

# **TCS Internship | Mobility Department**

## **Step Counting Application**

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### **Team Members**

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### **Platform**

Android (Native)

### **Target Version**

Lollipop API 21 (Android 5.0)

### **Hardware used**

Nexus 5

LG G Watch

### **Purpose**

The purpose of the developed application was to track a users fitness, including their steps walked, calories burned and meters travelled and offer this information dynamically on a cross-device interface.

### **Sensors Implemented**

Accelerometer (STEP\_COUNTER)

### **Requirements**

In-built Step Counter sensor

API 21 (Android 5.0) or greater

### **Limitations**

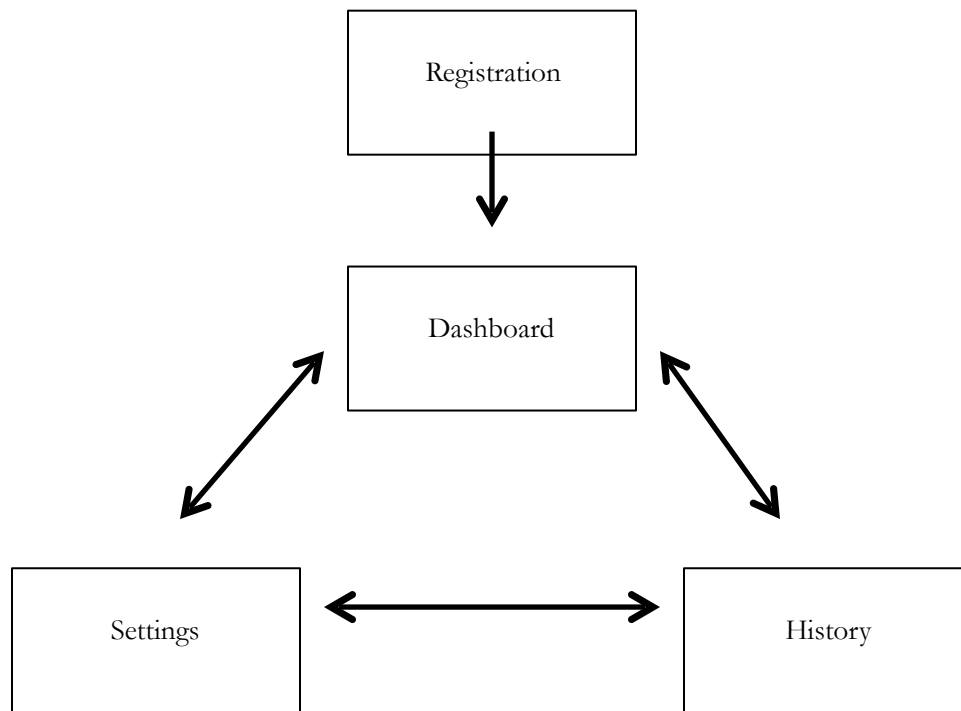
To support devices without a heart rate monitor, caloric and distance values are calculated based on scientifically tested averages and user-inputted data such as height, gender and lifestyle. As such, the accuracy was compromised but values represent a close approximate.

### **Pages**

The list of pages created in the application are as follows

- Initial Entry of Information (Registration)
- Dashboard
- Settings
- History

### **User Flow**



**Registration** – Upon installing and opening the application for the first time, the user will be prompted to enter information such as their name, height, weight, age, gender and lifestyle

**Dashboard** – After this initial registration, the user will see the dashboard first every time they open the application. They will be able to see all important and relevant information here.

**Settings** – Accessible through the dashboard and history, the settings page allows users to update personal information, including their daily step goal and the ability to toggle the step counting property of the application on or off. Users can also reset their account through this page.

**History** – Accessible through the dashboard and settings, the history page shows users two graphs; one giving the daily activity for the last week and another giving the hourly activity for the current day.

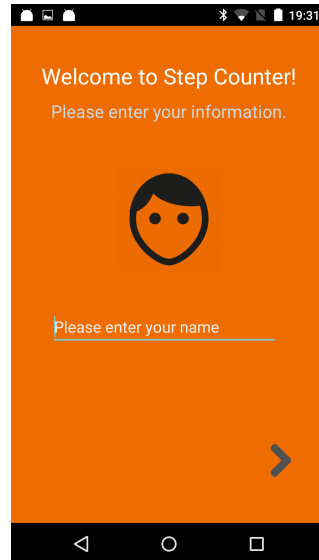
**Mobile Interface:**

## A. Registration

On opening the application for the first time, the user is required to enter their personal information which is stored in a shared preferences file. If text fields are left blank or incorrectly filled, the user will see an error message and not be allowed to continue until the information is correctly filled.

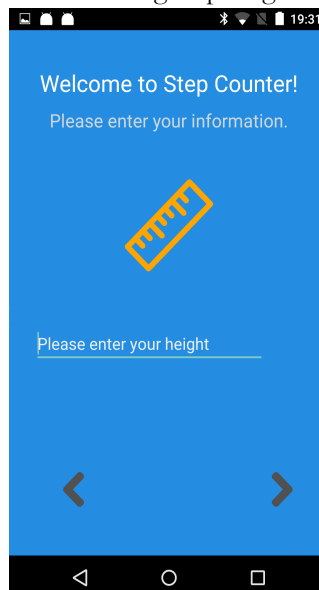
### Step 1: Name

The user is prompted to enter their name.



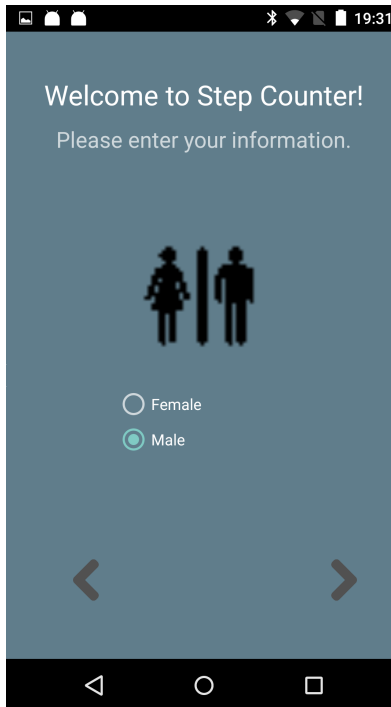
### Step 2: Height

The user is prompted to enter their height in centimeters. The input type is limited to numbers to prevent incorrect data being entered. This is used in calculating step length.



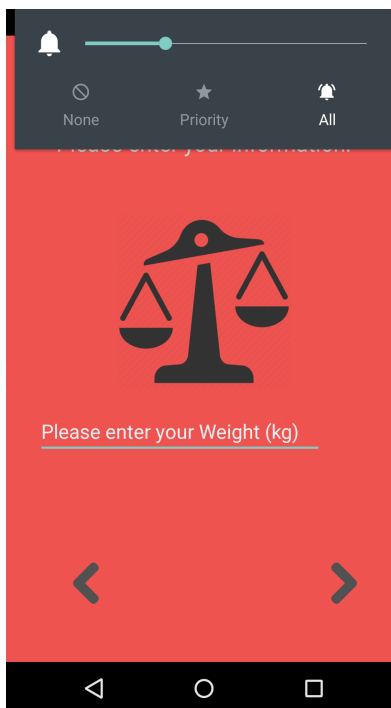
### Step 3: Gender

The user is prompted to select their gender. This is used in calculating step length.



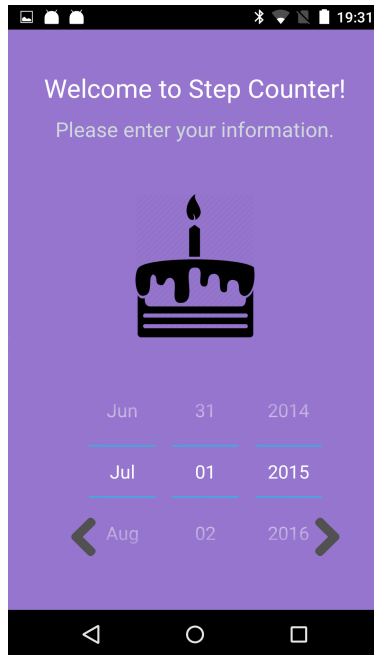
#### Step 4: Weight

The user is prompted to enter their weight in kilograms. The input type is limited to numbers to prevent incorrect data being entered. This is never used in later calculations.



#### Step 5: Date of Birth

The user is prompted to enter their date of birth using a date picker. This is unused in later calculations.

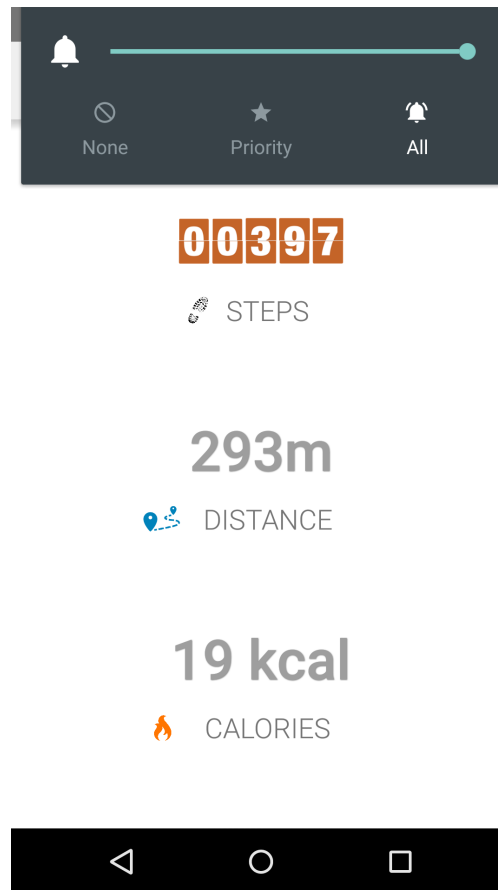


### Step 6: Lifestyle

The user is prompted to select the lifestyle option that most closely resembles theirs. This is used to calculate calories burned.



### B. Dashboard



The user is presented with dynamically updating values of steps walked, distance travelled, and calories burned.

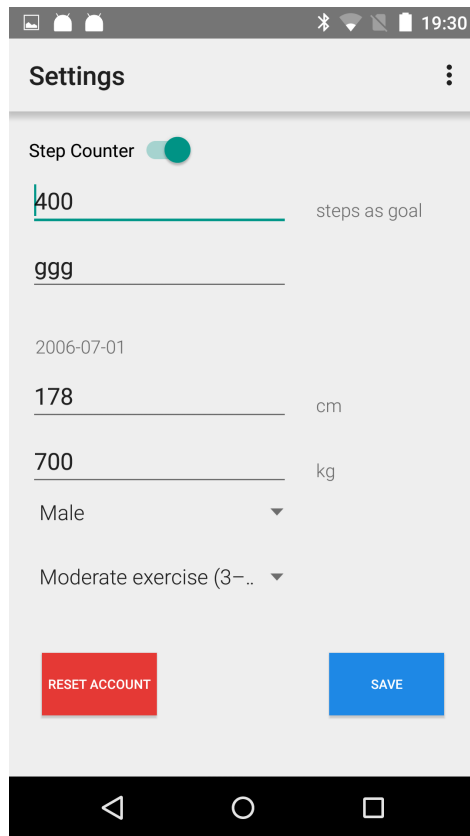
A service that increments each value accordingly upon detection of the step counting sensor is started upon boot or opening of the application, so the values are counted and incremented as long as the phone is not turned off.

Another service executes hourly and pushes entries to two tables in a database. Each entry contains the milliseconds elapsed until that time, which is the primary key, the number of steps, the number of calories and the number of meters walked. Hourly information for all three values is stored in one table containing a maximum of 24 entries. This table is cleared at the end of each day. Daily information for all three values is stored in another table containing a maximum of 8 entries. This table is updated so that it never contains more than 8 elements, by deleting the oldest entry and entering the newest entry at the end of a day. The hourly and daily values are stored in the shared preferences file so that in the event of the phone turning off in the middle of an hour, some data can be used to populate the database upon turning the phone back on. phone shutting down.

The service mentioned in the above paragraph alerts the user of any inactivity at 6PM daily. If the user has walked less than half of their daily goal, the user will be informed of this and the number of steps needed to meet their goal via a notification. If the user has walked more than half but less than 95% of their daily goal, they are sent a notification urging them to meet their daily goal.

In the service mentioned first, the user is sent a congratulatory notification upon meeting their daily goal.

### C. Settings

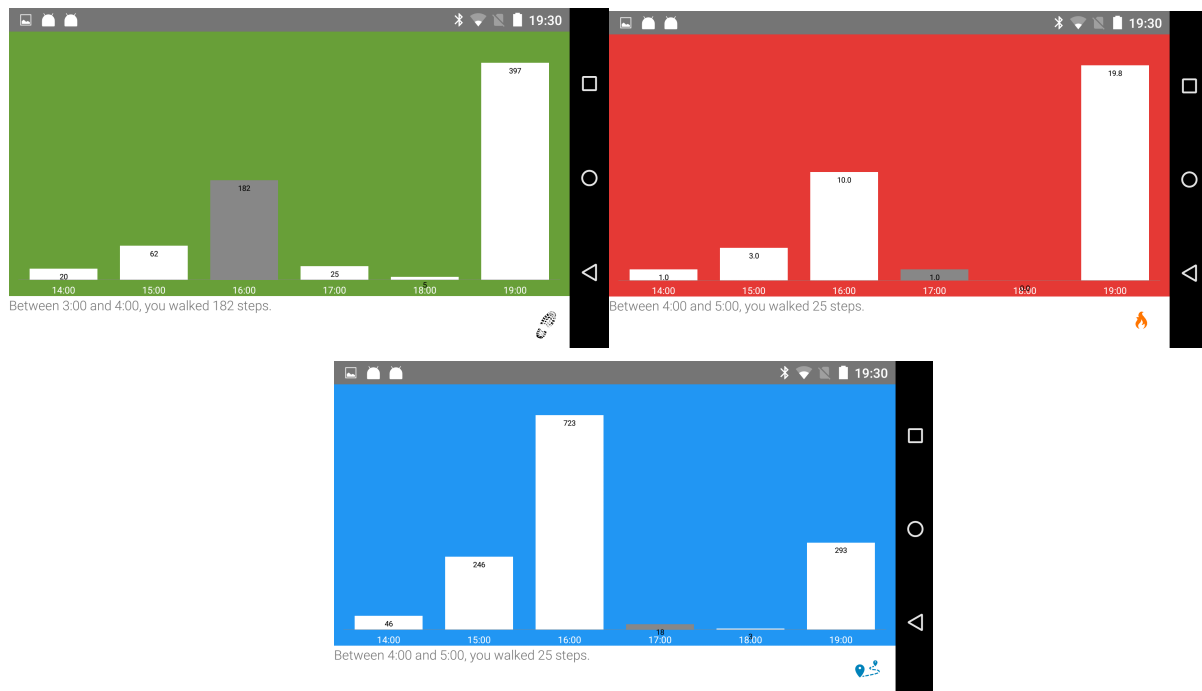


The screenshot displays the 'Settings' page of a mobile application. At the top, there's a status bar with icons for signal, Wi-Fi, and battery, along with the time 19:30. The 'Settings' title is at the top left, and a three-dot menu icon is at the top right. Below the title, there's a 'Step Counter' toggle switch, which is currently turned on. Underneath, there's a text input field for the daily goal, showing '400' with a blue underline, and the text 'steps as goal' to its right. Below that is another text input field showing '99g'. Further down is a date input field showing '2006-07-01'. Below the date is a height input field showing '178' with 'cm' to its right. Below the height is a weight input field showing '700' with 'kg' to its right. Below the weight is a dropdown menu for gender, currently set to 'Male'. Below the gender is another dropdown menu for exercise level, currently set to 'Moderate exercise (3-..)'. At the bottom of the settings list, there are two buttons: a red 'RESET ACCOUNT' button on the left and a blue 'SAVE' button on the right. The bottom of the screen shows the standard Android navigation bar with back, home, and recent apps icons.

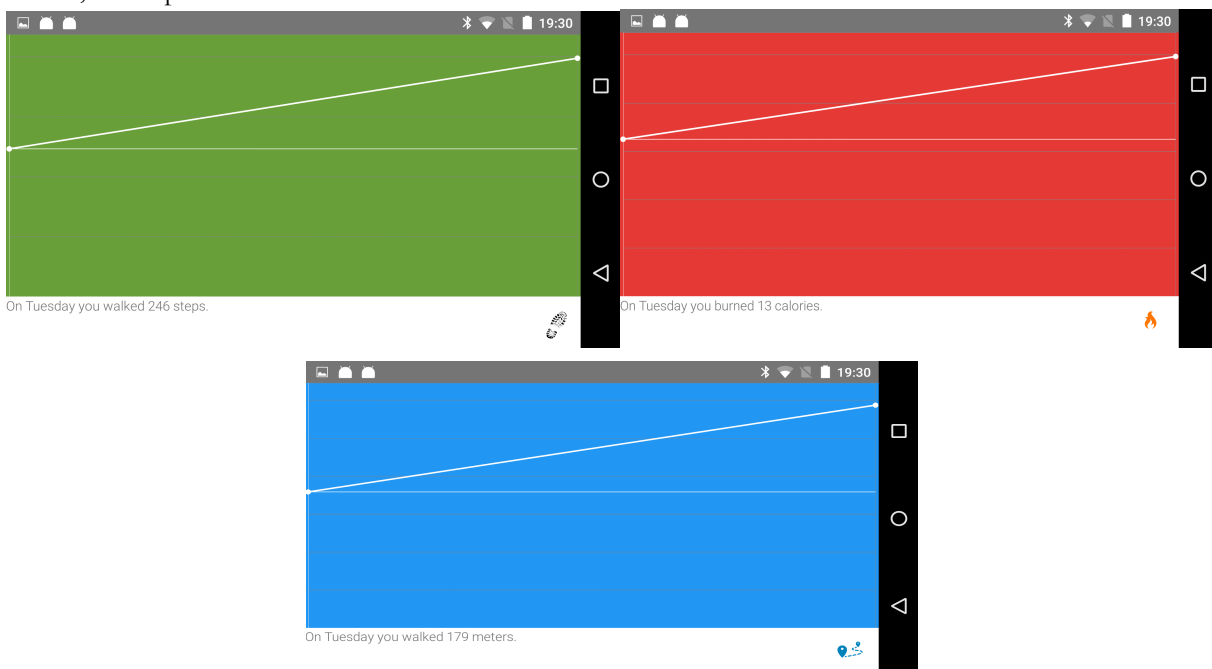
The user is allowed to change any information they have entered, excluding their birthday, in the settings page. They are also given the opportunity to turn the step counter off and on, and set their daily goal, which is 10,000 by default. To update their information, they must click the 'Save' button, which saves the entered information in the shared preferences file. To reset their account, including the database, the user clicks the 'Reset' button. Both buttons prompt the user with an alert dialog asking for confirmation in their action to prevent misclicks.

### D. History

The history page contains two fragments, each of which displays a different graph. Each fragment is accessible by swiping the screen left or right.



The first fragment displays a bar graph which shows hourly data. Each bar contains the value at the top and upon clicking on each bar, an explanatory text appears below explaining what the data means. On long-click, the graph changes to the next graph in the sequence. As shown above, the sequence is steps, calories, and distance, and repeat.



On swiping right, the user is shown daily data for the past week. The data is represented by a line graph and upon clicking each data point, the user is shown an explanation in the bar below. Again, long clicking allows the user to navigate through the sequence of graphs.



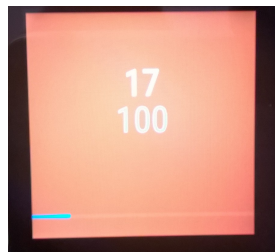
## Wear Interface

### A. Dashboard



Upon opening the wear application, the user will see the dashboard, which is similar to the dashboard on the mobile device. The user will be able to see current daily values for steps, calories and distance, which update dynamically as the values themselves increment.

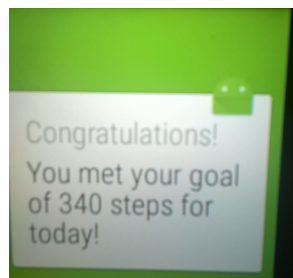
### B. Detailed Step Progress Indicator



Upon swiping right, the user will see a screen with their current daily steps walked on top, their step goal underneath and a progress bar indicating their progress at the bottom of the screen. This allows the user to get a visual sense of how close they are to achieving their goal.

### C. Notifications

As mentioned earlier, there are many to indicate inactivity or completion of example of what a user with a step goal completing their goal. The wear easy for the user to discover they have without having to pull out their phone.



notifications that are offered to the user their goal. The above picture shows an of 340 steps will encounter upon component of the application makes it met their goal while walking or running