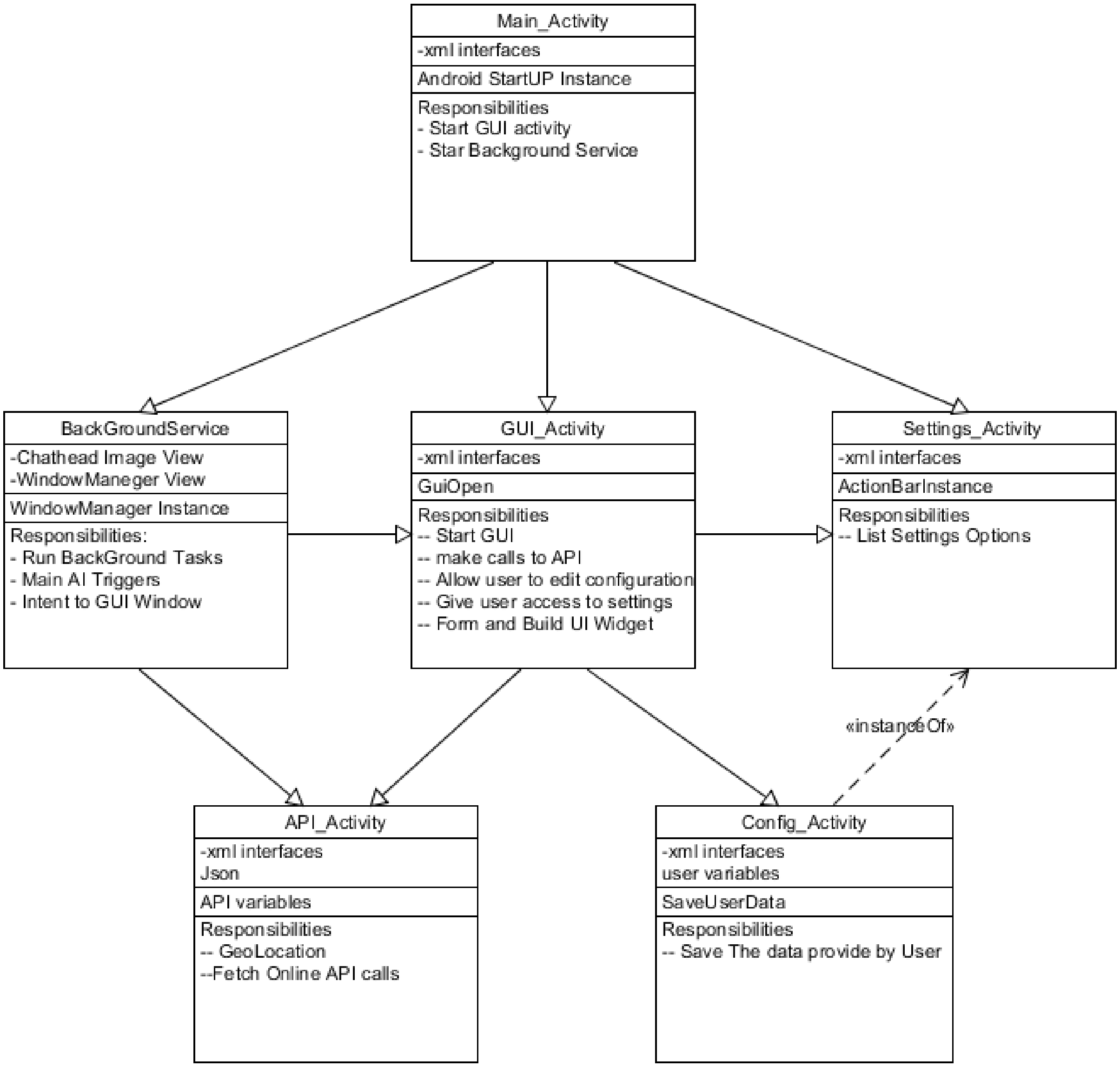
2.3 Implementation

This is version #1 of Class Diagram for the Application:



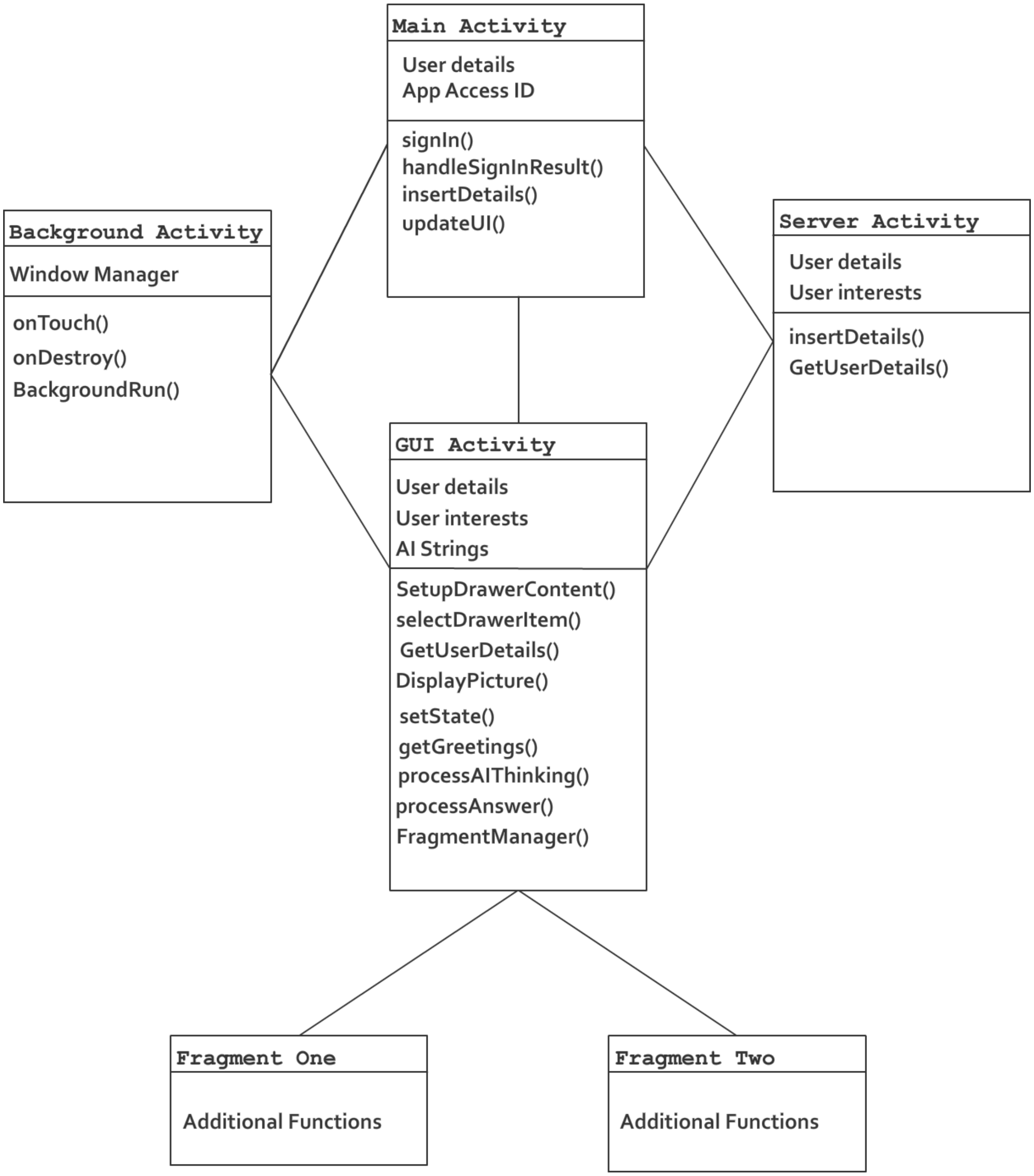
The reason why I have chosen to organize this class diagram in this particular way is because when it comes to Android development there are certain rules that are needed to be followed when making classes. Each class stands for its own functionality. All data generated from different classes go back through the GUI class and back to the Main Activity.

This is version #2 of Class Diagram for the Application:



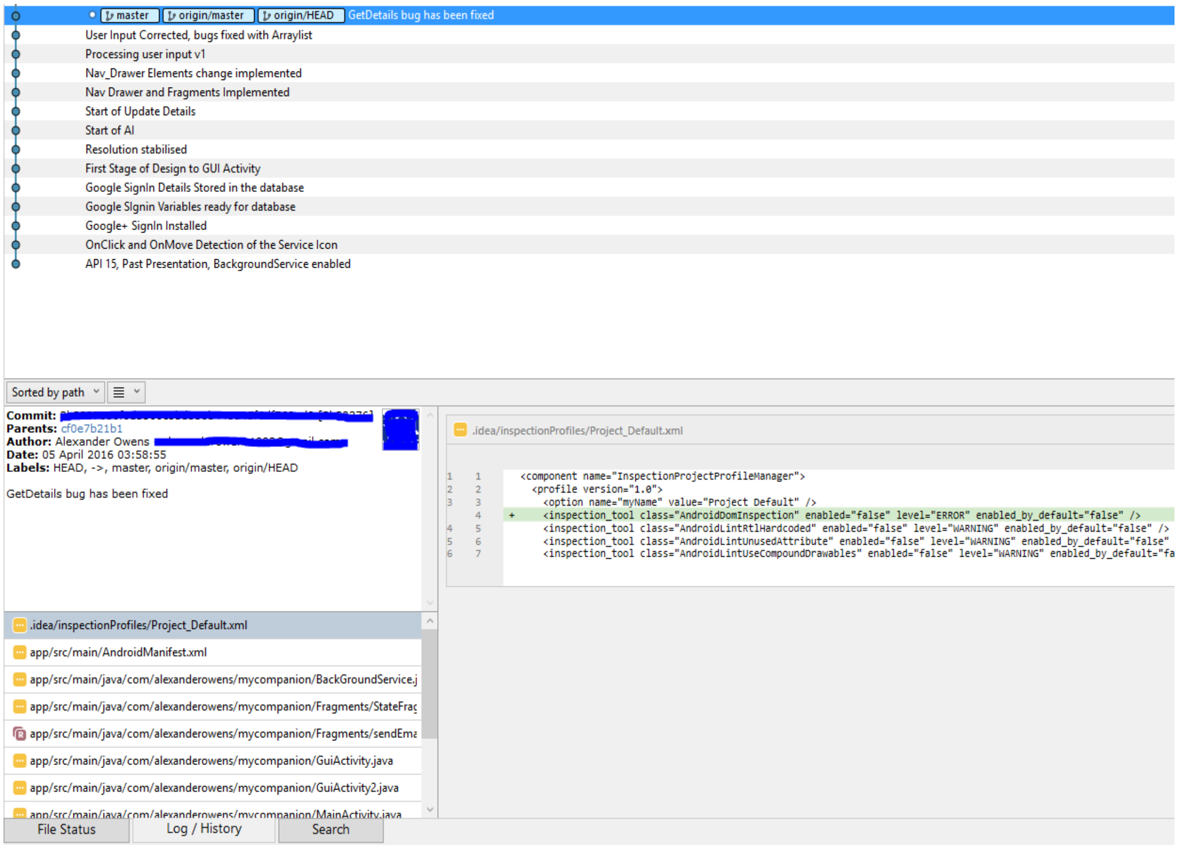
In order for the app to run in Back Ground on Android System, the app needs a class that will focus on that. The class will be able to appear on the screen as a chathead to allow the user instant access to the app at any time.

This is version #3 **THE FINAL** of Class Diagram for the Application:



This design would help the application to be easily upgraded with additional functionality.

Before the programing code process started I created a version control environment using SourceTree, git and BitBucket to keep track of my code and backup purposes.



GetDetails bug has been fixed
User Input Corrected, bugs fixed with Arraylist
Processing user input v1
Nav_Drawer Elements change implemented
Nav Drawer and Fragments Implemented
Start of Update Details
Start of AI
Resolution stabilised
First Stage of Design to GUI Activity
Google SignIn Details Stored in the database
Google SIgnin Variables ready for database
Google+ SignIn Installed
OnClick and OnMove Detection of the Service Icon
API 15, Past Presentation, BackgroundService enabled

Commit: [redacted]
Parents: cf0e7b21b1
Author: Alexander Owens [redacted]
Date: 05 April 2016 03:58:55
Labels: HEAD, ->, master, origin/master, origin/HEAD

[redacted]

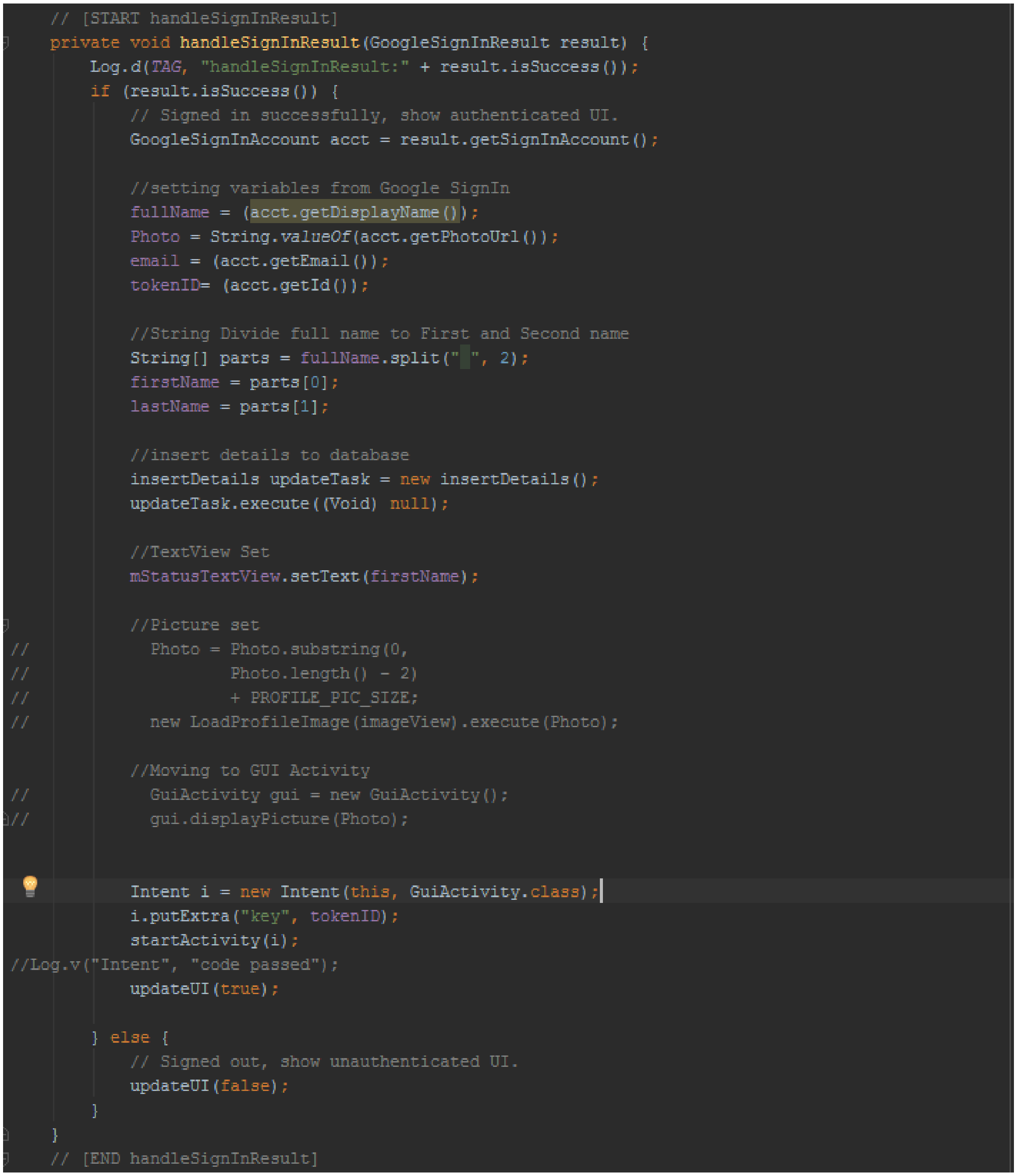
GetDetails bug has been fixed

.idea/inspectionProfiles/Project_Default.xml
app/src/main/AndroidManifest.xml
app/src/main/java/com/alexanderowens/mycompanion/BackGroundService.j
app/src/main/java/com/alexanderowens/mycompanion/Fragments/StateFrag
app/src/main/java/com/alexanderowens/mycompanion/Fragments/sendEma
app/src/main/java/com/alexanderowens/mycompanion/GuiActivity.java
app/src/main/java/com/alexanderowens/mycompanion/GuiActivity2.java
app/src/main/java/com/alexanderowens/mycompanion/MainActivity.java

.idea/inspectionProfiles/Project_Default.xml

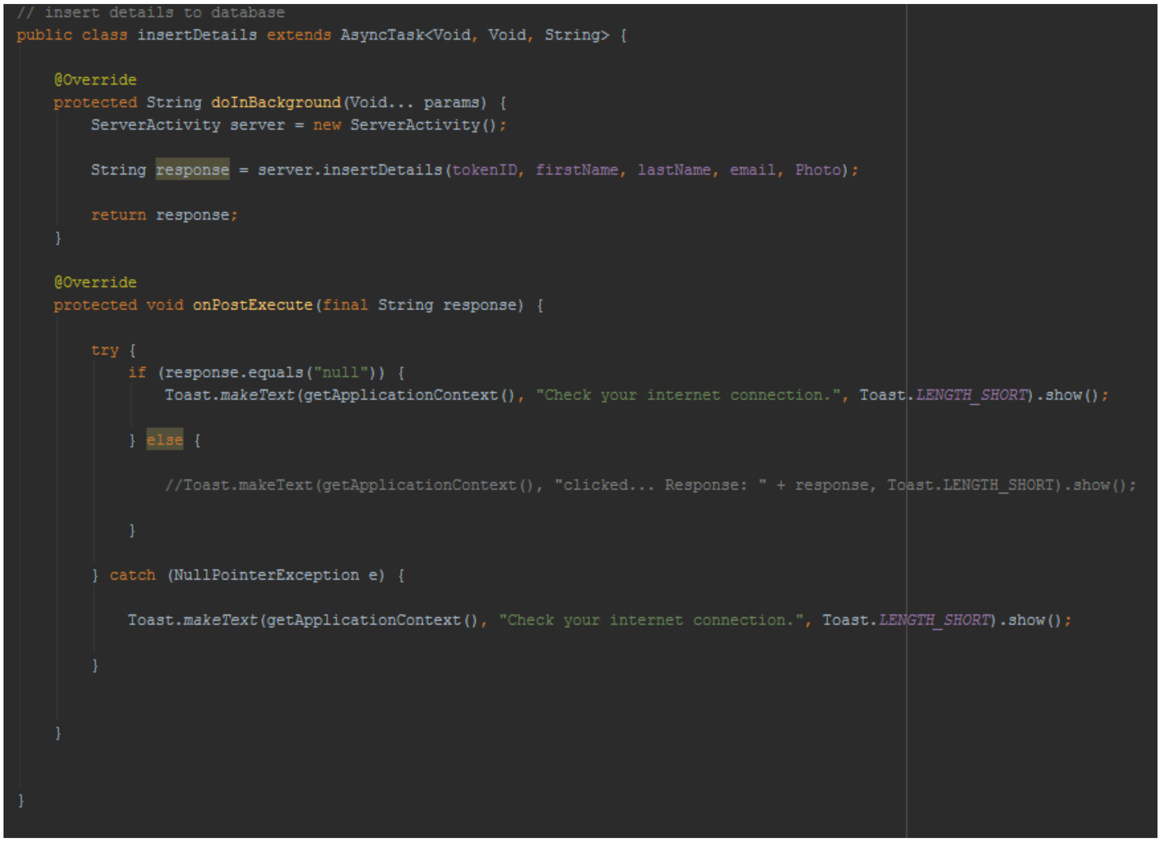
```
  <component name="InspectionProjectProfileManager">
    <profile version="1.0">
      <option name="myName" value="Project Default" />
+     <inspection_tool class="AndroidDomInspection" enabled="false" level="ERROR" enabled_by_default="false" />
      <inspection_tool class="AndroidLintRtlHardcoded" enabled="false" level="WARNING" enabled_by_default="false" />
      <inspection_tool class="AndroidLintUnusedAttribute" enabled="false" level="WARNING" enabled_by_default="false"
      <inspection_tool class="AndroidLintUseCompoundDrawables" enabled="false" level="WARNING" enabled_by_default="fa
```

Main Activity is the main class that starts when the application run for the first time. The user will be asked to Google sign in, in order to proceed with login and the rest of the app.



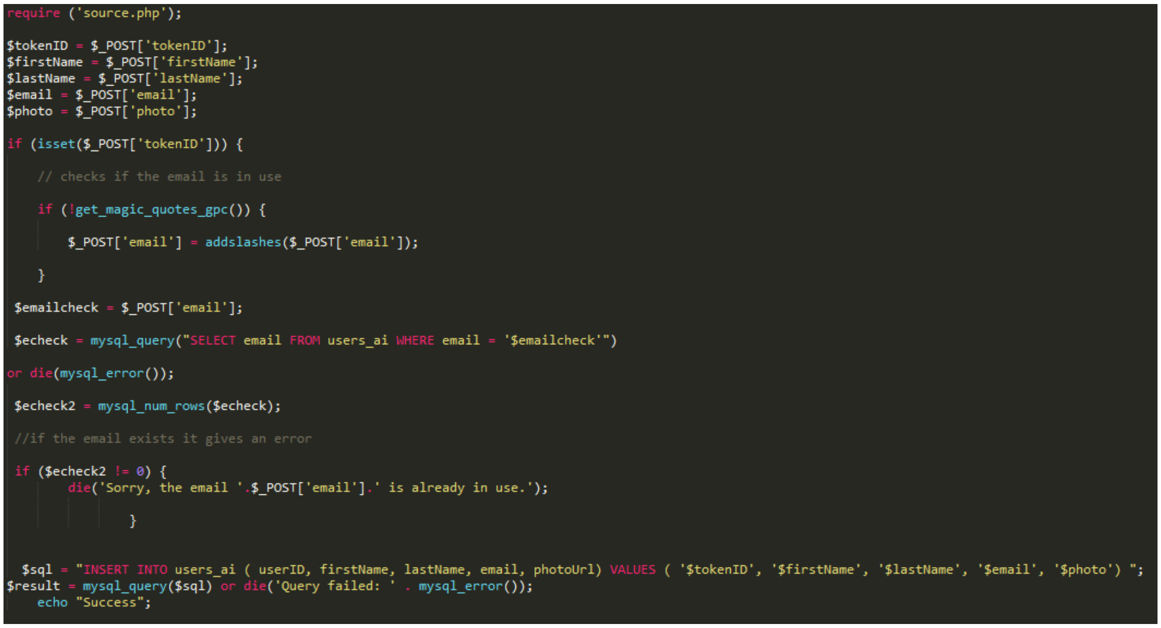
```
    // [START handleSignInResult]
    private void handleSignInResult(GoogleSignInResult result) {
        Log.d(TAG, "handleSignInResult:" + result.isSuccess());
        if (result.isSuccess()) {
            // Signed in successfully, show authenticated UI.
            GoogleSignInAccount acct = result.getSignInAccount();

            //setting variables from Google SignIn
            fullName = (acct.getDisplayName());
            Photo = String.valueOf(acct.getPhotoUrl());
            email = (acct.getEmail());
            tokenID= (acct.getId());

            //String Divide full name to First and Second name
            String[] parts = fullName.split(" ", 2);
            firstName = parts[0];
            lastName = parts[1];

            //insert details to database
            insertDetails updateTask = new insertDetails();
            updateTask.execute((Void) null);

            //TextView Set
            mStatusTextView.setText(firstName);

            //Picture set
//            Photo = Photo.substring(0,
//                    Photo.length() - 2)
//                    + PROFILE_PIC_SIZE;
//            new LoadProfileImage(imageView).execute(Photo);

            //Moving to GUI Activity
//            GuiActivity gui = new GuiActivity();
//            gui.displayPicture(Photo);


            Intent i = new Intent(this, GuiActivity.class);
            i.putExtra("key", tokenID);
            startActivity(i);
//Log.v("Intent", "code passed");
            updateUI(true);

        } else {
            // Signed out, show unauthenticated UI.
            updateUI(false);
        }
    }
    // [END handleSignInResult]
```

Once the user have accepted to auto-login with the Google account, the Google API fetches the user’s information like name, email, etc. Before the user is able to proceed the next intent Activity, the fetched information is being adding the apps database the data gets called in to another activity class (Server Activity)



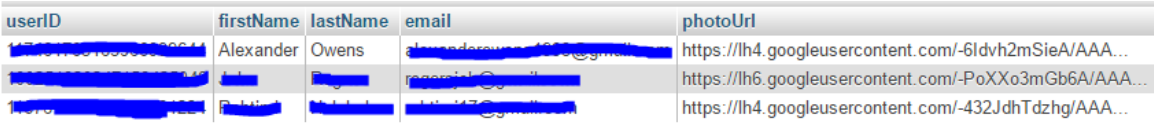
```
// insert details to database
public class insertDetails extends AsyncTask<Void, Void, String> {

    @Override
    protected String doInBackground(Void... params) {
        ServerActivity server = new ServerActivity();

        String response = server.insertDetails(tokenID, firstName, lastName, email, Photo);

        return response;
    }

    @Override
    protected void onPostExecute(final String response) {

        try {
            if (response.equals("null")) {
                Toast.makeText(getApplicationContext(), "Check your internet connection.", Toast.LENGTH_SHORT).show();

            } else {

                //Toast.makeText(getApplicationContext(), "clicked... Response: " + response, Toast.LENGTH_SHORT).show();

            }

        } catch (NullPointerException e) {

            Toast.makeText(getApplicationContext(), "Check your internet connection.", Toast.LENGTH_SHORT).show();

        }


    }


}
```

Server Activity handles the connection the database and focuses on storing the received data from other classes and getting information. The server activity handles the data which it send to an online hosted PHP files. Which input the data local MySQL database.



```php
require ('source.php');

$tokenID = $_POST['tokenID'];
$firstName = $_POST['firstName'];
$lastName = $_POST['lastName'];
$email = $_POST['email'];
$photo = $_POST['photo'];

if (isset($_POST['tokenID'])) {

    // checks if the email is in use

    if (!get_magic_quotes_gpc()) {

        $_POST['email'] = addslashes($_POST['email']);

    }

 $emailcheck = $_POST['email'];

 $echeck = mysql_query("SELECT email FROM users_ai WHERE email = '$emailcheck'")

or die(mysql_error());

 $echeck2 = mysql_num_rows($echeck);

 //if the email exists it gives an error

 if ($echeck2 != 0) {
        die('Sorry, the email '.$_POST['email'].' is already in use.');

                }


  $sql = "INSERT INTO users_ai ( userID, firstName, lastName, email, photoUrl) VALUES ( '$tokenID', '$firstName', '$lastName', '$email', '$photo') ";
$result = mysql_query($sql) or die('Query failed: ' . mysql_error());
    echo "Success";
```

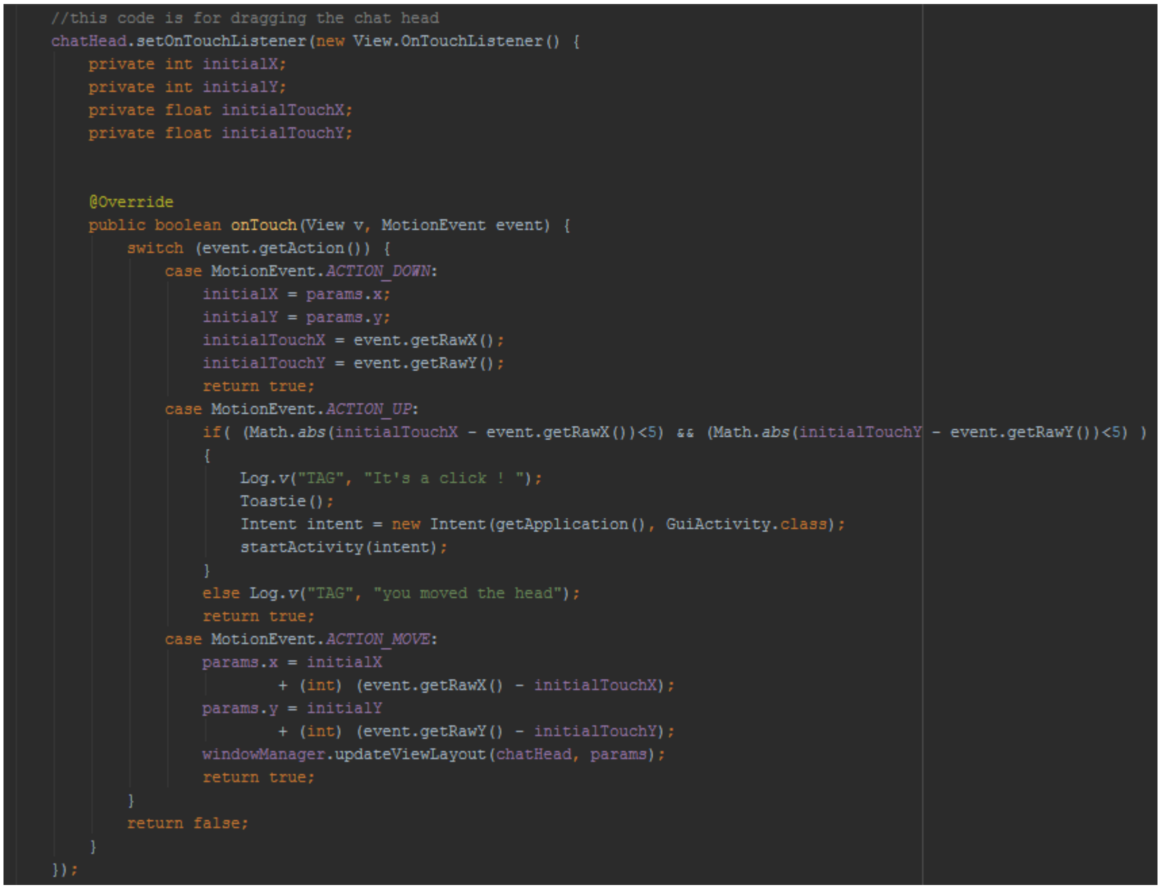
PHP files responsible for registering the first use information.



userID	firstName	lastName	email	photoUrl
[redacted]	Alexander	Owens	[redacted]	https://lh4.googleusercontent.com/-6Idvh2mSieA/AAA...
[redacted]	[redacted]	[redacted]	[redacted]	https://lh6.googleusercontent.com/-PoXXo3mGb6A/AAA...
[redacted]	[redacted]	[redacted]	[redacted]	https://lh4.googleusercontent.com/-432JdhTdzhg/AAA...

MySQL stored information.

The Background Activity is the class that allows to keep the app running as a service in the background of the device. It also adds and optional feature to appear as a chat head.

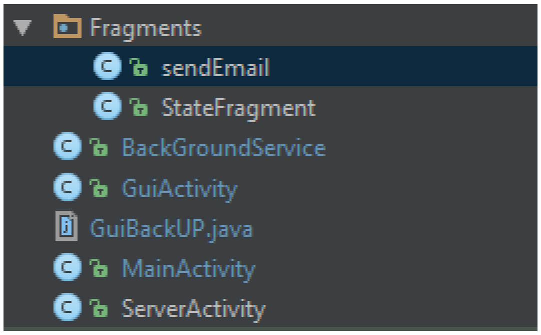


```
//this code is for dragging the chat head
chatHead.setOnTouchListener(new View.OnTouchListener() {
    private int initialX;
    private int initialY;
    private float initialTouchX;
    private float initialTouchY;


    @Override
    public boolean onTouch(View v, MotionEvent event) {
        switch (event.getAction()) {
            case MotionEvent.ACTION_DOWN:
                initialX = params.x;
                initialY = params.y;
                initialTouchX = event.getRawX();
                initialTouchY = event.getRawY();
                return true;
            case MotionEvent.ACTION_UP:
                if( (Math.abs(initialTouchX - event.getRawX())<5) && (Math.abs(initialTouchY - event.getRawY())<5) )
                {
                    Log.v("TAG", "It's a click ! ");
                    Toastie();
                    Intent intent = new Intent(getApplication(), GuiActivity.class);
                    startActivity(intent);
                }
                else Log.v("TAG", "you moved the head");
                return true;
            case MotionEvent.ACTION_MOVE:
                params.x = initialX
                        + (int) (event.getRawX() - initialTouchX);
                params.y = initialY
                        + (int) (event.getRawY() - initialTouchY);
                windowManager.updateViewLayout(chatHead, params);
                return true;
        }
        return false;
    }
});
```

Chat head drag and touch code.

The fragments - are classes that can be called and function at the same time as running the same activity without using an intent. A fragment contains its own GUI xml files and does not rely on the activity to provide GUI to function.

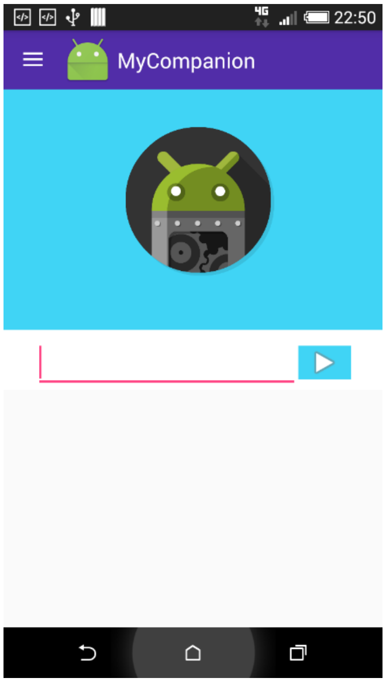
During the design stage and mid-point presentation I was told to look into redesigning the class diagram so that additional app functionality could be easily implemented if needed to be. After many hours of research I came to a conclusion of implementing Fragments. Fragments can hold as small packages of code, and executed by the app. The AI aspect is within GUI Activity class, and it would choose when to execute the functions. For example if the was a new API idea to be implemented into the app the code would

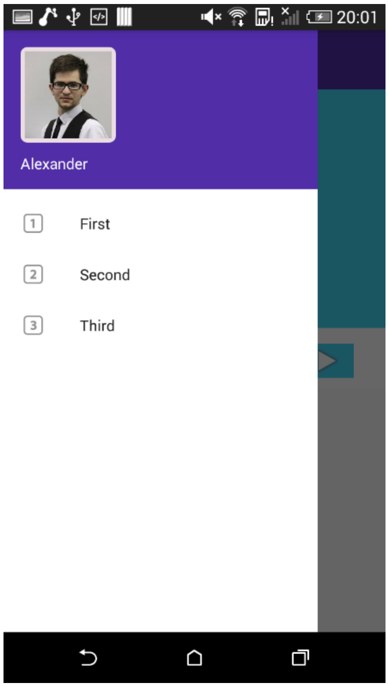


go into its own fragment. An unlimited number of fragments can be added to the app, so the functionality and things the app is able to do could only get richer. The main problem about that is that I simple do not have enough time to implement many additional fragments, but if there is a way set up to make it easy thing to do is already an achievement.

I had multiple ideas on the design of GUI but the main one came in mind is use of a navigational drawer that could function as a container for my fragments.

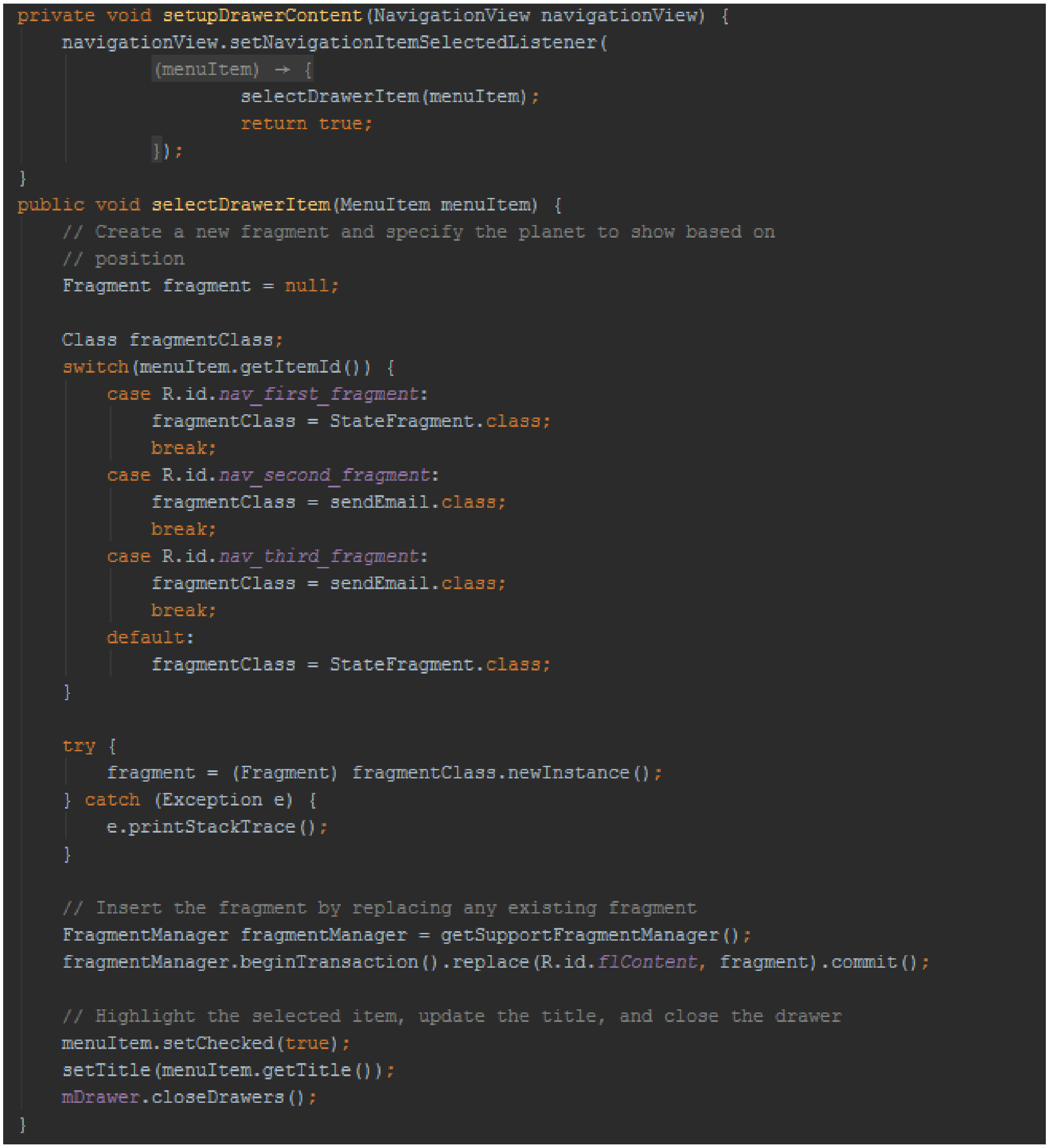
Navigational drawer is the bow container that appears on the screen when you slide right and closes again when you slide left.





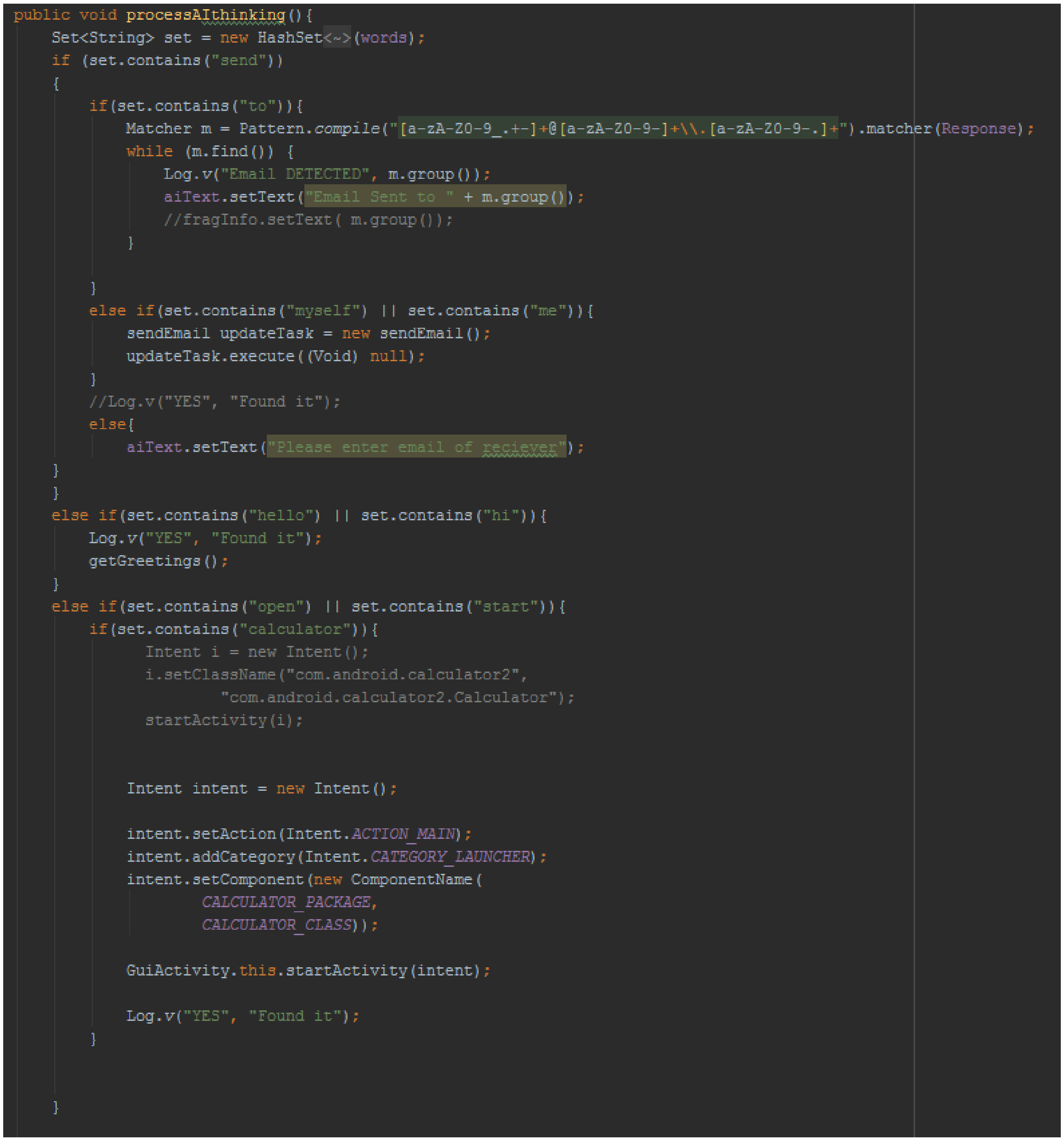
The generic code for that Android Studio provides for a navigational drawer wouldn’t work, so I had to work on research and attempt to build a custom drawer and make it work with my fragments.

Even if the Main Activity counts as the main class, the GUI Activity has a lot more functionality. After a user has successfully signed in in the Main Activity, he/she are pushed to the GUI Activity which then gives the user to control of the app and now he/she are able to interact with the AI.



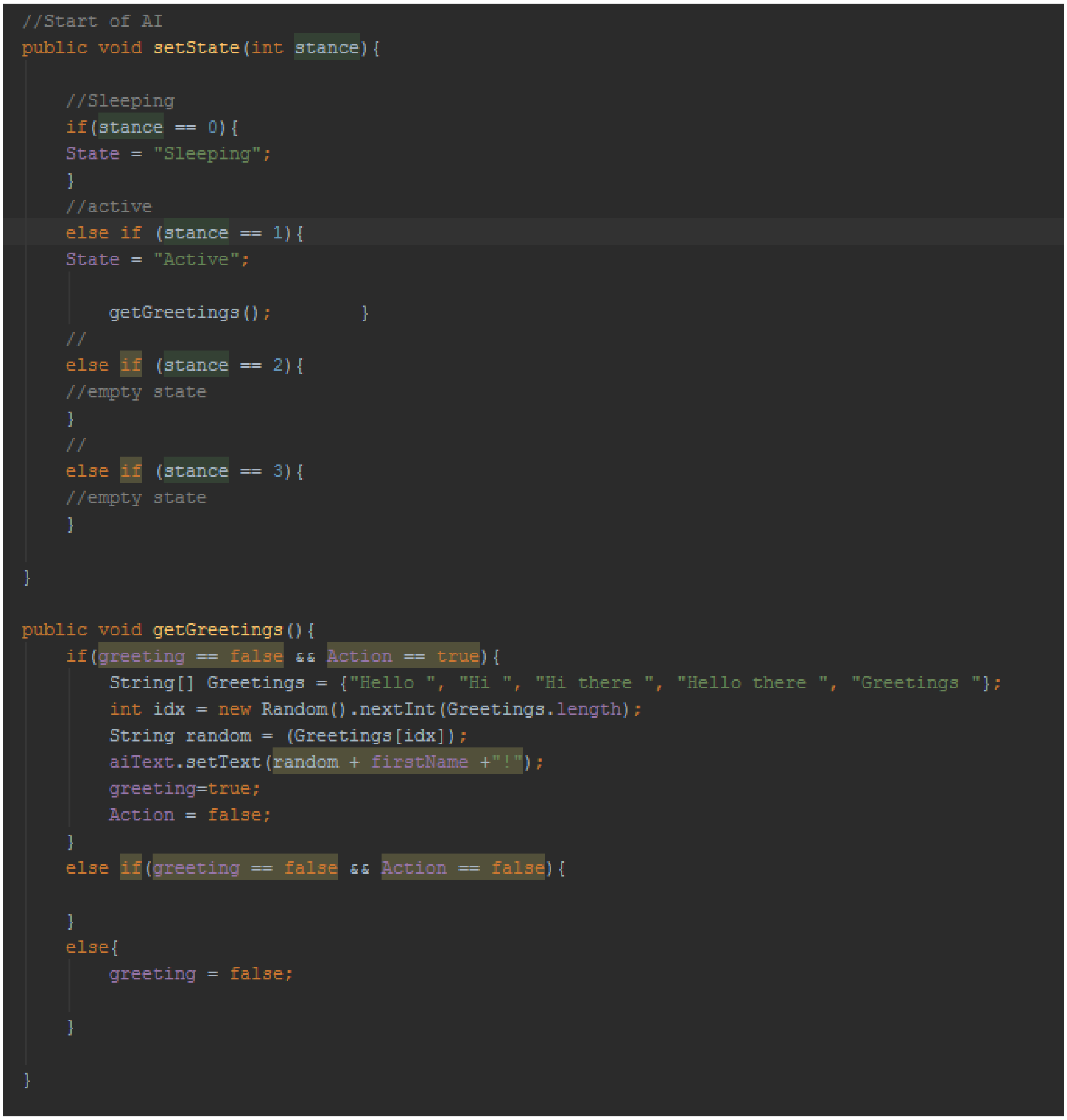
```
private void setupDrawerContent(NavigationView navigationView) {
    navigationView.setNavigationItemSelectedListener(
            (menuItem) -> {
                    selectDrawerItem(menuItem);
                    return true;
            });
}
public void selectDrawerItem(MenuItem menuItem) {
    // Create a new fragment and specify the planet to show based on
    // position
    Fragment fragment = null;

    Class fragmentClass;
    switch(menuItem.getItemId()) {
        case R.id.nav_first_fragment:
            fragmentClass = StateFragment.class;
            break;
        case R.id.nav_second_fragment:
            fragmentClass = sendEmail.class;
            break;
        case R.id.nav_third_fragment:
            fragmentClass = sendEmail.class;
            break;
        default:
            fragmentClass = StateFragment.class;
    }

    try {
        fragment = (Fragment) fragmentClass.newInstance();
    } catch (Exception e) {
        e.printStackTrace();
    }

    // Insert the fragment by replacing any existing fragment
    FragmentManager fragmentManager = getSupportFragmentManager();
    fragmentManager.beginTransaction().replace(R.id.flContent, fragment).commit();

    // Highlight the selected item, update the title, and close the drawer
    menuItem.setChecked(true);
    setTitle(menuItem.getTitle());
    mDrawer.closeDrawers();
}
```

The AI component is divided into 2 components, one is natural language processing and the other is chat bot.



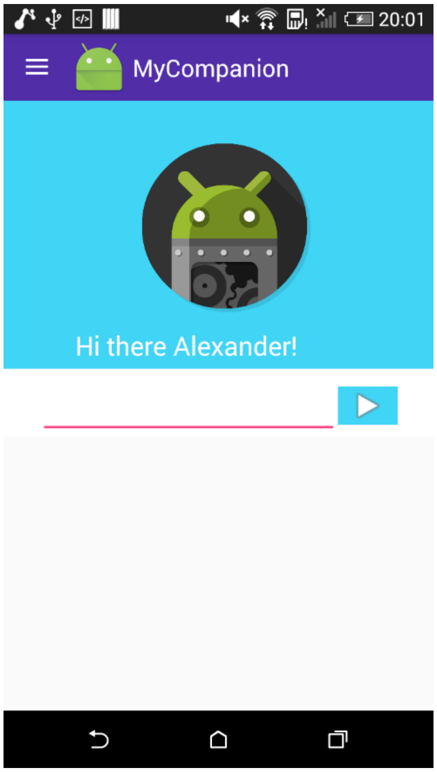
```
public void processAIthinking(){
    Set<String> set = new HashSet<~>(words);
    if (set.contains("send"))
    {
        if(set.contains("to")){
            Matcher m = Pattern.compile("[a-zA-Z0-9_.+-]+@[a-zA-Z0-9-]+\\.[a-zA-Z0-9-.]+").matcher(Response);
            while (m.find()) {
                Log.v("Email DETECTED", m.group());
                aiText.setText("Email Sent to " + m.group());
                //fragInfo.setText( m.group());
            }

        }
        else if(set.contains("myself") || set.contains("me")){
            sendEmail updateTask = new sendEmail();
            updateTask.execute((Void) null);
        }
        //Log.v("YES", "Found it");
        else{
            aiText.setText("Please enter email of reciever");
    }
    }
    else if(set.contains("hello") || set.contains("hi")){
        Log.v("YES", "Found it");
        getGreetings();
    }
    else if(set.contains("open") || set.contains("start")){
        if(set.contains("calculator")){
              Intent i = new Intent();
              i.setClassName("com.android.calculator2",
                      "com.android.calculator2.Calculator");
              startActivity(i);


            Intent intent = new Intent();

            intent.setAction(Intent.ACTION_MAIN);
            intent.addCategory(Intent.CATEGORY_LAUNCHER);
            intent.setComponent(new ComponentName(
                    CALCULATOR_PACKAGE,
                    CALCULATOR_CLASS));

            GuiActivity.this.startActivity(intent);

            Log.v("YES", "Found it");
        }


    }
```

Natural Language Processing works by Hard coding certain command words or phrases that can trigger a function if they come up as a match from the user speech.



```
//Start of AI
public void setState(int stance){

    //Sleeping
    if(stance == 0){
    State = "Sleeping";
    }
    //active
    else if (stance == 1){
    State = "Active";

        getGreetings();        }
    //
    else if (stance == 2){
    //empty state
    }
    //
    else if (stance == 3){
    //empty state
    }

}

public void getGreetings(){
    if(greeting == false && Action == true){
        String[] Greetings = {"Hello ", "Hi ", "Hi there ", "Hello there ", "Greetings "};
        int idx = new Random().nextInt(Greetings.length);
        String random = (Greetings[idx]);
        aiText.setText(random + firstName +"!");
        greeting=true;
        Action = false;
    }
    else if(greeting == false && Action == false){

    }
    else{
        greeting = false;

    }

}
```

A Code Example of AI logic states and interaction with user.



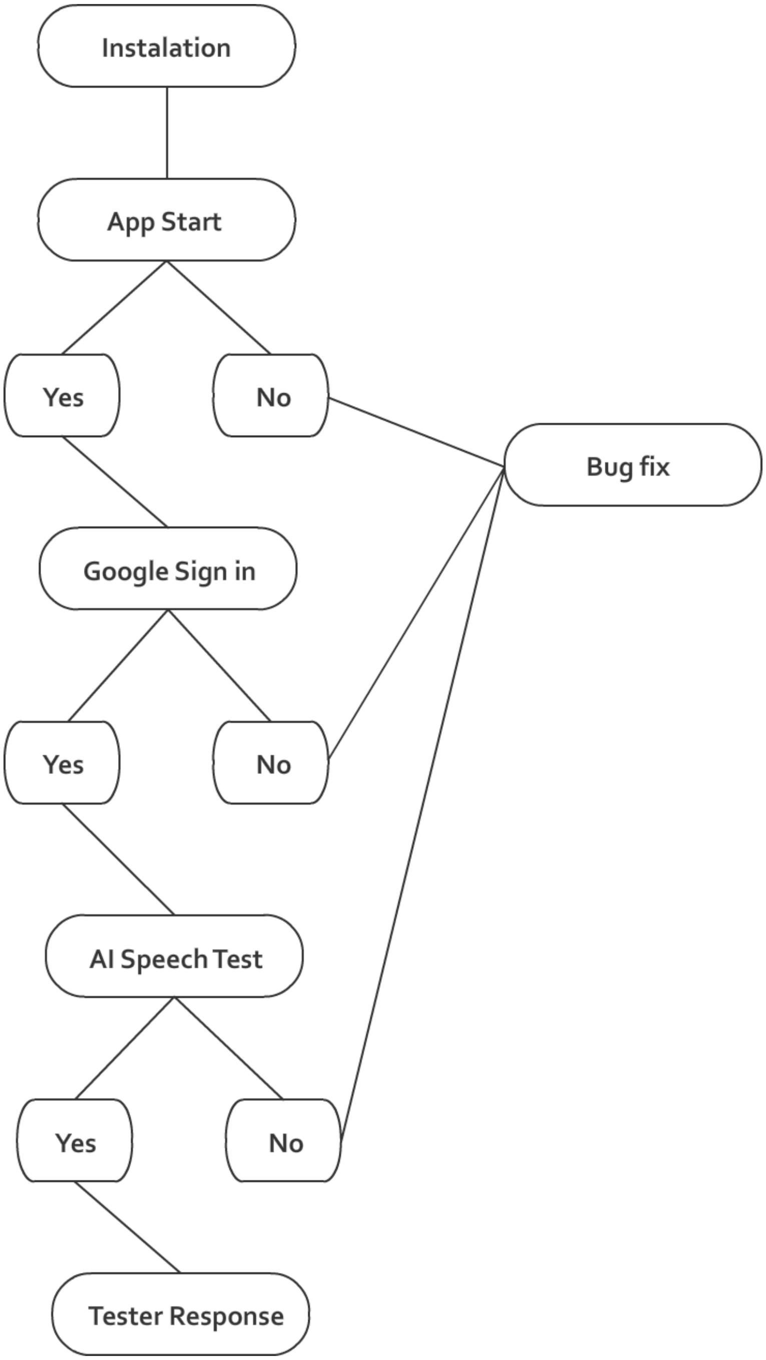
Hi there Alexander!

A GUI Example of AI logic states and interaction with user.

The Project is still in the early stages of the development, some functions might not be available before the deadline, but the main focus remained at the core of functionality of the project.

2.4 Testing

Testing is to be done on multiple Android mobile devices phones and tablets, with different 15 people. The testers were picked at random and they were different age, sex and had different versions of android devices.



The testing process was followed by the above the diagram.

The Testing Results:

Tester Number	App Start	Google Sign In	AI Speech
1	Yes	Yes	Yes
2	Yes	Yes	No
3	Yes	Yes	No
4	Yes	Yes	Yes
5	Yes	No	No
6	Yes	Yes	Yes
7	Yes	No	No
9	Yes	No	No
10	Yes	No	No
11	Yes	Yes	Yes
12	Yes	No	No
13	Yes	Yes	Yes
14	Yes	No	No
15	Yes	No	No

The positive results showed potential in apps stability with app GUI running well. Some weren’t able to get the AI to understand them.

The negative results showed a bug with Google sign in API, because of this bug users weren’t able to go pass the login screen. Through hours of research I found out that the bug isn’t caused by the project code is happens on newer android devices because of the newer OS. The Google Sign in API uses Google services package in Android Studio and the package has been updated and changed over past few months even if My project is running the latest version of the Services package, the package still is in beta and it doesn't the problem should be solved whenever the package gets an update.

The users with slightly older devices experienced no problems with sign in.

2.5 Conclusions

The idea is a unique, because there isn't much similar apps like that in the current Android market and can be easily evolved over time and become a potential successful product.

Advantages:

- **Easy To Use App**
- **Automated Companion**
- **Fast Access to Functionalities**
- **Background Service (Always Active)**
- **Low RAM Memory Consumption**
- **Easy to improve the app functionality.**

Disadvantages:

- **Not easily trusted app (People are cautious on the subject about AI)**
- **Hard to implement**
- **Limited by the platform**
- **Could consume a lot of Data**
- **Background Service could possibly drain power over time.**

The Implementation still is the earliest stages of development. I didn't not foresee that the idea would take so much of my time to design and develop. The project is a complicated subject that requires a full team of developers and more time to complete and that probably explains why there isn't anything like this in the Android market Play Store right now. I am still happy with what I managed to achieve during the project.

Through the process of development I discovered and learnt a lot of new things, improved my code, research and design.

3 Appendix

Project Proposal

Objectives

The Main Objective is to Research, Design and Develop an Artificial Intelligence App for Android Mobile Devices Platform and see what the capabilities are available and what can be possible to achieve with the tools that Android provides. This project is more or less of an experimentation based on a potential original idea for future a technology. The app will start up being simple and only over time it will rise to become more complex as additional code and algorithms get added. Portable technology is around everywhere at this day and age and its only becoming more and more popular. What if the technology had a bit of a mind on its own and become peoples personal assistant just sitting in your pocket ready to help. This could become a profitable a completely original idea if the research and experimentation pays off.

To achieve this task will require enormous amount of research and testing. How can a mind be created for a simple device and what are the capabilities of it? Would it really help in everyday lives of people? Along this journey of this project I might discover new ideas in what ways and directions I can take this project towards.

Background

Android Artificial Intelligence Companion App – is an idea for an application build for the Android Platform compatible with phones and tablets, which has multiple purposes, to gather important information from the phone locally and online wise and display it to the user at the most appropriate time the app chooses to. The app should be intelligent on being able to act on its own will and allow the user to believe the their mobile device has intelligence of its own, therefore the app makes their device become the users number 1 companion/friend who will be providing useful information to user at its own will and at the right time.

Some of the functions and abilities will include:

- Reading devices information on Battery life/ Memory drainage of other app and allowing user to shut down background tasks.
- App would run as a service above all other apps so it remains active (example: Facebook Chat-heads)
- Allow access to online APIs like Traffic, Weather and others
- To be able to be self-learning, to improve the service to the user by knowing what topics he/she likes and dislikes
- Provide a sort of entertainment, to be able to keep the user company by using friendly actions or minigames.
- Make the usage of a device easier for people who aren't good at technology

The main purpose of the project is to find out how far it is possible to take the artificial intelligence on android platform and see what kind of possibilities are out there for such development.

Technical Approach

To achieve such project certain steps need to be carried out:

1) Survey different people, elderly and young, male and female and evaluate.
2) Write Project Proposal.
3) Research technology and test code and algorithms with online libraries.
4) Test out different algorithm using Android live device/devices.
5) Write Requirement Specification.
6) Install Developer environment.
7) Install Version/Source control.
8) Design Analysis
9) Development
10) Mid-Point Presentation
11) Project Development
12) Documentation and Submission
13) Presentation

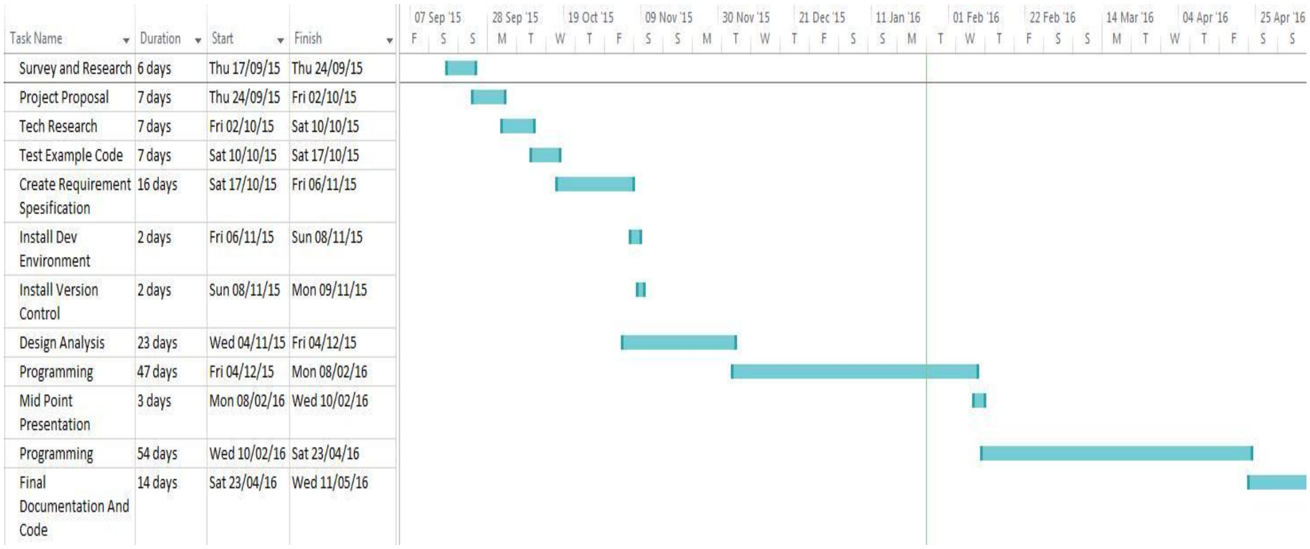
Special resources required

Resources required:

- Computer
- Android Mobile Phone and Android Tablet

- Android Studio
- SourceTree
- Git
- Online Android Documentation
- UmLet
- Android OS packages
- Android emulator
- Online Database Host

Project Plan



Task Name	Duration	Start	Finish
Survey and Research	6 days	Thu 17/09/15	Thu 24/09/15
Project Proposal	7 days	Thu 24/09/15	Fri 02/10/15
Tech Research	7 days	Fri 02/10/15	Sat 10/10/15
Test Example Code	7 days	Sat 10/10/15	Sat 17/10/15
Create Requirement Spesification	16 days	Sat 17/10/15	Fri 06/11/15
Install Dev Environment	2 days	Fri 06/11/15	Sun 08/11/15
Install Version Control	2 days	Sun 08/11/15	Mon 09/11/15
Design Analysis	23 days	Wed 04/11/15	Fri 04/12/15
Programming	47 days	Fri 04/12/15	Mon 08/02/16
Mid Point Presentation	3 days	Mon 08/02/16	Wed 10/02/16
Programming	54 days	Wed 10/02/16	Sat 23/04/16
Final Documentation And Code	14 days	Sat 23/04/16	Wed 11/05/16

Gannt Chart to represent the project development Schedule.

Technical Details

<u>Android Studio requires</u>:

- Java
- XML
- PHP
- MySQL

Android Platform is very complicated and also requires multiple OS packages downloaded in order to allow the app to function on multiple devices, like models, tablets.

Also in order to fully test out the app capabilities on multiple devices is also good idea to run android computer emulator using different android operating systems.

SourceTree requires:

- Git Command Line

Evaluation

I believe that this project idea has a potential, because it is a fully original idea and could possibly set up a new path on development for mobile devices for Android Platform. In this day and age mobile devices are just tools in our pockets but it's only a matter of time until they become more self-aware and self-learning assistants for people's everyday lives. It is still unknown how well Android platform will respond to the idea will the tools that are provided by Google help with such task. The way that Android Operating system works is that different apps gets shut down by the system over a small period of time if they were not properly closed by the user. The idea is to allow the app to run as a service in the background with the higher priority than any other regular app on the device.

3.1 Monthly Journals

3.1.1 Month: September 2015

My Achievements

This month, I was focusing a lot of research on App ideas on what is doable and what has been already done. I got to say that coming up with an app idea can be much more difficult than the actual development.

At first I was thinking about A different API mashups and then I was thinking about how would different API integrate together.

After many hours of research on the appstore, internet I managed to come up with few ideas.

My Reflection

My App ideas weren't perfect and I wasn't very confident in them, It took some additional research.

The problem is that I'm confused even those ideas would be useful when developed or even in development itself.

Upon decided of the ideas I create A Project Proposal about it

3.1.2 Month: October 2015

My Achievements

This is my second month of working on this project and I managed to come up with a better and solid idea for an App which I am happy about. It is the Android AI Companion App which is my original idea and it’s quite unique because there is much like this out there in the market

I have completed My Project Requirement Specifications document which took a long time to do, but I’m glad that this difficult step is over and I am now ready to move onto the next part.

My Reflection

This document took a lot of my time which I first intended to use on research and tutorial practice for android.

3.1.3 Month: November 2015

My Achievements

This is my third month of working on this project, I created a safe developer environment with all IDE installed as I needed as well as device drivers for my phone, tablet for testing and Android Emulator configured. Also I added safe and private source control to my project so that my code gets saved each time I commit and if I ever need to retract back in versions it will handle it without any problems.

I also started working on the Design Analysis document but it’s a document you can’t just complete straight away, some parts can only be decided as you move along with the project as new ideas come up. So the document will be broken down into multiple versions.

I kept with my study of Android Studio and how drivers work on different android OS devices, as well as I tried out few android tutorials on different functions so I am more familiar with the technology.

My Reflection

The Design Analysis document took a lot of my time which I first intended to use on research and tutorial practice for android.

3.1.4 Month: December 2015

My Achievements

My focus this month was based on continuation on research and design on how to proceed on building the project. My main goal was to learn how I could design my app so that Android system wouldn’t close the app over a period of time in standby mode and allow the app to constantly run in background.

My Reflection

Additional plan on design and development has been developed and my design analysis was updated.

3.1.5 Month: January 2016

My Achievements

This Month I focused on Starting development and code on the App, I created a new project set Android API 15. After a lot of research and code sample practices I managed to create and Service module on my app which would allow one of my classes in my app to constantly run in the background of an android device.

My Reflection

I also spent some time on preparation for the Mid-Point Presentation, I prepared some Slides, technical report document and updated my past documents.

3.1.6 Month: February 2016

My Achievements

I focused on getting a hosting and setting up a MySQL database. Once that was done, I proceeded with programing php files in order to transfer data in and out of the database.

My Reflection

After mid-point presentation I had to reflect and identify on which topics of my project I should focus on more and where to improve.

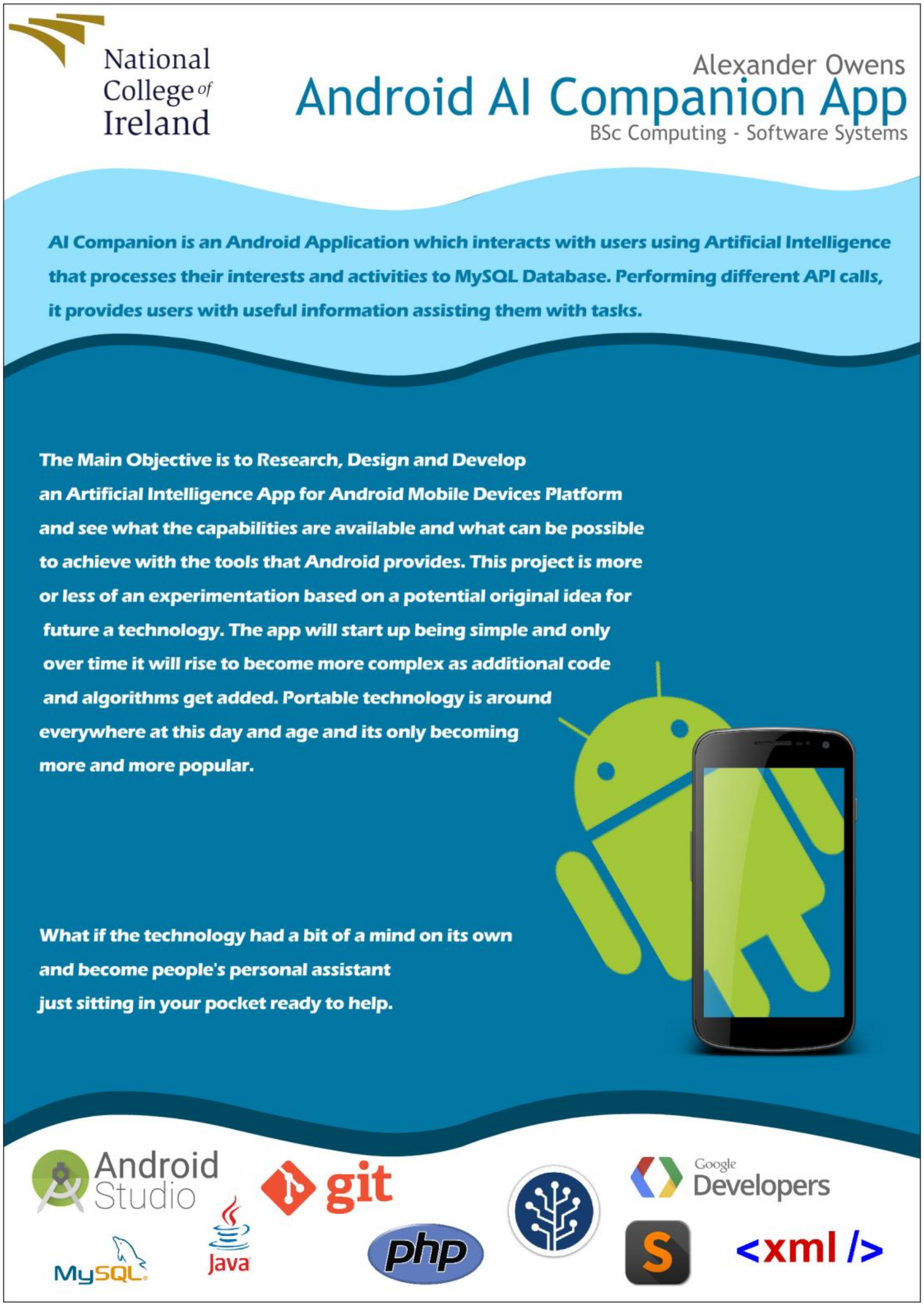
3.1.7 Month: March 2016

My Achievements

This Month I focused on development and code on the App, I spent a lot of my time researching on how to get AI to understand the user, I was thinking if there was any API but the ones I found were only available as beta in private paid membership. I came up with the idea to create my own Natural Language Processing with hard coded commands.

My Reflection

Ai is what this project about but it is also the hardest part that is taking a lot of time for research and development.



National College of Ireland

Alexander Owens

Android AI Companion App

BSc Computing - Software Systems

AI Companion is an Android Application which interacts with users using Artificial Intelligence that processes their interests and activities to MySQL Database. Performing different API calls, it provides users with useful information assisting them with tasks.

The Main Objective is to Research, Design and Develop an Artificial Intelligence App for Android Mobile Devices Platform and see what the capabilities are available and what can be possible to achieve with the tools that Android provides. This project is more or less of an experimentation based on a potential original idea for future a technology. The app will start up being simple and only over time it will rise to become more complex as additional code and algorithms get added. Portable technology is around everywhere at this day and age and its only becoming more and more popular.

What if the technology had a bit of a mind on its own and become people's personal assistant just sitting in your pocket ready to help.