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Project Proposal

The Healthy Vegan

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# Annotations

|  |  |
| --- | --- |
| App | Application |
| Sclera | White part of eyes |
| User | End-user who is using the app |
| Intent | A user page in an Android app |
| Firebase | Online services such as databases and authenticators provided by Google. |

# Objectives

## General

The objective of this project is to create a vegan health app that is different and more useful than other vegan health apps out there. Anyone, whether vegan or not will be able to use it. The Project will be developed into an Android application. Its main, innovative feature is checking the user’s health by the whiteness of their eyes.

## Checking health

A user will be able to get their health checked by allowing the app to scan their eyes. The whiteness to yellowness of their sclera will determine their health. This will be done via the device’s camera or by the device’s images. If their sclera is more yellow, the more ill they may be. At no point is this app a replacement for any medical professionals or services. It will only be a guide. This will be communicated to the user before they use the app.

## Features

Apart from checking the user’s sclera, the user will be able to record what they are eating and whether it’s vegan, vegetarian and/or allergen friendly. This will be done via database. The user can either manually enter a product or scan the barcode of said product. This would be useful for when the user is grocery shopping: they can use the app to scan a product and get information on whether the item is OK for them to eat.

The user will also be able to record exercise and to set daily nutrition values, like other fitness and health apps.

## Database

The database will be implemented via Google Firebase Realtime Database. This is a No-SQL database that is generally used for Android apps.

The main tables in the database will be Users, Products and Ingredients. Users table will contain the user’s information, their daily diet intake, their goals and their health check. Products will contain product information such as ingredients. Nutritional and storage information will also be included. Ingredients will contain the origin of the ingredient and whether it’s suitable for vegans, vegetarians or allergen dietary needs.

## Artificial Intelligence

Artificial intelligence will be used to personalise and implement individualism into the app. (Tatú, 2019) This app with “learn” or monitor what aspects of the app a user is utilising. The app will promote these sections more, with notifications and the like. This will also assist in optimisation of the app, where only required intents will be loaded and will minimise the user’s Internet usage from within the app.

# Background

The idea for this Project began in late August 2020 where it was decided that an Android app was to be created. As a *de facto*, there are many fitness and health apps available. A health app was proposed for this project, but it was felt that this idea has been exhausted with little success for less popular apps.

The author decided to become vegan in mid-September after they saw that male chicks are destroyed shortly after birth. This is known as “chick culling”. (Wray, 2020) This was a last straw from them, and they decided to become vegan. While personally eliciting information for switching to a vegan diet, there was not that was provided is just recipes and very general information. The author felt at a loss on how to correctly transition to veganism.  
  
Being vegan, one asks themselves: “Can I eat this?” After trying a few vegan Android apps (described more in Research below), there was no solid information from these apps on whether a product is suitable for vegan. The main answer that was received was “Not sure”. But that was an impasse, as there was no connection to where information could be retrieved to get information on whether the food is Ok for the vegan diet. This project is to redesign vegan, health and fitness apps that are currently available and go above and beyond with improvements. This is how the idea of a vegan health app was discovered.   
  
The idea behind identifying the sclera was founded due to a family member of the author having issues with their gut. This caused the person’s sclera to become a tint of yellow and their skin to become sallow. The author thought that a health app with scanning the sclera would be a beneficial idea.

# Technical Approach

<Technical approach diagram>

These are the main aspects of the app:

## Profile

The user will be able to create an account on the app if they wish. If not, the name “Guest” with a generated number afterwards will be their username. This is so the user can use the app across any device they use. When the user is creating their account, they can set up their dietary needs, restrictions, and their health goals.

Profiles will be stored in Firebase Realtime Database and will be authenticated using Firebase Authentication.

## Food product querying

One section of the app will be where the user can check a food product on whether it is suitable for their diet. The user can do a search for the product brand and name of scan the barcode using their device’s camera. The information retrieved will show the ingredients of the product and its nutritional information. Ingredients not suitable for the user’s diet will be highlighted. The user can tap on that ingredient to get more information on that ingredient, such as its origins.

## Health and fitness

Another part of the app will consider the user’s health and fitness. This will deal with the user’s daily exercise, calorie intake, weight goals. The user’s location will determine their nearest gym, so that the option of attending a gym is provided, to where they can obtain professional services if needed.

Food products and the user’s health and fitness will be stored in a NoSQL database online using Firebase Realtime Database.

Checking sclera  
The checking on the user’s sclera will be completely optional. If the user wishes to use this, they can either upload a photo of their eyes or take a new photo with the device’s camera. The photo will be analysed for different shades of white and yellow around the user’s iris. The more yellow the sclera is, the potential of the user being ill is greater. To reiterate; the user will be informed that this app is not a replacement for medical advice.

Checking the user’s sclera will be implemented using a custom API service.

## Version control and methodologies

Version control will be handed using a GitHub repository and will be synced using Git Bash. The version control will be located online at <https://github.com/JoeyTatu/Software_Project_2020_21>.  
  
A mix of Kanban and Scrum will be used for the methodologies.

# Special Resources Required

This Project will be completed in Android Studio using Kotlin coding. Implementation of external code required will be implemented in Android Studio. An example of this is using Picasso for simplifying the process of inserting images into intents and sections of the app.

# Research

## Vegan apps

Apps available on the Google Play Store include vegan/vegetarian apps that search for restaurants that serve these types of meals (HappyCow, 2020) or apps that scan food items. With the app that scans food items, many of the results were “not sure”. That is: is it vegan or vegetarian could not be determined. No information was provided as to why a “not sure” result was shown, nor was there any sources whether provided by an online link or information in the app to identify whether the product is suitable. The reviews left on the Play Store say the app is often wrong and is unreliable. (Burggraf, 2020)

## Fitness and health apps

The app “Home Workout - No Equipment” on the Google Play Store has relatively positive reviews. The app allows a user to set a weight goal and to set up daily and weekly workout plans. The app demonstrates exactly what to do with animations and videos. (Leap Fitness Group, 2020)

## Scholarly

A Nigerian study analysing persuasive technology in fitness apps considered a user’s responsiveness to setting and completing goals, receiving a reward and competition between other users, for example. The report also looked a how men and women compared and if their results would be different over a six-month period. (Oyibo, et al., 2019)

An interesting result of this study shows that people are more prone to setting and completing their goals if there is some sort of an incentive afterwards. People are less likely to do this based on social interactions. (Oyibo, et al., 2019) This is useful information and will be implemented into the Healthy Vegan app.

A journal by the American Journal of Medicine looks at observing a patient’s health and well-being in between their visits with their doctor via a smart device and discusses the in-built features and how these can record the patient’s health via an app. The journal suggests that the app’s data can be extracted and used to analyse the patient’s health. It concludes that apps that involve “evidence-based behaviour change techniques” have a better chance of working. These apps may also assist people who have restricted contact with healthcare. (Higgins, 2016)

# Project Plan

<Gantt chart>

# Technical Details

The Project will be developed in Android, using the coding language Kotlin. The database and user authentication will be handled by Firebase. Firebase Realtime Database is a NoSQL database. Some of the libraries to be implemented will be Google Play Services for adverts and location services, Picasso to assist in inserting images more easily and Circle Image View to create rounded corners on buttons, images and the like.

# Evaluation

A Testing Report will be generated after a section is completed to identify and correct errors.

Some examples of Unit Testing, Integration Testing and Performance Testing include:

## Unit Testing

Assumption: The user has not opened the app before.  
  
Scenario 1: Create Profile / Set up workout plan

* Can the user successfully connect to the database?
* Does the user have internet access?
  + If the user has not got internet access, the test fails.
* Is the data securely sent and retrieved from the database?
  + An example profile will be created
  + Before sending to the database, a project will copy and try to read the data.
  + If data can be read, the test fails.
  + For a successful test, the data should not be viewable by any other program or person, except the database where it’s being inserted or retrieved from.
* Can the user successfully add their profile to the database?
  + The test profile mentioned above will be retrieved and displayed in an intent on the app for testing purposes.
  + A call to the database requesting the profile information will be called
  + If the correct profile information is displayed, the test passes.

## Integration testing

Assumption: The profile has previously been created.

### Scenario 1: User accessing their workout plan

* Integration between the user’s profile and workout plan.
  + The user sets what workouts they wish to do
  + The test user created an example workout plan
  + The workout plan is sent to the database.
  + The workout plan is retrieved from the database and put into the test intent
  + If the correct workout plan is displayed with the user profile ID, the test passes.

## Performance Testing

Performance testing will be completed using Junit.

The following will be tested:

### Response time:

* The response time must be less than 4 secs with 500 users accessing the database at the same time.
* Check the response time of the app/database when a user’s Internet connection is slow or limited.
* Check response time when the load condition is low, medium and heavy.

### Users and database

* Check what the maximum number of users accessing the app and database before it becomes unresponsive.
* With 500 records being sent and received to the database at one time, check the execution time. The limit would be 10 seconds.

(Tatú, 2019)

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