KTFit

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Introduction

Our fitness application is called *KTFit*, it aims to encourage people of all ages to start getting into fitness. We want to motivate customers to compete with friends to reach goals, track progress, and keep hydrated. The application should be able to keep track and display the user's number of steps per day, number of minutes they have been active, cardiovascular workout logs, and have the ability to add friends to see their workouts. Our application will track activities including walking, running and cycling. The metrics tracked for workouts will be distance covered, duration, and speed of the workout session.

Users will have the ability to track water and caffeine intake while providing daily reminders if they have not input their totals. A workout planner is available to plan workouts and view upcoming events that they have saved. We will assume that a user's phone is in their pocket to count their steps correctly. We assume that the water and caffeine count provided by the user is correct. A technical requirement of our application is that it will work on Android 10 and older.

Related Apps

A few applications which consist of similar features as that of our application are: *Strava* which lets you connect with your friends and lets you share and compare workouts. *MyFitnessPal* and *FitBit* let you log water as well as caffeine intake and help you keep record if you have had enough water. *JEFIT* and '*My Workout Plan - Daily Workout Planner*' lets you create a personalized workout planner. *Google Fit* helps you keep track steps taken and also logs active minutes. *Nike+* lets you share your running distance and time with friends for a community competition.

Market Need and Target Audience

The target audience for our application is beginners or people who do not work out often, but want to start. We hope our application will help people overcome problems with their health in terms of fitness and hydration, as well as improving motivation and time management. We hope that daily reminders about water consumption and goals will keep users motivated and encourage them to stay on track.

Motivation

KTFit focuses on the customers who are currently working or studying and have a fixed schedule. It tries to inspire people to get some time out of their busy schedule towards fitness. It helps them to connect with friends which can encourage them for workouts lasting for a short span. It also keeps a track of the user's water and caffeine intake with the help of reminders.

Features Implemented and Other Details

The first time you launch the application you are asked to create an account if you do not have an account already. For a new user, a Create Account option helps the user to register and the user is created in the database. On the Registration page the user is asked to input his First Name, Last Name, Data of Birth, Height (in inches), Weight (in lbs.) and the application saves these details in the database. We are using Firebase authentication and the Firebase real time database for our application. Once the account is created your data is saved and you can Sign In later using the same username and password. Once you sign in, you are moved to the main page where you can start a workout session (Start Workout), track the water and caffeine intake (Water/Caffeine Tracker) and add the plan of your workout(Workout Planner). The workouts performed are saved in the Workout History section of this application. For motivation of the users, we have a Milestones section where the application automatically tracks when users have completed new milestones for performing workout sessions. The Friends tab lets you add your friends and see suggested users.

- Start Workout

We are tracking the duration of the workout here, and taking the distance covered from the user as the metrics. We then calculate the speed of the workout and save these values to the database. Users can select the type of workout such as Walk, Run, Cycle, or Other and then the user can start the workout using the Start button. Users can also Pause the session for breaks and Reset once he/she has completed the session. Users can log the distance covered in miles and this data is saved in the history. Based on the distance covered and the time taken, the application calculates speed and it is displayed in the history as well. Once the Workout is started a notification is shown on the phone indicating a session is in progress.

The formula for speed: distance/time in seconds

- Water/Caffeine Tracker

In the tracker activity of the application the user is prompted to set the limit if it's not already set. Once the limit is set, the user can record the intake of water or caffeine in respective sections. A notification is set for the user to update the tracker daily at an hourly interval, for the demo purpose we have configured it for 30 seconds. Once the limit is achieved the user is given a message about goal completion. We have saved these values to the database so even if the user moves around the application and or moves out of it the values stay intact. For sending out reminders we are using the AlarmManager, Broadcast Receiver and the Notification Manager.

- Workout Planner

In the planner activity users can select the date for future workout sessions and the sessions are listed in the Upcoming Events section of the Planner. The user can also invite friends, set the time of the workout, and select different options for when to repeat this event. There is a Reminder set for the sessions created which sends out a reminder daily for the sessions.

- Milestones

This activity sets a few milestones for new users to keep them motivated. It records the first time a walk, run and cycle is completed. We save the workouts in the database and take the workout details to check these milestones. New milestones are shown in the Upcoming section and Completed shows the ones completed as the name suggests.

- Workout History

On this screen, a table is shown each time a session is completed based on saved workouts from the database. We are using a TableLayout contained within a ScrollView to display the details of each Workout. We can see the workout time, type of workout, duration of the session, distance covered and the relative speed. For every new workout, a new row is added to the table display.

- Friends

A list of all the users is displayed under suggested friends. A user can add new friends from this list. Long click on the friend's name lets you add another user to be added as a friend. Once added, that friend is moved to the friends list and removed from the suggested friends list.

- Step Counting

We are using the STEP_COUNTER sensor for counting the steps of the user. The step count is displayed on the home screen of the application. The values are saved to the database each time the application is saved to ensure the steps stay accurate.

- Active Minutes

We are tracking the active minutes using the DetectedActivity class from google API. It is counting if an activity is detected and stops if the device is still. This is displayed on the home screen and saved to the database too.

External libraries and Data Storage mechanisms

We are using Firebase authentication and the Firebase real time database for saving the users and user related data. The database was used to store and display information in every tab. Using firebase authentication was helpful to validate account information and verify that a certain email was not already associated with an account. The database allowed us to save, retrieve, and update information for a better user experience.

We used GoogleAPI for activity detection by adding play-services-location as a dependency in our build.gradle. The below pictures show the Firebase data setup we used during this project. As you can see, the structure of the database is related to each user's id which is generated automatically by Firebase authentication (third image) upon account creation. From there, each user has data for active minutes, caffeine intake/goals, account information, planner events, friends (connected to that friend's user id), milestones (boolean for complete/incomplete), step count per day, and a list of workouts with their metrics.

Responsibilities

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- Start workout session which allows the user to choose the workout and shows the elapsed time
- Step counting
- Tracking active minutes of the user
- Planner for adding future plans of workout and sending reminders
- Tracker the water and caffeine intake
- Reminders for inputting daily water/caffeine intake and also daily reminders for the planner based on upcoming session
- Project setup in GitLab

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- Firebase Realtime Database and Authentication
- Sign in of the user
- Account registration and creation for new user
- Friends activity that helps you add friends from the list of users stored in the database and shows suggested users
- Milestones helps you display the goals achieved and upcoming
- History Records display the past workouts
- All database related saving, retrieving, and updating (upcoming events for planner, water/caffeine tracking, step/active minutes, friends, workouts, milestones)

Future Work

In the future, we could use the metrics to calculate the calories burned by the user in each session. When the workout is in progress, the timer could be configured to run in the background and could be displayed in notifications. Ability to send invitations to friends for workout sessions and planning together using the planner instead of simply writing the name of the friend. Configuring an option to change account information and password after login for the users. Changes in the User Interface for better experience. Allowing users to modify the frequency of the reminders sent. Sending reminders for each upcoming plan recorded in the Workout Planner.

Lessons Learned

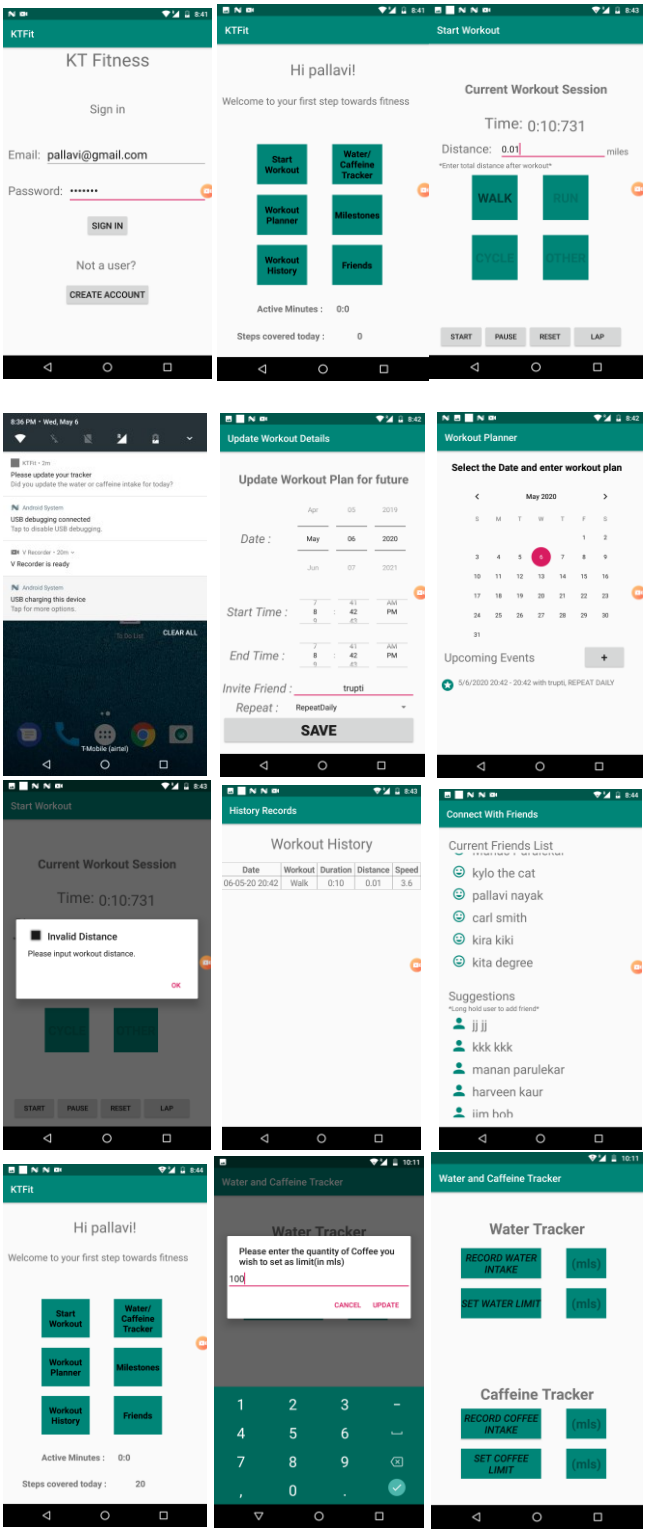
We did face issues tracking the active minutes of the user. We are using DetectedActivity to track the active minutes of the user. The detected activity parameters seem to update rapidly and were not able to detect movement accurately. We changed the delay and this helped us in differentiating between if the device is active or still.

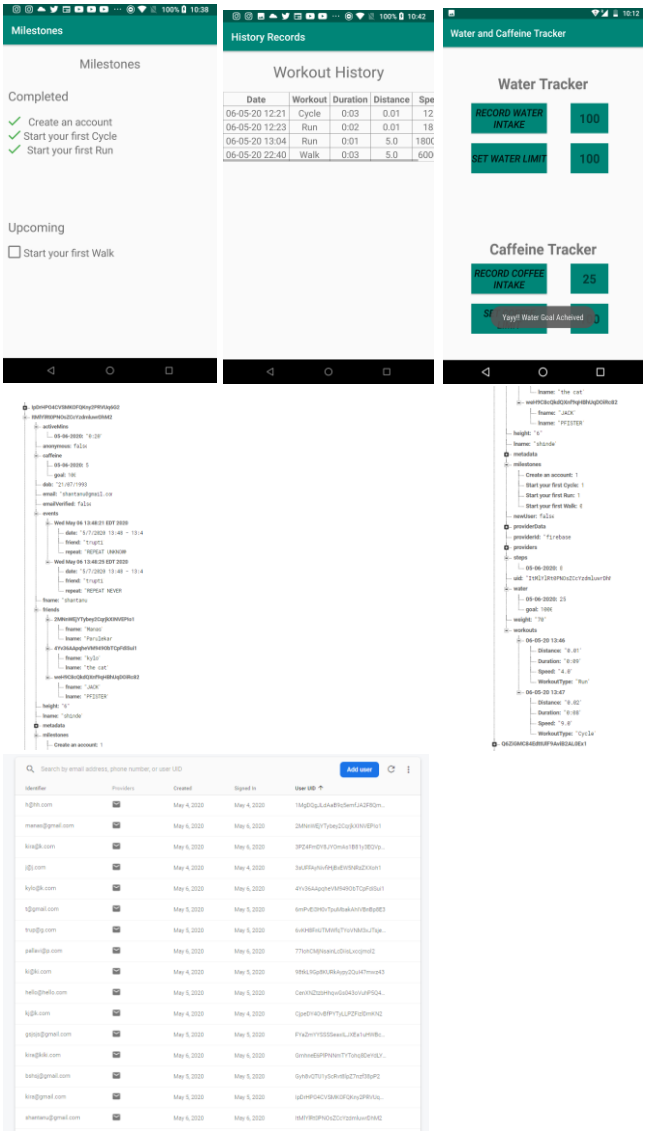
The initial sensor value of the Step Counter sensor in the device cannot be manually changed, they only update on the device reboot. So, we retrieved the actual value of the step count using that initial value and subtracting it from the current count. The database was a big challenge because neither of us had used Firebase database or authentication before so it took a long time to get that up and running.

Test Cases

- Login with random 5 users, trying the registration and sign in respectively. Exiting the app and checking if the data is still intact for that user.
- Verifying if the actual steps taken match with the number of steps detected by the sensor.
- Verify if the friends can be added and if an user can visit a friend's page.
- Logging a workout session and checking if it appears in the history and also verifying if the speed is calculated for each session. Verifying if a notification is sent when a workout is started.
- Verifying if the application sends a reminder to update the tracker for water and caffeine daily. (We have configured it for 30 seconds for demo purposes).
- Complete a milestone and verify if it moves to the Completed section from the Upcoming section.

Screenshots of the Application:





Demo Link for the Video:

https://drive.google.com/file/d/1LmcSBeZouAUHVpz4SvZWYKQ12X85FqdL/view?usp=sharing

REFERENCES

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