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# *Running Tracker*

SCHOOL OF COMPUTER SCIENCE

COMP3040 UNMC AUM1 (19-20)-COURSEWORK 2


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# Introduction:

Advancement of technology made life easier in some aspects and lead to many health issues. Example of these issues, vision problems, hearing loss, neck strains, and sitting too much [1]. Although these issues are caused by technologies such mobile phones, personal computers, laptops etc, still technology has provided features that helps to solve them. To solve issues such as sitting too much, the individual is required to move around.

Exercise is very important and walking has many benefits not only physical health but mentally as well. There are many benefits some are listed below [2]:

- Lifting your mood (mental)
- Get creative juices flowing (mental)
- Rev Metabolism (physical)
- Boost bone strength (physical)

And many other benefit, therefore our target in this project, is to develop an android mobile application that track their speed of walking, time, and distance travelled. Which would make it easier for user to track their progress and time walked.

# Development Process and Explaination:

Requirements needed to be gathered from coursework sheet and analysed. The requirements from coursework sheet are listed as following:

1. Logging the movement of user when they go running
2. Storing movement
3. Track progress
4. Option of how and when the logging happens

These requirement was divided into smaller pieces to be able to have full application. The first step was to create a simple design that would show time in seconds, speed in meters per second, and distance travelled in kilometres when user starts activity. Figure 1 shows the main interface that contains START, Statistics and Log buttons.


*Figure 1 Screenshot of main activity when users launch application*

Figure 2 show when user click on START button, a timer, distance, and speed layout is shown with option of Pausing or Stopping. And the device starts calculations and displays distance travelled, speed, and show timer. As soon as the user clicks start in the background *TrackingService* is started. Which gets current location and starting location, gets the speed. Using built-in methods in Location object *getSpeed*. It detects the walking speed and displays it on screen as shown in figure 2. The distance is calculated by built-in method *distanceTo*, where it takes the starting location as input and returns the value in metres. Then distance calculated is displayed on screen. The only activity which is happening in main activity is timer. Where a thread has been used to update screen every second, which displays the timer which increments by one every second as well.


*Figure 2 Sample of Main Activity when user clicks on Start*

When user clicks PAUSE, timer, speed and distance will be on hold, and the view will show figure 1 interface. In the background the location the service will be stopped however the distance that has been already calculated will be stored temporary in a variable in main activity. When user click starts again, the progress will continue from they stopped. The time as well will pause and continues when user returns again. When user pauses, there is a chance that user moved to another place so the distance that he travelled while they are on pause mode will not be calculated. When user clicks on STOP the user, is given the option of storing the current log or don't store it as seen in figure 3.


*Figure 3 Saving Dialog when user click on stop*

If user clicks “Yes”, the log will be stored otherwise it will not be stored. In all case, the timer, distance, and speed will be set to Zero. If user selects “Yes”, date, time, average speed, and highest speed will be retrieved from TrackingService then stored. Timer is calculated in main activity so it is retrieved from mainactivity. The distance is the only value that is required to be calculated in background and main activity again in case if user decided to pause half way his walking/running journey. As shown in figure 1, there is history image on the left and chart on the right. To view all stored logs the user will click on history image. It will show a list of all logs and activities done by user. Figure 4 demonstrates an example of layout. By default the logs are sorted by date and time in descending order. However, the user is given the option to choose sorting category by click the sorting icon on top right corner of the screen. In the backend all data are retrieved from the SQLite database and stored in Cursor. Then data is retrieved one by one by looping through the cursor and stored in arraylist with object as RunLogDetail that contains a methods for getting data.


*Figure 4 History Activity shows all activity sorted by date and time.*

The user has the option to sort running logs according to different categories by click on the icon top right corner, the user can sort data by Date and Time, Distance, Duration, or Highest speed. The user as well has the choice to delete any log entry by just click on it as shown in figure 5.

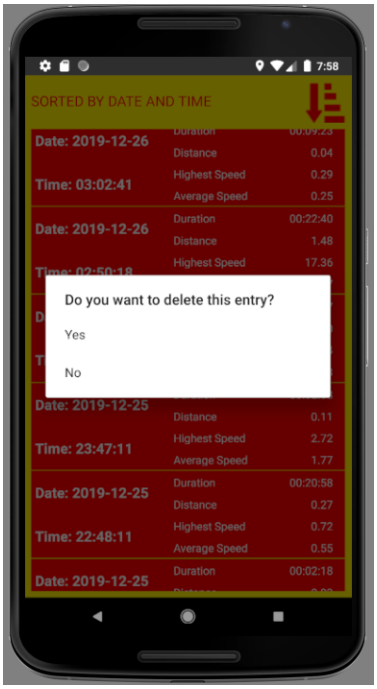


*Figure 5 Delete Dialog shown when user clicks on any entry*

If user selects “yes”, the relevant log will be deleted from database. The database implementation is very similar to database implement in recipe book application and lab 5. Where the only difference is the stored data. On the other hand, the user can view the overall progress, today, this week, this month, and all time progress. This can be shown by selecting the chart icon in right bottom corner of figure 1.

Once user clicks on it, figure 6 will be shown. Figure 6 is an example of how the statistics will be displayed when there is zero logs.


*Figure 6 Statistics Activity opened when user clicks on chart icon in figure 1*

If user wants to view only today’s stats, they would navigate to filter icon in top right corner. It will open a dialog that allows them to view any of the 4 stats or all of them as seen in figure 7.

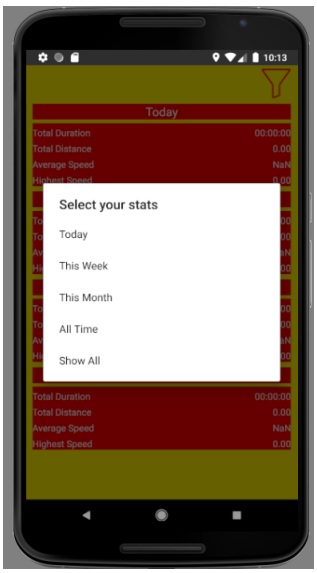


*Figure 7 Filter dialog opens when user clicks on filter icon*

Statistic calculation was calculated according to date of storage. While data is retrieved, it was filtered in different arraylists that is divided same categories as shown in figure 6 and 7. For each arraylist it had its own calculation, which where separated in different methods to reduce complexity and make it easier to debug.

Below is list of method that there usage was not explained and how they are related to application:-

- MyContentProvider, they are used in a way to prevents or reduces unauthorized access to data.
- Contract: is a class that communicates with database and MyContentProvider that contains column names, database name, and authority to access and manage database.
- ContentListAdapter: it liaise data in a layout that is later used to be shown in the history activity

# Conclusion:

Walking is important and this application would to detect to your total walking, jogging or running distance. Overall, the application is working as expected. It calculates distance, time, and speed. It was even tested with physical mobile phone on distance of about 350 metres, from TCR to I Blocks in a walking distance. The result of the test showed it was working well. However, when the application was tested to take a round track from orange building in a circle and returning to same point, the distance shown was close to zero. This shows that the Location distance calculation calculates the straight distance between two points ignoring any physical barriers. Another issue caused by application that can be future improvement is battery consumption. If application was kept for long time open if even service is not working a notification by OS informing user to close application.

# References:

[1] Health and Technology — Digital Responsibility. (2019). Retrieved 15 December 2019, from http://www.digitalresponsibility.org/health-and-technology

[2] Hilton Andersen, C. (2019). 15 Benefits of Walking for Just 15 Minutes. Retrieved 15 December 2019, from https://www.thehealthy.com/exercise/walking/walking-benefits-15-minutes/