An iPhone Application for Jogging and Running

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Introduction

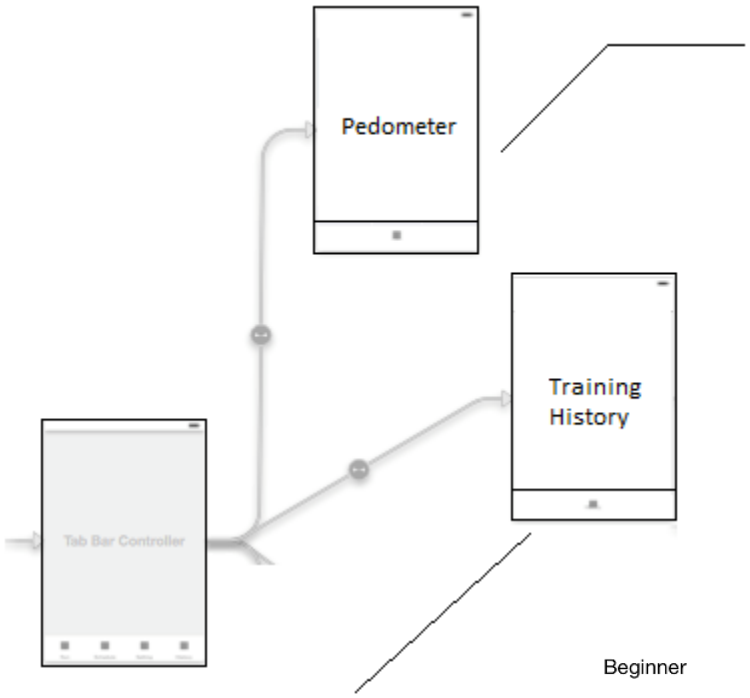
Overview

Some people start jogging because of fitness improvement. A pedometer can definitely help them for doing such kind of exercise. Since iPhone becomes a popular consumer device recently, we are going to design a pedometer application for iOS platform combines the features of a typical pedometer with detail information. Aiming to make joggers feel convenient while doing exercise and help them to improve themselves.

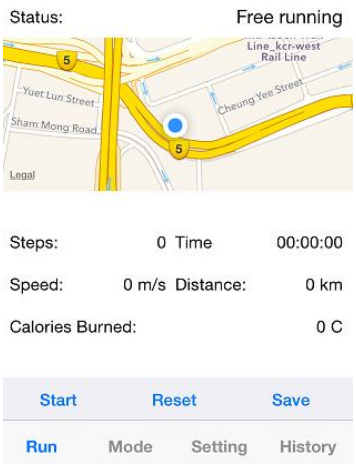
Objectives

This project aims to develop a pedometer mobile application for iPhone users. The application is designed for all people who are going to jog, including beginners and regular joggers. The jogging app should be able to records the user real-time running performance and help user schedule themselves.

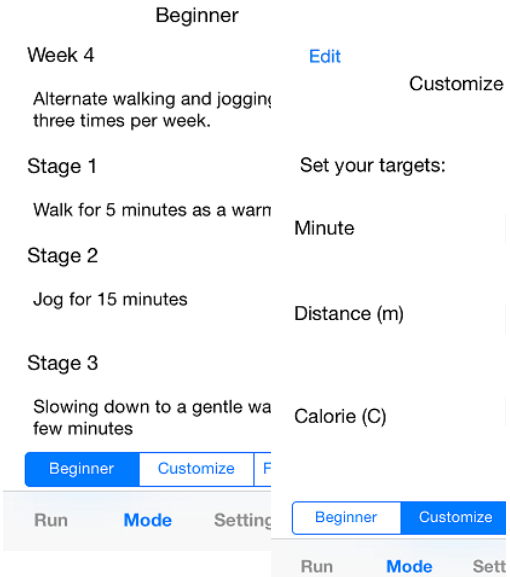
Design of User Interface

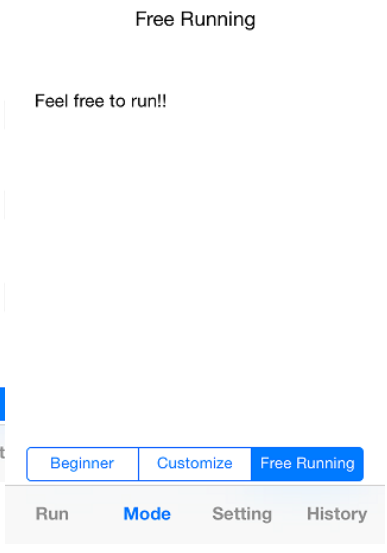


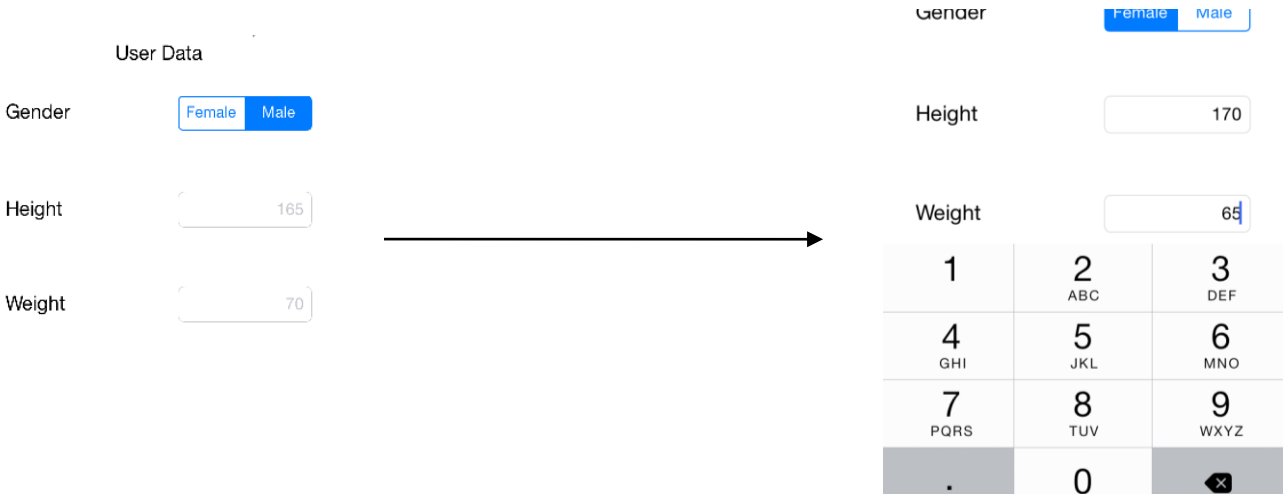
1. The Pedometer view controller handles the functions of time count, speed measurement, location detection and distance measurement.

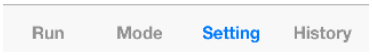


2. The Training History view controller can read data from the database and show the user training record including average speed, total distance travelled, steps count and estimated calories burned.

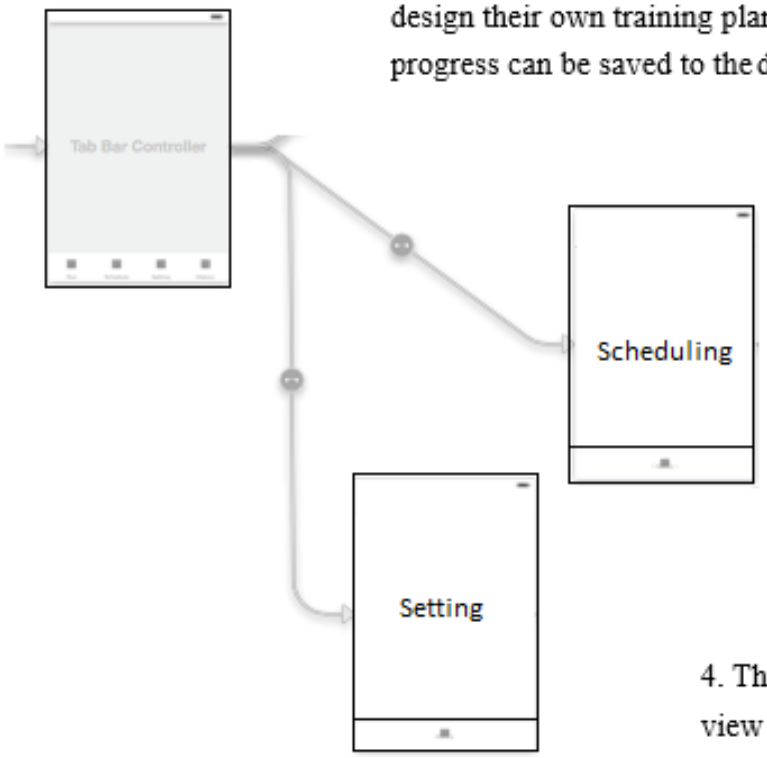




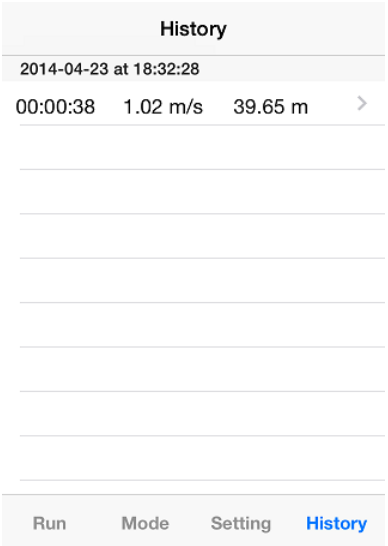


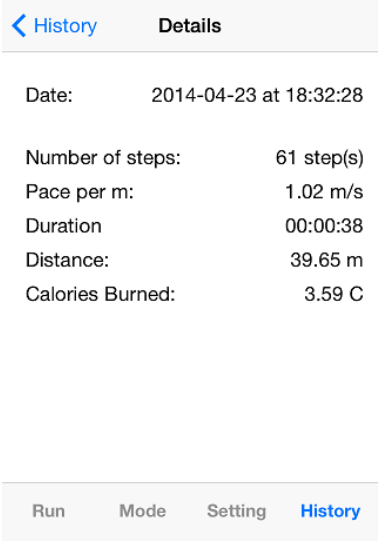


3. The Scheduling view controller provide a training plan for users to do regular jogging, and let users design their own training plan. The progress can be saved to the database.



4. The System Configuration view controller allows users to configure the system, turn on the GPS tracker function, turn on the notification and change the sensitivity.





Implementation

Step Detection

Data Filtering

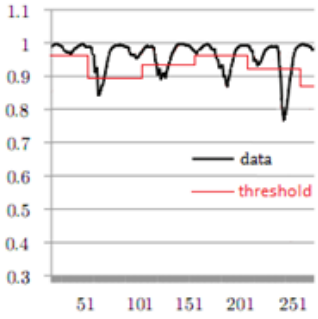
The system uses regular intervals (50 Hz) with the three components of acceleration (x, y, z) to calculate the dot product of two consecutive accelerations, then divides it by the normalized vector. To increase the precision of the measurement and to filter out noise, a weighted moving average of the last 10 values will be used.

Dynamic threshold

A dynamic threshold for acceleration on the data is necessary. The system continuously found out the maximum and minimum values of the weighted moving average and the dynamic threshold level is calculated by the average of those two values.

Step Count

The algorithm increments the step count when the WMA of filtered data decreases below these thresholds. In order to prevent the app to be too sensitive, the step counter has two regulations to discard the invalid step count.



The filtered data & the threshold

Result

The system's performance will be analyzed according to the following areas:

1. Reliability
   - The jogging application work properly every time

2. Accuracy
   - The views of the user interface display correctly
   - The algorithm works perfectly
   - Data fetching and pushing implements successfully

3. Consistency
   - The history displays and separates correctly

4. Latency
   - The latency time is small and acceptable

The jogging application can records the user real-time running performance and help user schedule themselves.The ability of real-time data tracking informs user about their performance immediately.

The application provides a training plan for complete inactive beginners. User can customize the training schedule. This fulfilled the requirements of the application.