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Medi-Guy
Technical Report

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Executive Summary

The medical industry in the past 20 years has taken huge strides towards safe and modern solutions but are also keeping some things the way, it is. I feel like there is a disconnect with different generations of people and this could be a factor is stunting a lot of growth in the medical field. The old generation is used to calling into GP and booking an appointment and getting checked and going to the emergency room whenever they feel slightly unwell. I found that a lot of things can be made easier with modern technology. The younger generation are constantly trying to find modern ways of doing things such as using a application to book appointments but trying to find a middle ground where both groups are happy can be a challenge. With more and more people around the world having access to the internet its inevitable that the medical industry would have to adapt to this. We see the adaption of this in different cases around for example. The height of the COVID pandemic the government signed of on the creation of apps such as Covid tracing applications that would alert you and the HSE if you were in contact with anyone with COVID-19. Some hospitals are making booking appointments for things such as blood tests online also. In conclusion as the world of technology progresses it is imperative that industries follow suite or risk being left behind.

1.0 Introduction

1.1. Background

As the number of people using mobiles in the world increases more people will be able to access mobile applications and software applications can provide a more durable way of accessing resources that can be more tedious to access otherwise. These applications can be downloaded by just having internet access and according to **Pew Research Centre** in the top 40 countries in the world 67% of people access the internet. A lot of the applications that consumers download is healthcare related.

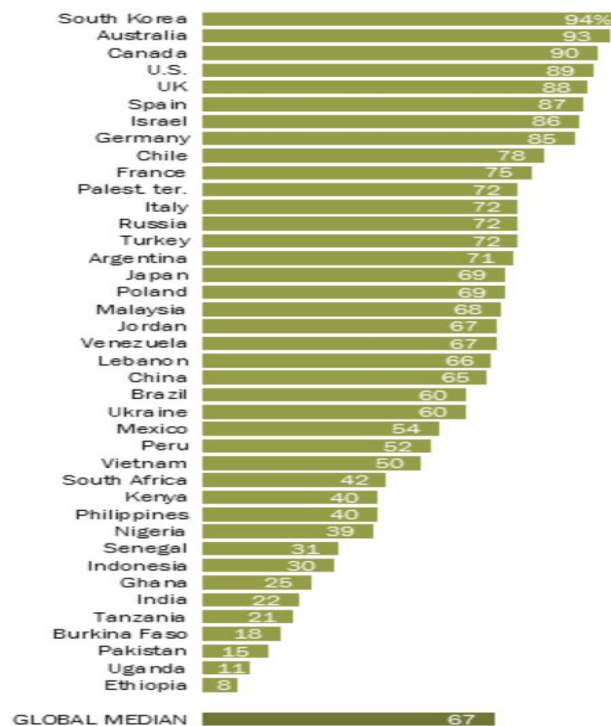
The aim of this application is to give people a modern approach to taking care of their health and wellbeing. This application gives users a way to keep up with the world around them and themselves by offering a range of different features that's focused on the medical field.

This project will see the development of different features within a larger application. One of these features will allow users to list any symptoms they may and from them symptoms an output that will briefly explain what they may have. Because of COVID there has been a lot of discussion of vaccinations. This application will make it easier to track vaccines that users have taken. This application will also have a built in COVID Tracker that will track daily, weekly and monthly COVID numbers and alert users of

any increase in numbers in regions closer to their proximity. Mental Health is just as important than any other health related issue. Mental health can cause array of issues. It can affect your performance in school or work and even the way you treat your family and friends. This application will have a personal journal section where the user can type out how they are feeling and also add a photo to each status.

Most adults in advanced economies use internet, developing countries less so

Adults who use the internet at least occasionally or report owning a smartphone



1.2. Aims

What does the project aim to achieve?

1. Accessibility

A big issue into with consumers in healthcare is accessibility. Some consumers may have disabilities where it can affect how they move. It may be difficult just to go to the local medical centre to ask when their next vaccination is. With this project the immunisation section will briefly outline when their next vaccination is. All the consumers would need is a mobile phone and the correct OS(Android).

2. Credibility

For the application two features will use an API. One API will be for the symptom checker which I will be using to check symptoms and output any

conditions the user may have. Another API would be a live COVID tracker that would take directly from live and daily changes in covid cases throughout Ireland.

3. Effectiveness

The effectiveness of the application is very important. Making sure the application can be used daily by anyone with and disability. Also making the application sophisticated enough that users can manoeuvre easily.

1.3. Technology

What technology will you use to achieve what you have set out to do and how will you use it?

In this project the primary technologies that I decided to use will be Java as the coding language and Android Studio as the IDE. Java is one of the most well-known and used coding languages in the world. It is used in many areas of development such as Mobile Development, Web Development, Databases and even game development. The benefit of using Java for android development is that it offers a scalable environment. As technology updates over time Java also tends to keep up because It is an open-source language. Because Java is the standard tools are being made to partner with Java. During the development process of this application I will be using numerous development tools that is built around Java. Java is consistent and compatible with many operating systems which gives it value among other languages. Example if I wanted to move the application to a different OS Java allows for seamless integration. In Android development security is very important. Everything from the compiler to the interpreter is built with having Java in mind. Lasty Java is a relatively easy language to pick up with millions of resources across the internet to help.

I will be creating the application on Android Studio IDE. Android Studio is a development tool for Android applications. It allows users to create any android application the desire and has many features. Android Studio has many benefits such as faster coding since it is powered by IntelliJ IDE it shows code correction. Android Studio has a built in emulator that mimics an actual android device it allows you to see and interact with your application without the need to plug in a physical phone. The most important aspect for Android Studio for this project is the Firebase Support and Integration. Firebase is baked into the software. It allows me to connect the Firebase database with just a few clicks this saves a lot of time.

There will be two API's I will be using in this project. The first API will be used for the News feature of the application I got the API key for this feature using the newsapi.org website. This website offers a free tier, this free tier allows for 100 request each day, news articles are available hourly and also get live top headlines. I Chose to use this API because it is well documented, and it gives a reasonable free tier. For the second API I will be using

<https://corona.lmao.ninja/v2/countries> this gives the countries covid results and updates every day.

In order to manage the APIs such as how it receives and sends information I use Retrofit.

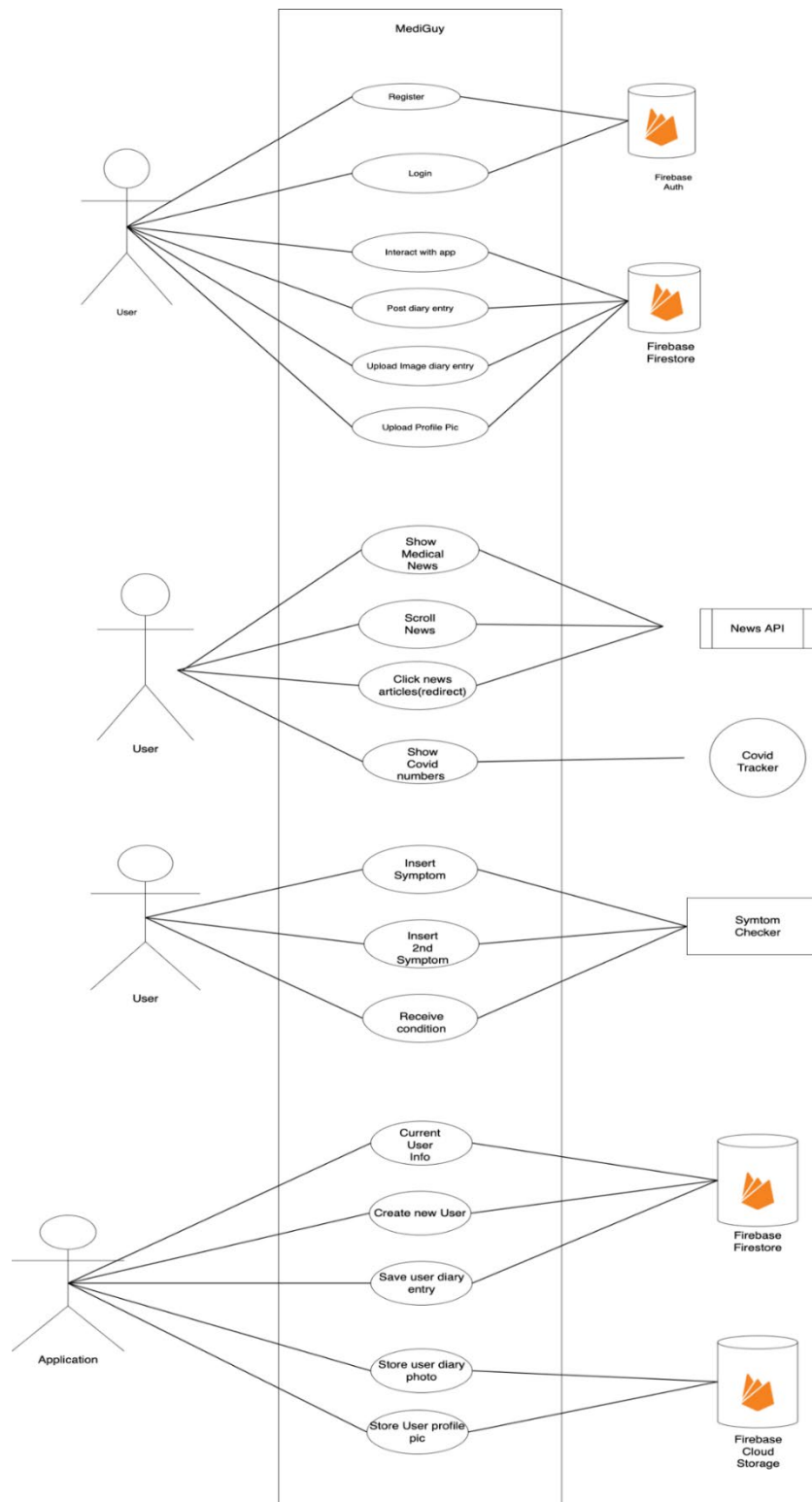
1.4. Structure

2.0 System

2.1. Requirements

2.1.1. Functional Requirements

2.1.1.1. Use Case Diagram



2.1.1.2. Requirement 1 : Login

2.1.1.3. Description & Priority

This requirement gives the user the opportunity to enter MediGuy application by entering an email address and password the registered with.

2.1.1.4. Use Case

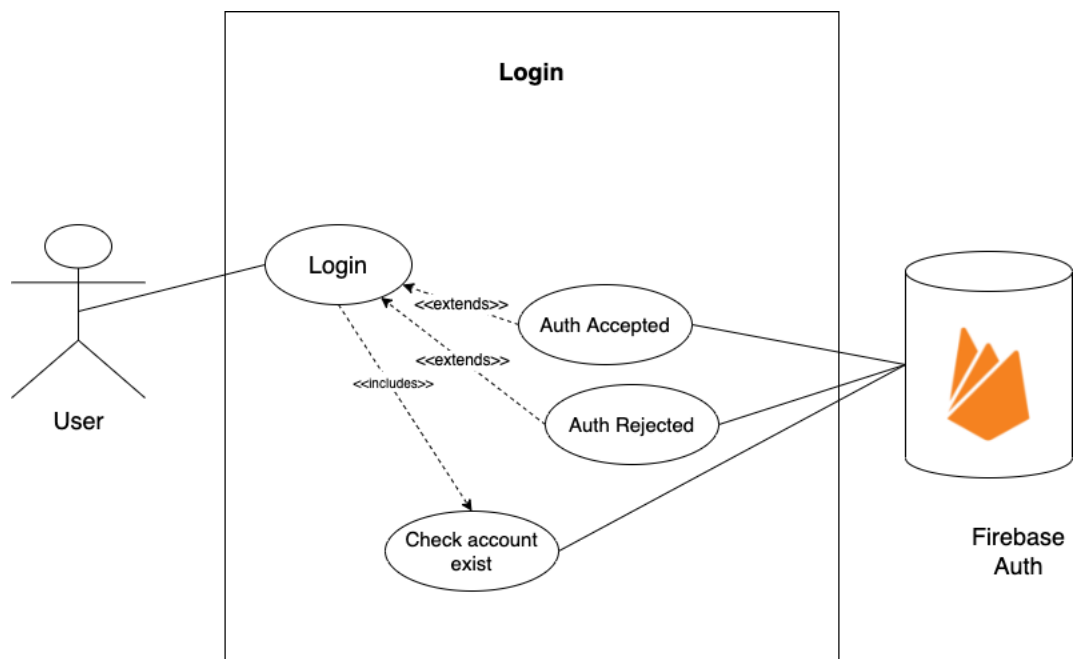
Scope

The scope of this use case is to give the user the access to the application. This use case will go through a series of validation steps for the user to enter MediGuy application

Description

This use case describes the steps that the user goes through to access MediGuy application.

Use Case Diagram



Flow Description

Precondition

Activation

The use case starts when the user launches the application from their android device.

Main flow

1. The user enters a valid email address and password when prompted to.
2. Application checks to see if both email address and password entered in the fields are valid. i.e email may not have an @ symbol so it may be rejected by the fields.
3. User presses the login button
4. Application sends the users login information to Firebase Authentication.
5. Firebase Authentication checks to see if user credentials is correct
6. Firebase responds to the application.
7. Application receives the response from Firebase Authentication
8. Application logs the user into their account.

Alternate flow

A1 : Invalid Email Field

1. User enters invalid email address in field
2. Field detects that the email address is incorrect
3. Use case starts back at 1. In the main flow

A2 : Invalid Password Field

1. User enters invalid password in field,
2. Field detects the password provided is incorrect
3. Use case starts back at 1. In the main flow

A3: Password Incorrect

1. The password provided in field is incorrect
2. User presses login button
3. Application sends the entered user email address and password to firebase authentication
4. Firebase detects that the received password does not match with the assigned email.
5. Firebase sends an incorrect error to application
6. Application receives response as incorrect password.
7. Use case starts back at 1. In the main flow.

A4: User does not exist

1. User enters email address and password in fields.
2. User presses login button

3. Application sends user information the Firebase Authentication
4. Firebase sends back an error as no account exists with these credentials
5. Application receives error and displays account does not exist
6. Use case starts back at 1. In the main flow

Exceptional flow

E1 : Firebase Servers are down

1. User enters email address and password in the fields
2. user presses the login button
3. Application sends the user information to Firebase Authentication
4. Application displays error as Firebase servers are down

E2: No Wi-Fi or Data Connectivity

1. Application checks if internet access is available
2. Application cannot send user information to Firebase as mobile has no internet access

Termination

Close the application

Post condition

Application waits for the user to enter account information

List further functional requirements here, using the same structure as for Requirement1.

2.1.1.5. Requirement 2: Registration

2.1.1.6. Description & Priority

This Requirement allows for the user to create an account using an email address and password of their choosing.

2.1.1.7. Use Case

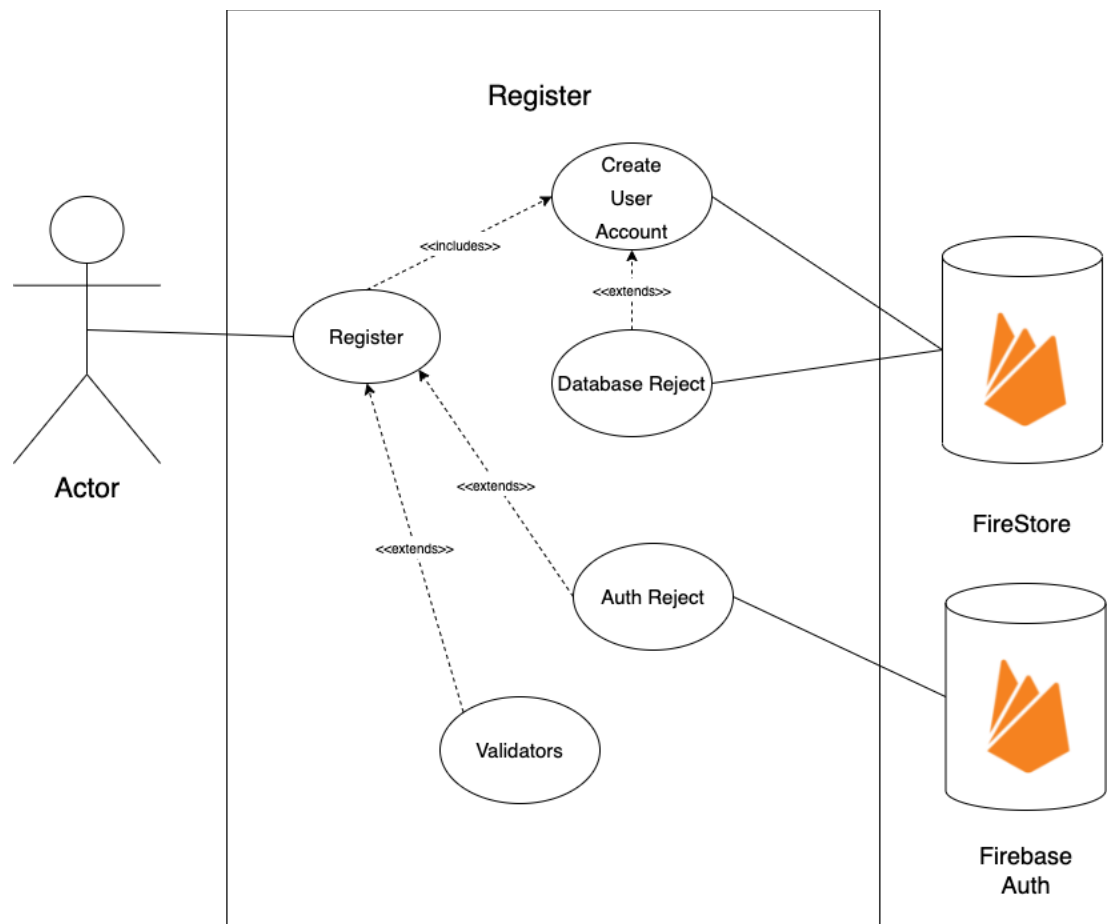
Scope

Scope of this allows the user to create an account on MediGuy application

Description

This use case describes the actions the user undergoes to create an account on MediGuy

Use Case Diagram



Flow Description

Precondition

Register button is on login page

Activation

The use case starts when the user clicks the sign-up button on the login page

Main flow

1. Application responds to registration button being pressed
2. Application redirects to the registration page.
3. User enters the email address and password the would like to use in the field boxes.
4. User presses the register button.
5. Application detects the registration button is pressed
6. Application sends a request to Firebase Authentication to create the user with the assigned email address and password
7. Firebase Authentication responds with a created user
8. Application requests Cloud Fire Store to create a user.

Alternate flow

A1 : Invalid Email Field

4. User enters invalid email address in field
5. Field detects that the email address is incorrect
6. Use case starts back at 1. In the main flow

A2 : Invalid Password Field

1. User enters invalid password in field,
2. Field detects the password provided is incorrect
3. Use case starts back at 1. In the main flow

A3 : Email already used

1. User types in email address and password to fields.
2. User presses login button
3. Application sends a request to Firebase Auth
4. Firebase Auth identifies that the email used already exists
5. User continues 3. Of the main flow.

Exceptional flow

E1 : Firebase Servers are down

1. User enters email address and password in the fields
2. user presses the login button
3. Application sends the user information to Firebase Authentication
4. Application displays error as Firebase servers are down

E2: No Wi-Fi or Data Connectivity

1. Application checks if internet access is available
2. Application cannot send user information to Firebase as mobile has no internet access

Termination

Close the application

Post condition

Application waits for the user to enter account information

2.1.1.8. Requirement 3: Insert Journal Entry

2.1.1.9. Description & Priority

This requirement allows the user to insert a journal entry and upload a entry image.

2.1.1.10. Use Case

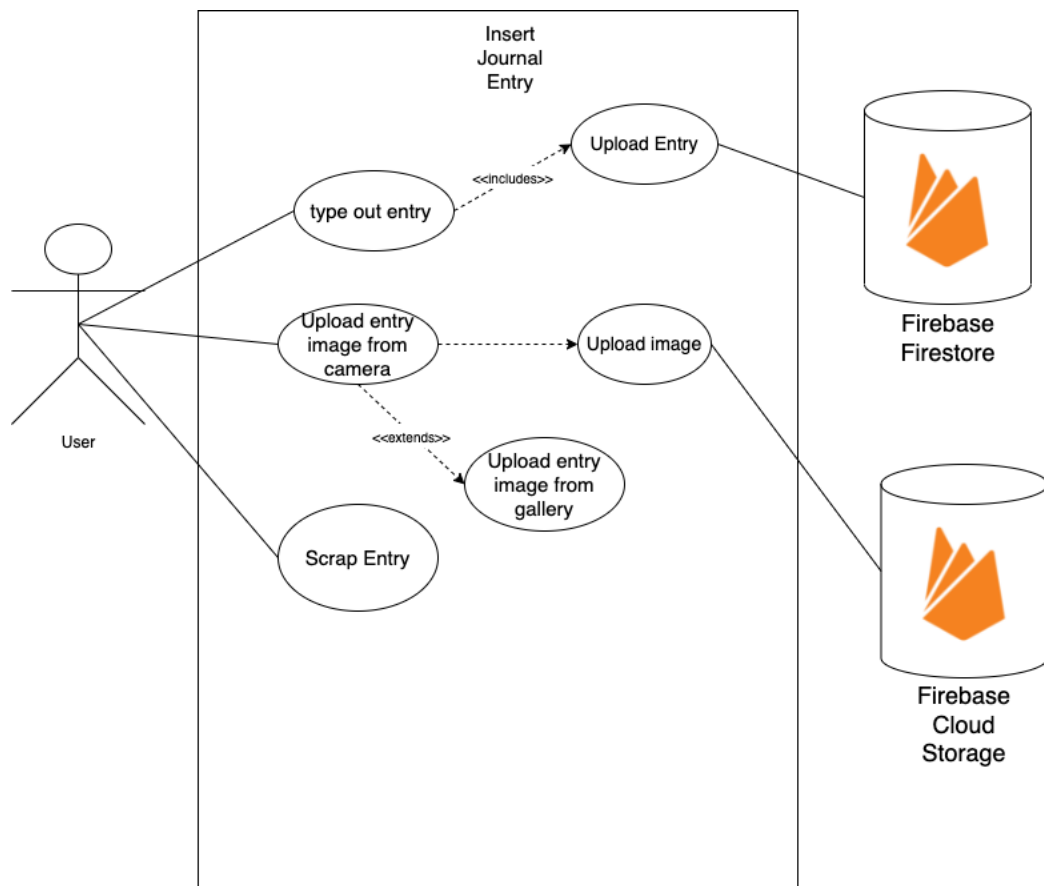
Scope

Scope of this allows the user to upload an image and insert a journal entry

Description

This use case shows the steps taken when the user uploads a journal entry and adds an image entry to the entry.

Use Case Diagram



Flow Description

Precondition

Application is currently on the Personal Journal activity.

Activation

This use case starts when the user clicks the Personal Journal activity on the application.

Main flow

1. Application detects the user clicks upload image symbol.
2. Application redirects user to choose between upload from gallery or use camera.
3. If users chooses photo
4. Application redirects user to their photo gallery.
5. User presses image from gallery
6. User redirected back to application with chosen image
7. User types out Journal title
8. User types out Journal entry
9. User clicks post button
10. Application shows user Journal title and image and text under.

Alternate flow

A1 : User deletes journal entry

1. User decides to remove entry
2. User clicks discard button
3. Application removes journal entry
4. Use case starts back at 1.

Exceptional flow

E1 : Firebase Servers are down

1. User enters email address and password in the fields
2. user presses the login button
3. Application sends the user information to Firebase Authentication
4. Application displays error as Firebase servers are down

E2: No Wi-Fi or Data Connectivity

1. Application checks if internet access is available

2.Application cannot send user information to Firebase as mobile has no internet access

Termination

Close the application

Post condition

Application waits for the user to make another movement.

[2.1.1.11. Requirement 4: Interact with News](#)

[2.1.1.12. Description & Priority](#)

This requirement allows the user to scroll and interact with the news page

2.1.1.13. Use Case

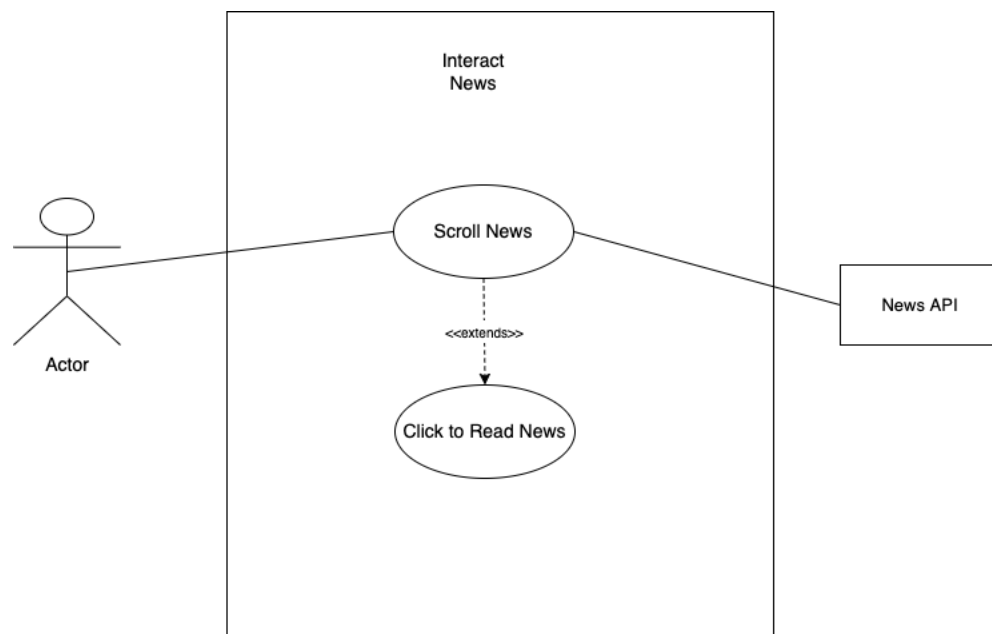
Scope

Scope of this allows the user to read news about the medical world

Description

This use case shows the steps of using the news page to scroll and read news

Use Case Diagram



Flow Description

Precondition

Application is currently on the News section

Activation

This use case starts when the user clicks the News section on the application.

Main flow

1. User clicks news section
2. User scrolls through news articles
3. User clicks article
4. Redirects user to article

Alternate flow

A1 : User backtracks to application

1. User backspaces back to application

Exceptional flow

E1: No Wi-Fi or Data Connectivity

1. Application checks if internet access is available

2. Application cannot send user information to Firebase as mobile has no internet access

Termination

Close the application

Post condition

Application waits for the user to make another movement.

2.1.2. Data Requirements

Firestore Authentication

For the MediGuy application both registration and login for the customer will be handled by Firestore Authentication. Firestore Authentication service allows MediGuy application to store users information in a encrypted structured database that nobody can access other than the developer. The developer can access user information such as User UID, email and other information. The UID is very important. Every user whole a UID. The user UID allows user to save their journal entry to Cloud Firestore and allows the user to upload images to Firestore Storage.

Search by email address, phone number or user UID					Add user	↺	⋮
Identifier	Providers	Created ↓	Signed in	User UID			
dan@gmail.com	✉	17 Apr 2022	19 Apr 2022	cKen6fiOyUM7hBW8SElxb1aKppK2			
jake@gmail.com	✉	10 Apr 2022	10 Apr 2022	UISrXzxQxLMVZQ4azj8yw3rr8Wg2			
dave@gmail.com	✉	5 Apr 2022	5 Apr 2022	xrZ6y1Ozx4TJAqT34zb23CJpcC3			
bill@gmail.com	✉	2 Mar 2022	2 Mar 2022	0iCNM8eqRlbdJftaCD3My0mbg9d2			
darren@gmail.com	✉	1 Mar 2022	1 Mar 2022	C9eeRzG9fVbU7ep8NqQ6jxHeOQB2			
christ@gmail.com	✉	6 Feb 2022	6 Feb 2022	41bqFilePnekUwhlyEFNbHKIYSy1			
test@gmail.com	✉	6 Feb 2022	6 Feb 2022	qtffk5mbQ7O57JE6UVoE4LBrnUg1			
chris@gmail.com	✉	19 Jan 2022	19 Jan 2022	EYA6GwPyGHPnGICyb9t7A5jPPzo1			
					Rows per page	50 ▼	1 – 8 of 8

In MediGuy the UID is used to give users access to Firestore Storage for saving images and Cloud Fire store for saving user information.

2.1.3. User Requirements

To use MediGuy Application the user must have an smartphone specifically a phone that is using Android OS. The Phone must be linked to the internet using either Wi-Fi or Data.

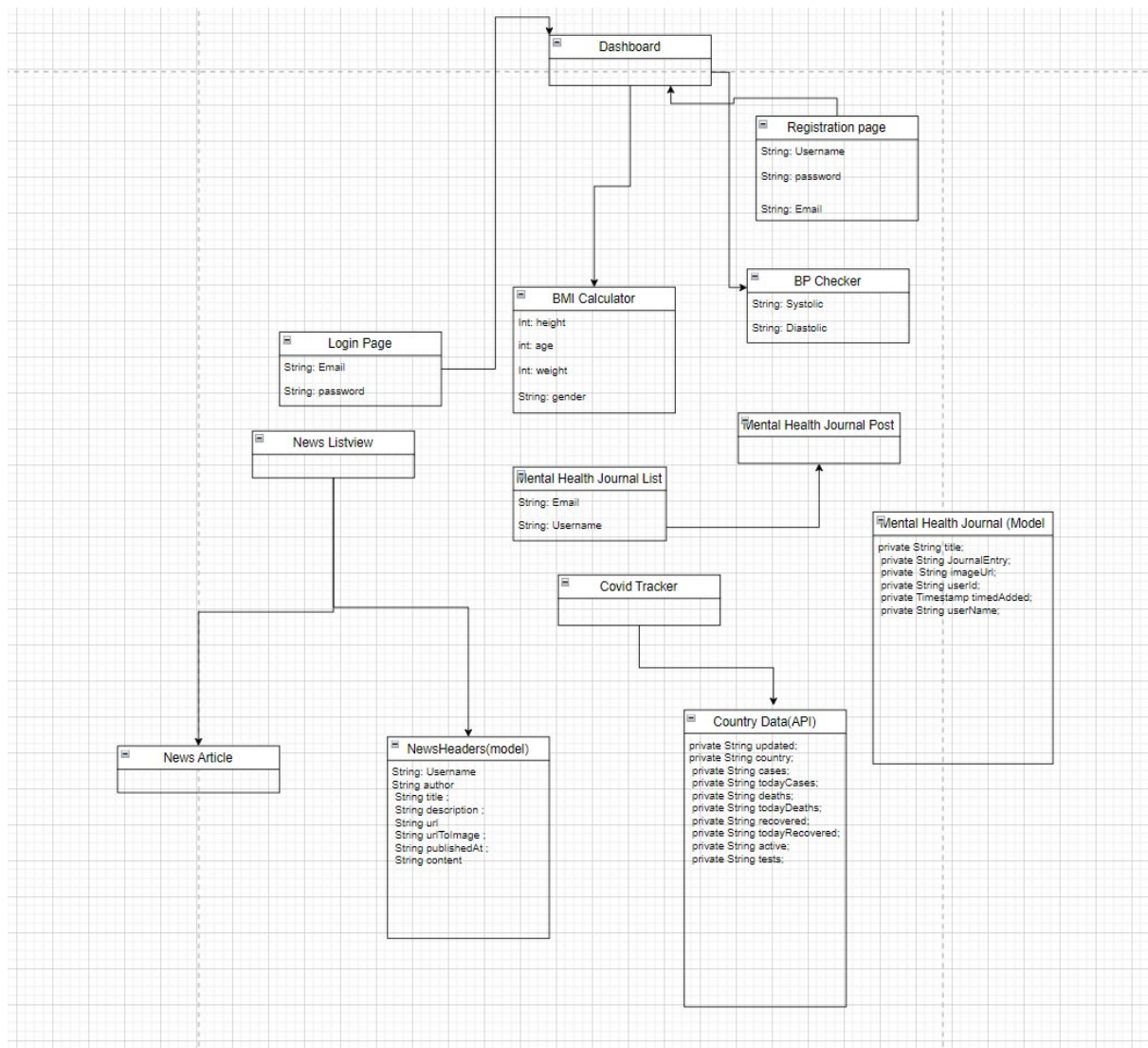
2.1.4. Environmental Requirements

In order to run the code you must use either a Laptop or a desktop. Because the application is written in Android the preferred OS you use would be Windows but Mac can be used also. Any device that can run Android Studio will work.

2.1.5. Usability Requirements

Any user with an Android Device can use this application. Users that need an application that tracks and gives users advice on medical issues can use this applications

2.2. Design & Architecture



2.3. Implementation

2.3.1 Create Account

```
firebaseAuth.createUserWithEmailAndPassword(email, password)
    .addOnCompleteListener(new OnCompleteListener<AuthResult>() {
        @Override
        public void onComplete(@NonNull Task<AuthResult> task) {
            if (task.isSuccessful()) {
                //we take user to AddJournalActivity
                currentUser = firebaseAuth.getCurrentUser();
                assert currentUser != null;
                final String currentUserId = currentUser.getUid();

                //Create a user Map so we can create a user in the User collection
                Map<String, String> userObj = new HashMap<>();
                userObj.put("userId", currentUserId);
                userObj.put("username", username);
            }
        }
    });
```

Using “FirebaseAuth.createUserWithEmailAndPassword” to pass the email and password that was inputted into the text field. After doing this in order to make sure that the email and password actually saved, I used a Listener. In this listener the task has the user that was created in order to check the success of the task I use an if statement. In the if statement a map is created, this allows us to create users and the user information will be stored in firebase.

```

//saving to firestore database
collectionReference.add(userObj)
.addOnSuccessListener(new OnSuccessListener<DocumentReference>() {
    @Override
    public void onSuccess(DocumentReference documentReference) {
        documentReference.get()
            .addOnCompleteListener(new OnCompleteListener<DocumentSnapshot>() {
                @Override
                public void onComplete(@NonNull Task<DocumentSnapshot> task) {
                    if (Objects.requireNonNull(task.getResult()).exists()) {
                        String name = task.getResult()
                            .getString( field: "username");

                        JournalApi journalApi = JournalApi.getInstance(); //Global API
                        journalApi.setUserId(currentUserId);
                        journalApi.setUsername(name);

                        Intent intent = new Intent( packageContext RegisterActivity.this,
                            DashboardActivity.class);
                        intent.putExtra( name: "username", name);
                        intent.putExtra( name: "userId", currentUserId);
                        startActivity(intent);
                    } else {
                    }
                }
            });
    }
});

```

In this code we save the user obj to appropriate collection. On the success of adding the user obj to the collection I added an on complete listener. Using the task, we check if the object exists if its true. I get the username from the object and redirect to the dashboard.

2.3.2 BMI Calculator

The BMI Calculator is a system I built from scratch. In order to access it the user must login and reach the dashboard once the user is in the BMI calculator activity, they have options to peak either a male or a female

```

mmale.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        mmale.setBackground(ContextCompat.getDrawable(getApplicationContext(),R.drawable.male));
        mfemale.setBackground(ContextCompat.getDrawable(getApplicationContext(),R.drawable.malenonfc));
        typeuser="Male";
    }
});

mfemale.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        mfemale.setBackground(ContextCompat.getDrawable(getApplicationContext(),R.drawable.male));
        mmale.setBackground(ContextCompat.getDrawable(getApplicationContext(),R.drawable.malenonfc));
        ///type of user
        typeuser="Female";
    }
});

```

Both these onclick listeners function is to highlight the gender in which the user presses. For example, if the user clicks the female gender the image will turn to a grey colour and vice-versa for the male.

In the BMI calculator I used a seek bar. The seekbar is used by the user to choose their height

```

///setting the max for the seekbar
mseekbarheight.setMax(300);
mseekbarheight.setProgress(170);
mseekbarheight.setOnSeekBarChangeListener(new SeekBar.OnSeekBarChangeListener() {
    @Override
    public void onProgressChanged(SeekBar seekBar, int progress, boolean fromUser) {
        currenttp = progress;
        mprogress=String.valueOf(currenttp);
        mheight.setText(mprogress);
    }

    @Override
    public void onStartTrackingTouch(SeekBar seekBar) {

    }

    @Override
    public void onStopTrackingTouch(SeekBar seekBar) {

    }
});

```

Here I declare the seek bar and give it a max value of 300

2.3.3 Storing Journal Image in Firebase

When using the Journal feature the user must upload a image as they post their daily journal.

I implemented this by using Firebase Cloud Storage

```
final StorageReference filepath = storageReference //.. journa_images/your_image.jpeg
    .child("journal_images") // folder is created on firebase called Journal_images
    .child("my_image_" + Timestamp.now().getSeconds()); //timestamp of image
```

Creating a directory in firebase called journal_images/my_image and give each image a timestamp .

```
filepath.putFile(imageUri) // putting file into a storage reference
    .addOnSuccessListener(new OnSuccessListener<UploadTask.TaskSnapshot>() {
        @Override
        public void onSuccess(UploadTask.TaskSnapshot taskSnapshot) {

            filepath.getDownloadUrl().addOnSuccessListener(new OnSuccessListener<Uri>() {
                @Override
                public void onSuccess(Uri uri) {

                    String imageUrl = uri.toString();

                    //journal
                    Journal journal = new Journal();
                    journal.setTitle(title);
                    journal.setJournalEntry(postEntry);
                    journal.setImageUrl(imageUrl);
                    journal.setTimedAdded(new Timestamp(new Date()));
                    journal.setUserName(currentUserName);
                    journal.setUserId(currentId);

                    ///collection of references
                    collectionReference.add(journal)
                        .addOnSuccessListener(new OnSuccessListener<DocumentReference>() {
                            @Override
                            public void onSuccess(DocumentReference documentReference) {
                                progressBar.setVisibility(View.INVISIBLE);
                                startActivity(new Intent( packageContext: JournalActivity.this,JournalListActivity.class));
                                finish();
                            }
                        })
                }
            })
        }
    })
```

On the success of uploading an image I use the Journal model I created that holds the different instance variables. Each instance holds specific parameters.

2.3.4 Show Journal List View


```

@Override
public void onBindViewHolder(@NonNull JournalRecyclerViewInputer.ViewHolder holder, int position) {

    Journal journal = journalList.get(position);
    String imageUrl;

    holder.title.setText(journal.getTitle());
    holder.entry.setText(journal.getJournalEntry());
    holder.name.setText(journal.getUserName());

    imageUrl = journal.getImageUrl();

    String ago = (String) DateUtils.getRelativeTimeSpanString( startTime: journal.getTimedAdded().getSeconds() * 1000);
    holder.date.setText(ago);

    Picasso.get().Picasso
        .load(imageUrl) RequestCreator
        .placeholder(R.drawable.image_one)
        .fit()
        .into(holder.image);
}

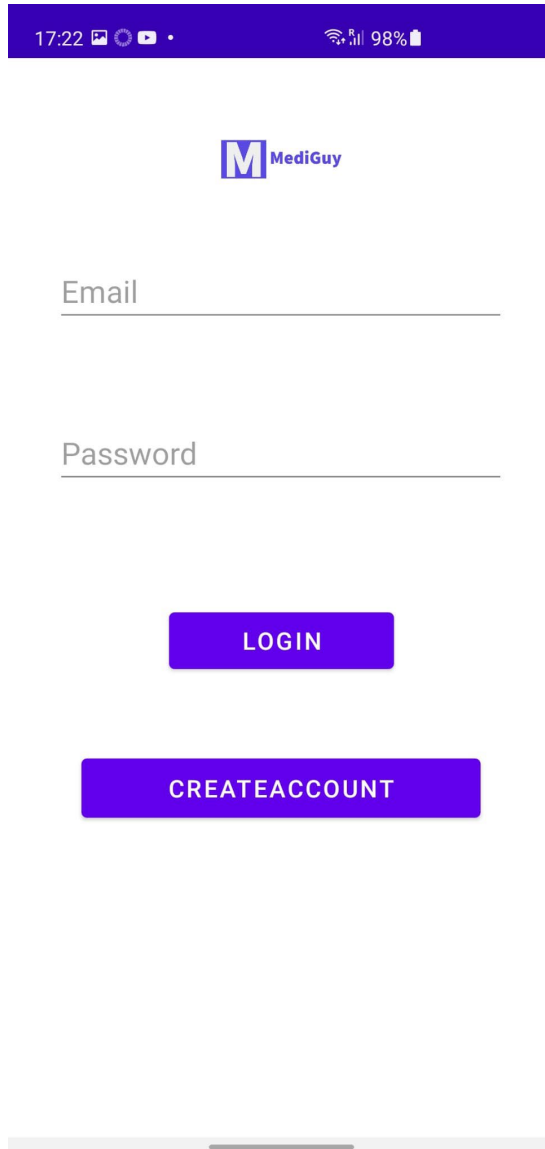
```

This is the RecyclerView adapter for the journal and im using Picasso which is an image downloading library for android.

2.4. Graphical User Interface (GUI)

Login

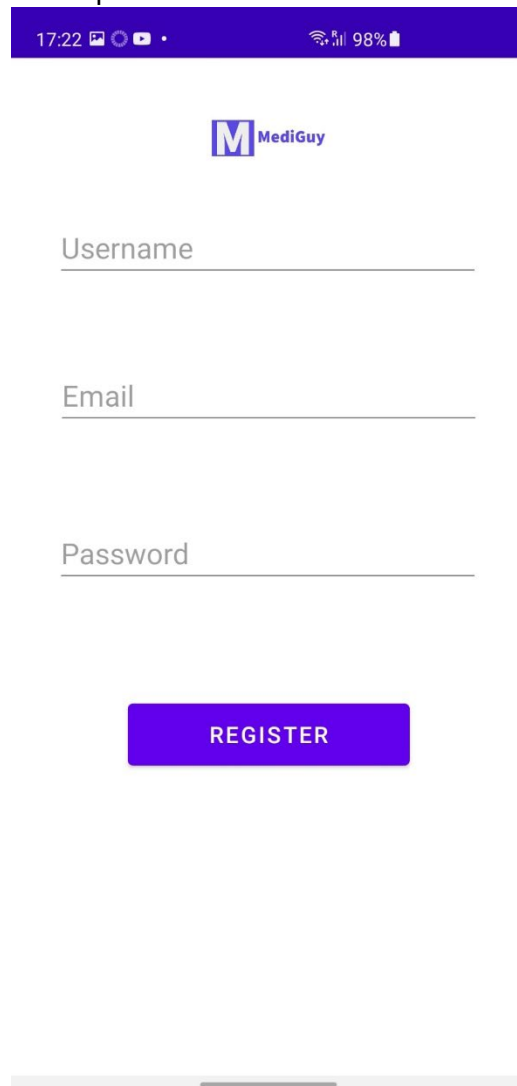
This is the login screen the user can input the credentials they used to create their account in this page. Due to issues with the login the user that is logging in must use their email to login always.



The image shows a mobile application login screen. At the top is a black status bar with the time 17:22, signal strength, and 98% battery. Below this is the MediGuy logo, consisting of a blue square with a white 'M' and the text 'MediGuy' in blue. There are two input fields: 'Email' and 'Password', both with light gray placeholder text. Below the 'Password' field is a red 'LOGIN' button. Further down is a red 'CREATEACCOUNT' button. At the very bottom is a light gray horizontal bar.

Registration

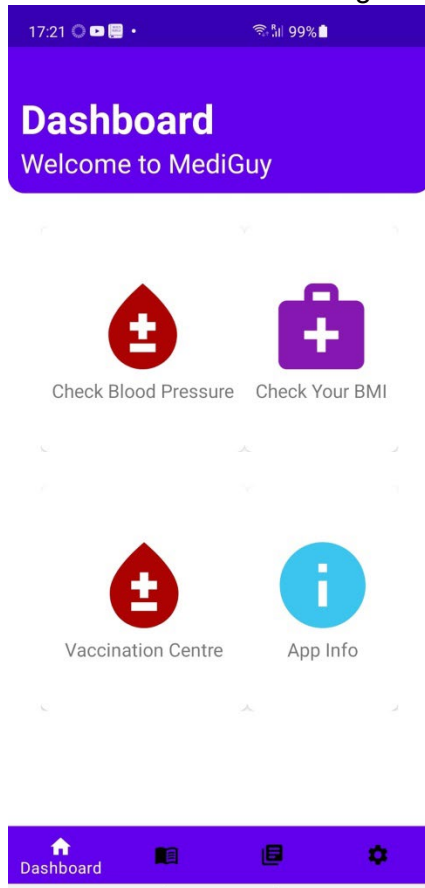
The registration page has 4 input fields. One for the username, email and password. It is important for the user to make sure they fill in these sections correctly.

A screenshot of a mobile application's registration page. At the top is a black status bar with white text and icons showing the time as 17:22, signal strength, and 98% battery. Below the status bar is a white header with a blue square logo containing a white 'M' and the text 'MediGuy' in blue. The main content area has a light gray background and contains three white input fields with gray placeholder text: 'Username', 'Email', and 'Password'. Below these fields is a red rectangular button with the word 'REGISTER' in white capital letters. At the very bottom of the screen is a white home indicator bar.

Dashboard

This is the first page that the user will see. The dashboard has 3 sections the user can click. The user can click the check blood pressure section, check BMI section or more info section.

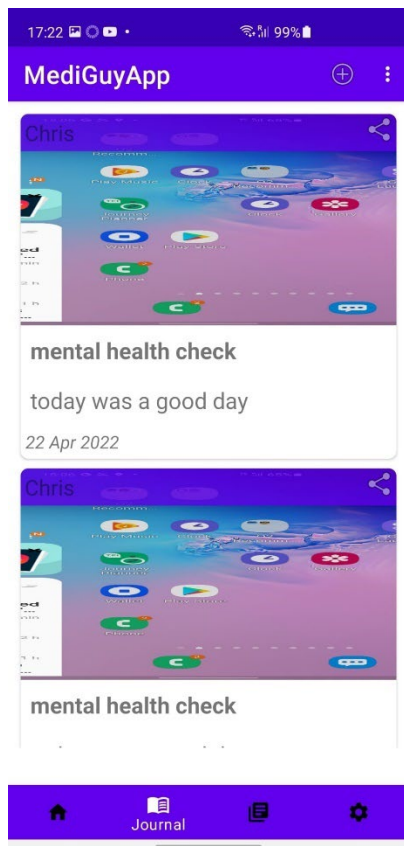
You can see that once the user goes to the dashboard you will see a bottom navbar that allows the user to navigate through different parts of the application



Journal Entry

Using the navigation bar you can move to the next activity which is the journal list page. With new users this page will be empty. For you to add a journal entry you must press the plus button at the top right of the activity. Once you press this button the user will be redirected to the page where you can submit a journal entry

For the Journal Entry all the fields must be filled out in order to submit. So the user must press the image in order to upload their own image. Once you have uploaded your own image fill in the Title and the description of your journal entry. When everything is done the user can press the post button and then you are redirected to the journal list page. The user can do this constantly and they will have a list of journal entries.





Title

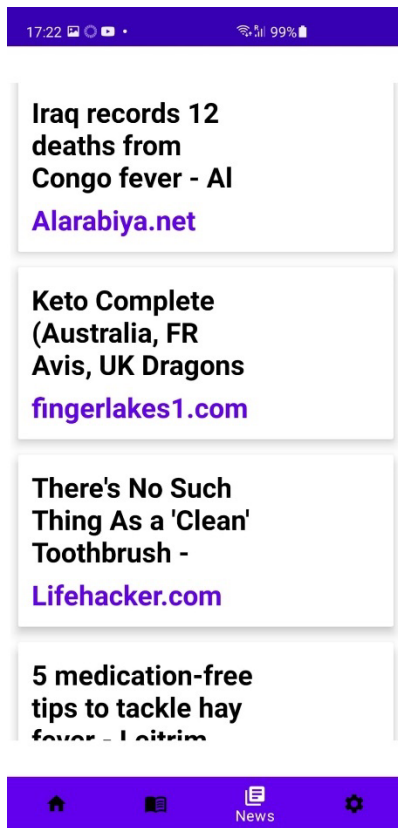
Post Entry

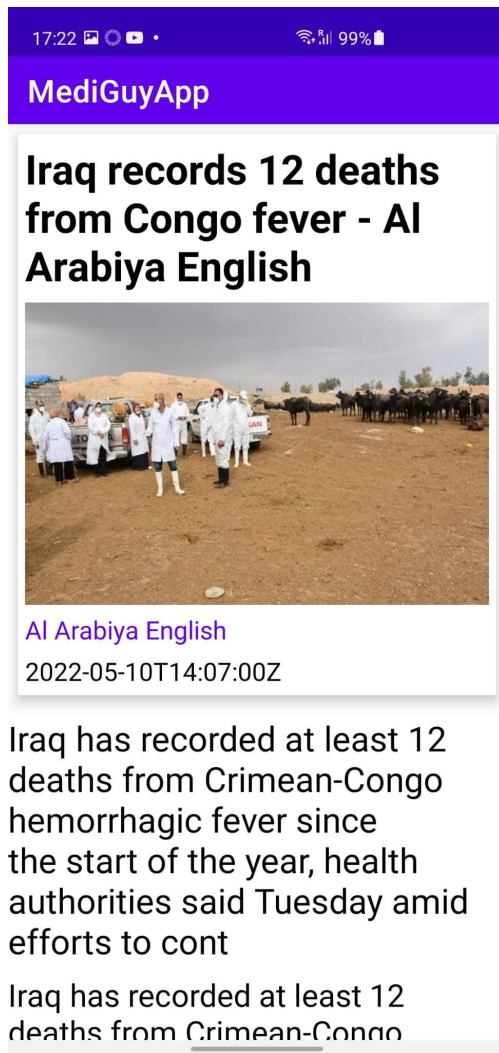
POST



News

Going to the news section you can see a list view of articles that are specifically tailored towards health and medicine. You can see the whole article with the article image used and the author.





2.5. Testing

2.5.1 System Test

A system test is used to see if the application runs as it is supposed to. The goal of the application is to run on Android with a minimum Android 5.0(Lollipop) SDK, any device that is running a SDK lower than Android 5.0 cannot run the application. The device used throughout the creation of the project was a Samsung galaxy S10.

2.6. Evaluation

Heuristic Evaluation is a method that includes different combination of rules. This method helped me evaluate and create a better experience for users using the application. The method helped me find any problems with the design of the application. The key rules of this method include:

Continuity:

This rule states that a user should not have problems with accessing links or any major accessing points of the application. In the mediguy application I tried to simplify as much things as I could, for example the dashboard has 3 features of the application linked with big images and texts which the user would not miss.

Error Prevention

This rule states that users should have easy access as to not prompt errors. In the application the user has an option to sign out with this the user and their session completely shuts off.

Aesthetic and minimalist design

This rule states that applications should not have any irrelevant content which could mislead the user when roaming the application. In the mediguy application from the signout up and login to the dashboard and all its features are straightforward, also with a bottom navbar that perfectly states each section of the application.

3.0 Conclusions

The main goal in the initial development of this project was to give people an outlet for all their medical needs, as shown using various features such as users' mental health journal. The project adopts a heavy use of apis to solve issues such as the news api and the covid tracker which are both accessed using a unique api key. With

the advantages come with disadvantages. The users only have one way of logging in which is creating an account with the application itself, a better solution would be to give users options to sign in with other networks such as google, facebook and outlook.

Another disadvantage would be that the Covid tracker is not necessarily live. It is updated every 24 hour which can be a hindrance in the overall experience of the application.

4.0 Further Development or Research

With additional time and resources, I would have tried to pursue developing this application with IOS instead of Android. This is because the userbase on IOS is more wide reaching than android especially in Europe. Another reason is because till this date I have not challenged myself to create an IOS application and it would have been a great introduction to IOS development.

5.0 References

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cleanpng.com. 2022. *Woman Cartoon - Unlimited Download*. *cleanpng.com*.. [online] Available at: <<https://www.cleanpng.com/png-stick-figure-woman-female-1693431/>> [Accessed 14 May 2022].

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cleanpng.com. 2022. *Green Check Mark - Unlimited Download*. *cleanpng.com*.. [online] Available at: <<https://www.cleanpng.com/png-tick-check-mark-clip-art-green-tick-png-hd-106170/>> [Accessed 9 May 2022].

6.0 Appendices

6.1. Project Proposal

1.0 Objectives

The aim of this application is to give people a modern way of approaching their health. This application gives users an opportunity to use an interactive environment that helps them manage medical related issues.

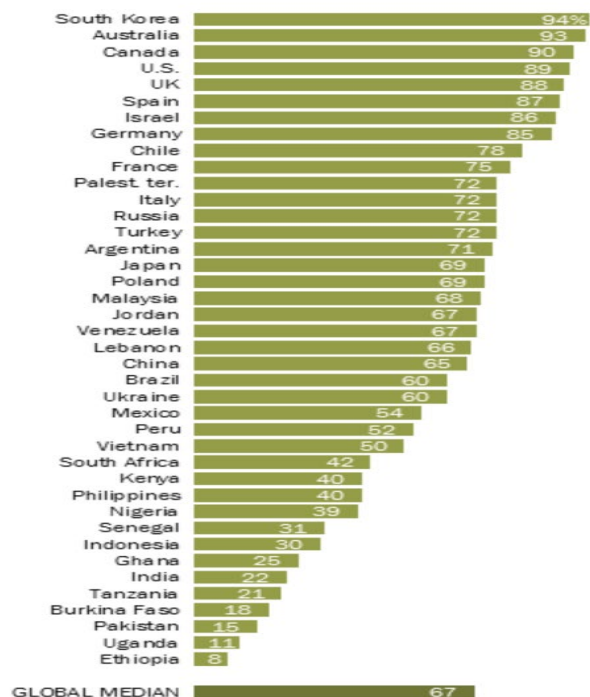
This project will see the development of different features within a larger application. One of these features will allow users to list any symptoms they may and from them symptoms an output that will briefly explain what they may have. Because of COVID there has been a lot of discussion of vaccinations. This application will make it easier to track vaccines that users have taken. This application will also have a built in COVID Tracker that will track daily, weekly and monthly COVID numbers and alert users of any increase in numbers in regions closer to their proximity.

2.0 Background

As the number of people using mobiles in the world increases more people will be able to access mobile applications and software applications can provide a more durable way of accessing resources that can be more tedious to access otherwise. These applications can be downloaded by just having internet access and according to **Pew Research Centre** in the top 40 countries in the world 67% of people access the internet. A lot of the applications that consumers download is healthcare related.

Most adults in advanced economies use internet, developing countries less so

Adults who use the internet at least occasionally or report owning a smartphone



Aims

1. Accessibility

A big issue into with consumers in healthcare is accessibility. Some consumers may have disabilities where it can affect how they move. It may be difficult just to go to the local medial centre to ask when their next vaccination

is. With this project the immunisation section will briefly outline when their next vaccination is. All the consumers would need is a mobile phone and the correct OS(Android).

2. Credibility

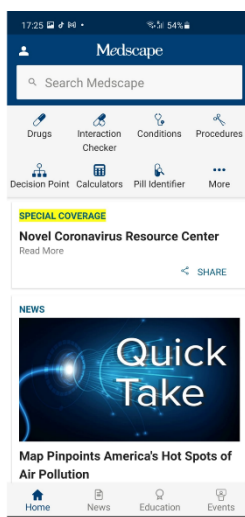
For the application two features will use an API. One API will be for the symptom checker which I will be using to check symptoms and output any conditions the user may have. Another API would be a live COVID tracker that would take directly from live and daily changes in covid cases throughout Ireland.

3. Effectiveness

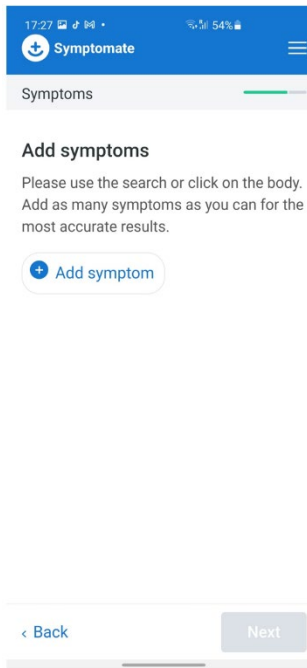
The effectiveness of the application is very important. Making sure the application can be used daily by anyone with and disability. Also making the application sophisticated enough that users can manoeuvre easily.

3.0 State of the Art

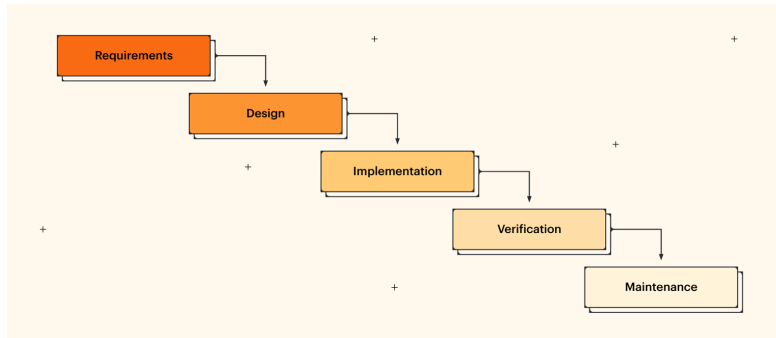
The application I will creating has different features. These main features consist of a symptom checker, vaccine tracker, COVID tracker and a medical news section. Currently on the market there are multiple application that do these things individually. Medscape is a mobile application only available on Google Play Store on Android OS. Medscape. The purpose of Medscape application is for users to gather live information that's happening throughout the medical industry. The big Difference between the app I will be creating, and Medscape is that Medscape is targeted towards medical professionals while the project that I will be creating is targeted towards everyday consumers.



Symptomae is an application on Android. The function of this application it for users to input any symptoms they may have and the output shows what sickness a user may have.



4.0 Technical Approach



Waterfall Methodology

In this project I will be following a Waterfall Model. Waterfall Model is a project management approach that would allow me to follow specific steps for this project. In the water fall approach I will be following 5 stages which I accounted for in my Gantt Chart.

Requirements

In this stage I will be going over all the requirements for the application. This stage happens in the first 2 weeks. In the stage I researched information such as what IDE I will be using the API's that I needed for this application and also the language that I will be writing the code in. This section is very important as it lays the groundwork for the whole year.

Design

This stage is where I will be designing each page on the application using the technologies and resources, I outlined in the requirements section.

Implementation

This stage is where most of the heavy work is being executed. At t this stage of the Waterfall I will not be going back and changing anything from previous stages. If I run into problems for example if the API's do not work, I will go back and change the API's.

Verification

This stage for the most part will happen near the end of the project lifecycle. If any issues arise from the application such as bugs they will be thoroughly looked at and fixed.

Launch

This Stage will be at the very end of the application. When everything is complete, I will launch the application onto Google Play Store.

5.0 Technical Details

IDE & Languages

For this project I will be using a mix of two IDE's. Because I am creating an android application using Java the first IDE that I will be using will be android studio. Android Studio is a fluid IDE that has features built in such as a direct link to GitHub where you can push and pull code in seconds. Android studio also has a built-in emulator which will help when I will be presenting the application on mid-terms. Visual Studio Code is the Second IDE I will be using to test API's that I will be using. Java will be the main language that I will be using on Android Studio.

API & Libraries

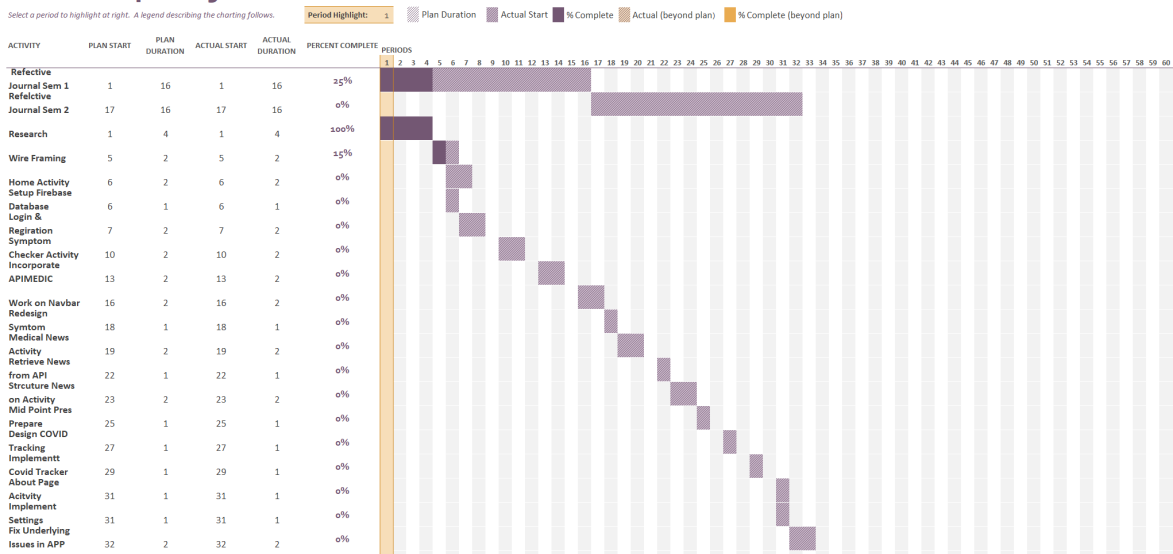
The 2 Main Features of this application will include an API. The First feature s a symptom checker from APIMedic. The user input symptoms they have, and the API will output what the condition the user may have. Second API that I will be using will be Coronavirus Smartable for the built is COVID Tracker on the application.

6.0 Special Resources Required

7.0 Project Plan

MediHelp Project Plan

Select a period to highlight at right. A legend describing the charting follows.



8.0 Testing

Scripted Box Testing

In order to test the application, I will be using the Scripted Box method. In this method will be giving the tester a script that has a step-by-step instruction based on the application version. This method allows me to pin-point certain features on the application that may need to be worked on more.

Exploratory

Exploratory Testing is another Testing method that I will be using. This is where testers have full autonomy on how they use the application. This method does something that scripted does not do. It gives users free-range to do whatever they want on the application using their own instincts. This helps with finding smaller errors and bugs.

References

Pew Research Center's Global Attitudes Project. 2021. *Internet access grows worldwide but remains higher in advanced economies*. [online] Available at: <<https://www.pewresearch.org/global/2016/02/22/internet-access-growing-worldwide-but-remains-higher-in-advanced-economies/>> [Accessed 7 November 2021].

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8.1. Ethics Approval Application (only if required)

National College of Ireland

DECLARATION OF ETHICS CONSIDERATION

School of Computing

Student Name: Christopher Angbalu.....

Student ID: X17366481.....

Programme BSc Computing..... **Year:** 4.....

Module: Software Project.....

Project Title: MediHelp.....

Please circle (or highlight) as appropriate

This project involves human participants	Yes / No
--	-----------------

Introduction

Secondary data refers to data that is collected by someone other than the current researcher. Common sources of secondary data for social science include censuses, information collected by government departments, organizational records and data originally collected for other research purposes. Primary data, by contrast, is collected by the investigator conducting the research.

A project that does not involve human participants requires ONLY completion of Declaration of Ethics Consideration Form and submission of the form on module's Moodle page

A project that involves human participants requires ethical clearance and an Ethics Application Form must be submitted through the module's Moodle page. Please refer to and ensure compliance with the ethical principles stated in NCI Ethics Form available on the Moodle page.

The following decision table will assist you in deciding if you have to complete the Declaration of Ethics Consideration Form or/and the Ethics Application Form.

Public Data	Y	Y	Y	Y	N	N	N	N
Private Data	Y	Y	N	N	Y	Y	N	N
Human Participants	Y	N	Y	N	Y	N	Y	N
Declaration of Ethics Consideration Form	x	X	x	X	X	X	x	
Ethics Application Form	X		X		X		X	

Please circle (or highlight) as appropriate

The project makes use of secondary dataset(s) created by the researcher	Yes / No
The project makes use of public secondary dataset(s)	Yes / No
The project makes use of non-public secondary dataset(s)	Yes / No
Approval letter from non-public secondary dataset(s) owner received	Yes / No

Sources of Data:

It is students' responsibility to ensure that they have the correct permissions/authorizations to use any data in a study. Projects that make use of data that does not have authorization to be used, will not be graded for that portion of the study that makes use of such data.

Public Data

A project that makes use of public secondary dataset(s) **does not need ethics permission**, but **needs a letter/email from the copyright holder** regarding potential use.

Some websites and data sources allow their data sets to be used under certain conditions. In these cases, a letter/email from the copyright holder is NOT necessary, but the researcher should cite the source of this permission and indicate under what conditions the data are allowed to be used. See Appendix I for examples of permissions granted by Fingal Open Data, and Eurostat website.

Where websites or data sources indicate that they do not grant permission for data to be used, you will still need a letter/email from the copyright holder. For example, see Appendix II for an example from the Journal of Statistics Education.

Private Data

A project that makes use of non-public (private) secondary dataset(s) must receive data usage permission from School of Computing.

An approval letter/email from the owner (e.g. institution, company, etc.) **of the non-public secondary dataset must be attached to the Declaration of Ethics Consideration.** The letter/email must confirm that the dataset is anonymised and permission for data processing, analysis and public dissemination is granted.

Evidence for use of secondary dataset(s)

Include dataset(s) owner letter/email or cite the source for usage permission

Covid Tracker - <https://rapidapi.com/SmarttableAI/api/coronavirus-smartable/>

News API - <https://newsapi.org/>

CHECKLIST

Non-public/private secondary dataset(s) -Owner letter/email is attached to this form	Yes / No
OR	
Citation and link to the web site where permission is granted – provided in this form	Yes / No

ETHICS CLEARANCE GUIDELINES WHEN HUMAN PARTICIPANTS ARE INVOLVED

The Ethics Application Form must be submitted on Moodle for approval prior to conducting the work.

Considerations in data collection

- Participants will not be identified, directly or through identifiers linked to the subjects in any reports produced by the study
- Responses will not place the participants at risk of professional liability or be damaging to the participants' financial standing, employability or reputation
- No confidential data will be used for personal advantage or that of a third party

Informed consent

- Consent to participate in the study has been given freely by the participants
- participants have the capacity to understand the project goals.
- Participants have been given information sheets that are understandable
- Likely benefits of the project itself have been explained to potential participants
- Risks and benefits of the project have been explained to potential participants
- Participants have been assured they will not suffer physical stress or discomfort or psychological or mental stress
- The participant has been assured s/he may withdraw at any time from the study without loss of benefit or penalty
- Special care has been taken where participants are unable to consent for themselves (e.g children under the age of 18, elders with age 85+, people with intellectual or learning disability, individuals or groups receiving help through the voluntary sector, those in a subordinate position to the researcher, groups who do not understand the consent and research process)
- Participants have been informed of potential conflict of interest issues
- The onus is on the researcher to inform participants if deception methods have to be used in a line of research

I have read, understood, and will adhere to the ethical principles described above in the conduct of the project work.

Signature: Christopher Angbalu.....
.....

Date: 3/04/2022.....
.....

Appendix I

1) Fingal Open Data: <http://data.fingal.ie/About>

Licence

Citizens are free to access and use this data as they wish, free of charge, in accordance with the Creative Commons Attribution 4.0 International License (CC-BY).

Note: From November 2010 to July 2015, data on Fingal Open Data was published in accordance with the PSI general licence.

Use of any published data is subject to Data Protection legislation.

Licence Statement

Under the CC-BY Licence, users must acknowledge the source of the Information in their product or application by including or linking to this attribution statement: "Contains Fingal County Council Data licensed under a Creative Commons Attribution 4.0 International (CC BY 4.0) licence".

Multiple Attributions

If using data from several Information Providers and listing multiple attributions is not practical in a product or application, users may include a URI or hyperlink to a resource that contains the required attribution statements.

2) Eurostat: <https://ec.europa.eu/eurostat/about/policies/copyright>

COPYRIGHT NOTICE AND FREE RE-USE OF DATA

Eurostat has a policy of encouraging free re-use of its data, both for non-commercial and commercial purposes. All statistical data, metadata, content of web pages or other dissemination tools, official publications and other documents published on its website, with the exceptions listed below, can be reused without any payment or written licence provided that:

- the source is indicated as Eurostat
- when re-use involves modifications to the data or text, this must be stated clearly to the end user of the information

Appendix II

Journal of Statistics Education: http://jse.amstat.org/jse_users.htm

JSE Copyright and Usage Policy

Unlike other American Statistical Association journals, the Journal of Statistics Education (JSE) does not require authors to transfer copyright for the published material to JSE. Authors maintain copyright of published material. Because copyright is not transferred from the author, permission to use materials published by JSE remains with the author. Therefore, to use published material from a JSE article the requesting person must get approval from the author.

8.2. Reflective Journals

October Journal

Supervision & Reflection Template

Student Name	Christopher Angbalu
Student Number	X17366481
Course	Bsc Computing (Software Development)

Month: October

What?

In the month of October my energy was put towards researching the project that I will be working on. The Technology that I was researching was mainly API's that have something to do with the medical industry. Two API's consisted of different sicknesses and conditions. One other API is a COVID Tracker.

So What?

Currently thing is moving accordingly since it is the first months. I've got most of the technology that I will be using but im currently waiting for feedback from my supervisor on the project idea. The

challenges that I could come across would be changes to my initial idea which then I would need to remove some technologies.

Now What?

If my supervisor does change my project a little, I can be proactive and try to add new features and technology and become more innovative

Student Signature

Christopher Angbalu

November Journal

Supervision & Reflection Template

Student Name	Christopher Angbalu
Student Number	X17366481
Course	BSc Computing

Month: November

What?

Reflect on what has happened in your project this month?

December Journal is below November Journal

November was a slower month I used the month to change up my project idea and add some more features that would be helpful. Some technologies such as the symptom checker api have been difficult to research due to limited resources online.

So What?

Consider what that meant for your project progress. What were your successes? What challenges still remain?

My Successes in the month of November included. Laying out what my project will look like in the end. I decided on all the features that will be used. Now im in the process of outlining each task that will be completed by the end of the year.

Now What?

What can you do to address outstanding challenges?

Figuring out what features I will drop and which features I will keep while doing this I add other features that will be helpful

Student Signature

Christopher Angbalu

December Journal

Supervision & Reflection Template

Student Name	Christopher Angbalu
Student Number	X17366481
Course	BSc Computing

Month: December

What?

Reflect on what has happened in your project this month?

This month was eventful when it comes to the progress of my project. I started & finished the login®istration and the bottom nav bar. Also the Personal Journal is fully completed.

So What?

Consider what that meant for your project progress. What were your successes? What challenges still remain?

The challenge I encountered since the last month was working with Android Studio. I had ran into a number of errors due to the android studios build. Many different features of android studio was no longer available due to them being deprecated

<p>Now What?</p> <p>What can you do to address outstanding challenges?</p> <p>Im currently waiting for the new year to start working on the News feature. This will be using an API that will output current news in the medical field.</p>	
<p>Student Signature</p>	<p>Christopher Angbalu</p>

January Journal

Supervision & Reflection Template

<p>Student Name</p>	<p>Christopher Angbalu</p>
<p>Student Number</p>	<p>X17366481</p>
<p>Course</p>	<p>Bsc Computing(Software Development)</p>

Month: January

<p>What?</p> <p>Reflect on what has happened in your project this month?</p> <p>This month I finished one of the key features of the mobile application. The Daily Diary entry this feature allows a user to post daily dairy entries by writing a description and uploading a picture. This diary and all the other users diary entries can be seen I a list view on the diary page. Other features I finished would be the initial layout of the application. Navbar, login, registration and symbols</p>
<p>So What?</p> <p>Consider what that meant for your project progress. What were your successes? What challenges still remain?</p>

The diary entry is using Firebase Fire store and Firebase Cloud storage together. With each upload the image also uploads. I ran into issues such as code that used to work no longer being used in the current android versions.

Now What?

What can you do to address outstanding challenges?

This month I will be working on two features of the application. The News API page which shows all the medical news that the user needs to know and the covid tracker feature. After these two I will be working on an emergency room map feature which shows all the emergency rooms close to the user.

Student Signature

Christopher Angbalu

February Journal

Supervision & Reflection Template

Student Name	Christopher Angbalu
Student Number	X17366481
Course	BSc Computing(Software Development)

Month: February

What?

Reflect on what has happened in your project this month?

This month I spent less time on my project due to being busy working on my other modules. I did finish off the end of my News API which I needed to redo due to some issues I was having.

So What?

Consider what that meant for your project progress. What were your successes? What challenges still remain?

My project is moving as intended at the moment I still have two more features to do which is my Covid Tracker feature and another feature which will be a BMI calculator. I changed features last minute I will no longer be working with Google Maps and instead I will be working on a BMI calculator.

Now What?

What can you do to address outstanding challenges?

For the month of march, I will be working on The Covid tracker API and BMI calculator features. By the end of the month, I hope to have these features completed. Once these features are done I will be doing a design overhaul of my application. The design overhaul will be a makeover of the look of the application. It will be more presentable

Student Signature

Christopher Angbalu

March Journal

Supervision & Reflection Template

Student Name	Christopher Angbalu
Student Number	X17366481
Course	Bsc Computing(Software Development)

Month: March

What?

Reflect on what has happened in your project this month?

I used the month of march to re design my project. March, I added the Covid Section of my application and that was mostly what I did in March but I started the redesign near the end of march

So What?

Consider what that meant for your project progress. What were your successes? What challenges still remain?

Redesigning the layout of my project is extremely important for the Month of April now that I have completed the main features of the application, which is the Journal, News API and Covid Tracker.

Now What?

What can you do to address outstanding challenges?

The challenges I faced this month was to hit the deadline I set for myself to complete all the features of that application

Student Signature

Christopher Angbalu

8.3. Invention Disclosure Form (Remove if not completed)

Please fill in the following sections, if you think your idea is innovative:

1. Title of Invention

MediGuy

2. Inventors

Name	School/Research Institute	Affiliation with Institute (i.e. department, student, staff, visitor)	Address, contact phone no., e-mail	% Contribution to the Invention
Christopher Angbalu	National College of Ireland	Computing		100%

3. Contribution to the Invention

Each contributor/potential inventor should write a paragraph relating to his/her contribution and include a signature and date at the end of the paragraph.

Fully created each feature which includes Symptom checker, News section, Personal Journal, Covid Tracker

4. Description of Invention

(Please highlight the novelty/patentable aspect. Attach extra sheets if necessary including diagrams where appropriate). What is novel, the 'inventive step'? For more information on patents, please look at <http://www.patentsoffice.ie/en/patents.aspx>

5. Why is this invention more advantageous than present technology?

What is its novel or unusual features? What problems does it solve? What are the problems associated with these technologies, products or processes? Explain how this invention overcomes these problems (*i.e.* what are its advantages).

People need to visit the hospital if they feel like they have health problems. This gives users a different option before going to the hospital. They can check their symptoms to see what condition they may have. The application also gives users

chance to be more proactive with their health by following news in the medical world and tracking covid numbers.

6. What is the current stage of development / testing of the invention?

Currently working on the Personal Journal

7. List the names of companies which you think would be interested in using, developing or marketing this invention

8. Funding Partner(s)

Government Agency & Department	
% Support	
Contract/Grant No.	
Contact Name	
Phone No.	
Address	

Industry or other Sponsor	
% Support	
Contract/Grant No.	
Contact Name	
Phone No.	
Address	

9. Where was the research carried out?

Researched the number of users that use medical based applications. This includes fitness. It is a very large market with more growth in the future.

10. What is the potential commercial application of this invention?

--

11. Was there transfer of any materials/information to or from other institutions regarding this invention?

If so please give details and provide signed agreements where relevant.

N/A

12. Have any third parties any rights to this invention?

If yes, give names and addresses and a brief explanation of involvement.

no

13. Are there any existing or planned disclosures regarding this invention?

Please give details.

No

14. Has any patent application been made? Yes/No

If yes, give date: _____ Application No.: _____

Name of patent agent:

Please supply copy of specification.

15. Is a model or prototype available? Has the invention been demonstrated practically?

Not available currently

I/we acknowledge that I/we have read, understood and agree with this form and the Institute's *Intellectual Property and Procedures* and that all the information provided in this disclosure is complete and correct.

I/we shall take all reasonable precautions to protect the integrity and confidentiality of the IP in question.

Inventor: Christopher Angbalu

Chris Angbalu

Signature Date

Signature

8.4. Other materials used

Any other reference material used in the project for example evaluation surveys etc.