Chapter 8

Conclusions & Future extensions

8.1 Limitations

'Stay Fit' application runs in only ios devices and that also iphone only. The support for the other platforms is not still provided. It also requires the BLE to function properly. 'Stay Fit' runs in only portrait orientation of the device, it does not automatically adjust the UI according to the change in device orientation. So user will see the uniform user interface throughout the application.

The application allows only one user to use the functionality at a time if other user wants to use the application then it must be reset before he/she can do so. When application is reset, all the data previously saved for the user are deleted. Also the data for the user is saved locally on a device and provides no backup. If user changes his/her device then all the data those where saved on old device cannot be restored to new one. Also if the user uses multiple devices the synchronization support between two different devices is not provided. Also there is no backup for this locally saved data.

The voice assistance support is provided periodically during a workout only, so user is not able to customize the duration after which a voice feedback should be provided. All the parameters of voice assistance are predefined and cannot be changed. Though user have option to turn off or on the voice support.

The user will not be able to delete the specific heart rate data of certain duration, though the workout data can be deleted which also deleted all the attributes of workout along with heart rate data.

If user makes any changes to the workout reminder in the native reminder application of ios then those changes are reflected to the application but the application is not able to prevent the changes from the native app.

The application requires the user to have a preconfigured facebook or twitter account before sharing the workout attributes it does not provide the mechanism to authenticate the user to the appropriate network account.

8.2 Discussion

8.2.1 Self Analysis of Project Viabilities

We started the project first by understanding coding for Objective-C. We already know primary language C and object oriented languages C++ and JAVA , so things were a little easy, but there was a lot to learn. After getting some basic information about it, we started learning about BLE technology and BLE enabled devices. Then the in depth study of "180D" service of BLE was undertaken.

We developed the whole project under the guidance of senior iPhone developer working at Infostretch Solutions. He is proficient in mobile development and he helped us to solve the major portions of the doubts that we had while developing the application. Implementation of 'Stay Fit' Mobile application took the major portion of time as we have used MVC(Model-View-Controller) architecture

and the most difficult portion of application was to write a custom library that would help any BLE peripheral to connect to the BLE enabled device and also provide sufficient durability to save bulk data. Once that was complete, we had confidence that the project would reach a successful conclusion.

'Stay Fit' uses a peripheral device, which has implemented the HRM (Heart Rate Monitor) profile of Bluetooth smart protocol. The application gets user's heart rate in bps unit from the device and also records the location details and allows users to track his/her fitness, all in one app. In addition to that, the application keep record of user's daily activity and also shows a statistics of all workouts that user has undergone to. The application also uses GPS to accurately measure the distance covered and speed of user during workout. Over all, 'Stay Fit' helps user to stay fit.

The Graphical user interface of the application is so nice and simple that any novice user can handle the application very easily. Also, if user faces some difficulties in handling application, we have provided help module having snapshots to show handling of application.

8.2.2 Problems Encountered and Possible Solutions

Initially the problems we faced were in understanding the Objective-C, iOS platform and Xcode Development tool, their features and various controls used for development of iPhone application, as it was completely new for us. These were solved by the online documentation provided by Apple. Also, our project guide has given us many demos regarding development of it.

In the project, the most difficulty was experienced when plotting the heart rate data on a graph. That required in depth understanding of the core plot and the open GL framework, which is very different from the rest of the modules of the application. Various tutorials and example code helped a lot in saving time and providing custom and best possible solution to plot HR data on graph that automatically zooms in and out and also changes axis labels accordingly.

Main difficulties that are commonly faced by all iOS Developer is that regarding Memory management. Because, there is no any thing named garbage collection in iPhone. There are commonly so many memory leaks are observed in many iPhone application.

The vast difficulty was to provide support for user interface of iOS 6 and 7 both. There was a vast change in the UI when iOS 7 was introduced. It was very difficult to design screens, which look exactly similar in both iOS.

One of the new feature introduced in ios was auto-layout. Before this the components of UI were designed using auto-resizing masks. All the working employees of the company were using that only, thus there was not much experience on the new technology. Infostretch organized a seminar on "Auto-Layout" to make the employees familiar with new technology. After various sample applications and apple guidelines, the project UI was successfully developed using auto layout constraints.

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8.2.3 Summary of Work Done

We have been working on iOS Platform since December and we have successfully completed this project as per requirement. We have developed our project using OS X 10.8.2 (Mountain Lion). We have used MVC model for developing the project. For providing simple and nice view to our application, we have used nib interface.

To be a bit more precise about the learning during the project work we would like to mention the technical knowledge gained about MVC model, UI design etc. The greatest learning curve during these months was learning about the work culture in industries, the interpersonal skills gained through the teamwork and efficient work patterns to resist against stress and work pressure yet achieve the targets given.

8.3 Conclusion

Obesity is the most prevalent, fatal, chronic, relapsing disorder of the 21st century. Obesity is a leading cause of world's mortality, morbidity, disability, healthcare utilization and healthcare costs. It is likely that the increase in obesity will strain our healthcare system with millions of additional cases of diabetes, heart disease and disability. Significantly, excess adiposity or obesity causes insulin secretion, which can cause insulin resistance that leads to type-2 diabetes.

Regular physical activity will help you to avoid these things. Physical activity is essential to prevent and reduce risks of many diseases and improve physical and mental health. It can even help you live longer—research from the American Journal of Preventative Medicine indicates that regular exercise can add up to five years to your life.

Since regularity in physical activity is very important, the development of the fitness application that can run in your mobile device is necessary.

This mobile application can be used to track different parameters during workout. This app will be able to connect to BLE enabled Heart Rate Monitor. This monitor will continuously send user's Heart Rate data to application. This application will keep track of Heart Rate data along with user's Speed (Min, Max & Avg.), Energy Expended (Calories burned), Duration, Distance, Step Count, Path on Map. User will be able to set his/her workout goals through this application. Application will notify user on completion of any goal. User will able to view/share his/her daily/weekly/monthly workout statistic from app. This app will remind user for Workout if he/she has set any reminder. User will able to Play music during workout.

8.4 Future Extensions

Cloud Synchronization

As per the current limitation of the application, the locally saved data is not backed-up anywhere. Thus on changing of the device, the data is lost and user has start it all again. Thus this application can be extended to provide the support for synchronizing data to cloud, hence user cannot even get his/her data back on new device, he/she will also be able to use multiple devices at same time and all the data would be saved and retrieved from iCloud.

Plotting ECG

Currently user is able to see only the heart rate data on graph. The BLE peripheral also sends the RR interval values via Bluetooth which can be used in plotting ECG of the user. That ECG can be very useful and it has large applications of its own, in the area of medical science.

Social Network Synchronization

Using 'Stay Fit', user can share the attributes of his/her workout on facebook and twitter. But user is not able to see the progress of his/her friends that may be shared through the same application on the social networking sites. The application can be extended to provide support for user to add the friends from his/her social network account and see the details of their workout and also compete with them to achieve better fitness results.

Support for other BLE Device Connection

Currently 'Stay Fit' scans and connects to BLE devices with service uuid '180D'. It can be extended to allow user to connect other BLE devices such as heart Rate Monitors, which have added functionality.