Project Proposal

CSE 535

Phase I

1. **Project Members**
   a. Omkar Salvi (1209536104)
   b. Saurabh Jagdhane (1209572595)
   c. Vishal Srivastava (1209824652)

2. **Project Idea**
   We are designing a fitness application which will track user's exercise activity (running, cycling, crunches, etc.) and store the information about activities performed in a database which will be utilized to track user's performance. The app can suggest whether to exercise in a gym or continue daily outdoor exercise depending upon weather condition. Depending upon calories burnt in an exercise nutrient diet can be suggested. Depending upon user's exercise timings notification is given to encourage regular exercise.

   Project Relevance to the class: We are planning to use different sensors such as accelerometer, gyroscope, GPS, proximity sensor to get data about user's exercise activity. We'll need a SQL database to store user's data. An open source weather API will be used to determine the current weather condition.

3. **Plan to use external sensors**
   No (but can be used on wearables if UI designed accordingly)

4. **Type of platform being used**
   API level 19+, i.e., Android version 4.0+

5. **Development Setup**
   Android Studio, Testing: Emulator (AVD), Smart-phone (Android 4.0+)

6. **Specification of context aware behavior**
   1) Based on accelerometer readings speed of the user can be predicted.
   2) Differentiate between user's exercise activities based on accelerometer data.
   3) GPS will be used to calculate the distance covered by the user.
   4) Based on the weather data acquired through the API we can suggest the user to do an indoor or outdoor exercise.

7. Tasks to be completed for the Project (15 tasks)
    1) Weather API- **(Acquisition)** Obtain a current location using GPS. Extract data from current weather conditions such as temperature, humidity, wind speed, etc.
    2) Alarm notifications- **(Action)** Reminder to start exercise activity and recommend about indoor or outdoor exercise depending on weather conditions. **(Context change)**
    3) Accelerometer and sensor fusion- **(Acquisition)** Based on data acquired from accelerometer and gyroscope provide a reliable measurement of velocity using Kalman filter (sensor fusion).
    4) Prediction of exercise mode depending on accelerometer data- **(Action)** Based on accelerometer data from different axis predict the type of activity (running, walking, cycling, and crunches). **(Context change)**
    5) Distance covered using GPS- **(Delivery and Reception)** Using Google Location API track the distance covered by the user.
    6) Proximity sensor- **(Acquisition)** the data acquire will simply keep count of number of push-ups performed.
    7) Display user's activity in a graph- **(Delivery and Reception)** Plot distance covered vs time (per session) to set milestones.
    8) Scoreboard- **(Delivery and Reception)** Display rankings based on different parameters (distance, speed, calories, etc.) obtained from common database.
    9) Database- **(Delivery and Reception)** Manage and maintain a common SQL database and obtain data for plotting and scoreboard. The SQL database contains distance covered, speed, etc. by all users.
    10) Notification through vibration if the milestone is achieved- **(Action)** Divide the course of exercise into milestones and notify user after achieving each milestone through vibration.
    11) Share on social media- **(Delivery and Reception)** User can share achievements on social media (Facebook, twitter, etc.)
    12) Nutrient chart- **(Delivery and Reception)** Based on the exercise history suggest nutrient chart based on balanced diet.
    13) Music application- **(Action)** As the user starts running **(Context change)** application will play music and pauses the music if user halts.
    14) Settings- **(Delivery and Reception)** Control various parameters and options [Vibration on/off, music on/off]
    15) Workout planner- **(Delivery and Reception)** Based on the current BMI and targets set by the user suggest a workout plans and mode of exercise for intended calorie burn.

8. Work division and Deadlines

S.no	Task	Assignee	Deadline
1	Weather API	Saurabh	02/23/2016
2	Alarm notifications	Saurabh	03/10/2016
3	Accelerometer and sensor fusion	Vishal	02/23/2016
4	Prediction of exercise mode	Saurabh	03/18/2016
5	Distance covered using GPS	Omkar	02/23/2016
6	Proximity sensor	Omkar	03/10/2016
7	Display user's activity in a graph	Vishal	03/10/2016
8	Scoreboard	Omkar	03/18/2016
9	Database	Omkar	03/26/2016
10	Notification through vibration	Vishal	03/18/2016
11	Share on social media	Saurabh	03/26/2016
12	Nutrient chart	Saurabh	04/03/2016
13	Music application	Vishal	03/26/2016
14	Settings	Vishal	04/03/2016
15	Workout planner	Omkar	04/03/2016