Fantastic Training App: A Fitness application for Mountain Climbers using UOA Calendar API

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ABSTRACT

We have developed a fitness application for the mountain climbers called as the "Fantastic Training Application". This application helps the users to make themselves fit for the mountain climbing activity. This application can be used specifically for climbing Mount Kilimanjaro. The UOA Calendar API has been integrated in this application to store the training routine details and they can be viewed at any time by the users. The users are allowed to update or delete an event as well. The users are asked for their profile information for the first time and they can edit them at any time. A summary is provided for the users based on the workout completed by them. The application is user friendly and personalized. Users get motivated through the smileys they get when they have completed a particular workout schedule. The application ensures that the sedentary behavior of the user is reduced and they can actively involve in the physical fitness regime.

KEYWORDS

Intention-Behavior gap, physical activity, Theory of Planned Behavior (TPB), web application, goal-setting, health behavior, action control, human psychology, usability, design approaches, fitness

INTRODUCTION

Physical fitness of people is playing a major role in the lives of human beings nowadays. Sedentary behaviors are resulting in lots of health issues. The users need to involve in different types of exercises namely walking/jogging, lifting weights and hiking [3] to make themselves physically fit. A person is said physically fit when he has good cardiovascular fitness, body composition, flexibility, muscular strength and muscular endurance. The research question for this project is the need for the physical and psychological aspects for the development of a personalized, UI efficient, user friendly fitness application that will help the users to make themeslves fit for the mountain climbing.

We have conducted various research to find out about the existing applications and we have considered some design approaches from the same. Various web applications are available which can be used by the users to indulge themselves in the physical fitness regime. Many design factors and psychological factors [1, 2] are needed to be considered for building such an application. We have

developed such a web application called "Fantastic Training" which is basically a fitness application. Though this application is designed for users who are willing to climb Mount Kilimanjaro, this can be also used by people who are willing to make themselves physically fit.

This application is personalized and a separate calendar is given for each user to create the workout information and the information the user provides is stored in the database and can be retrieved later for making updates. A summary page which consists of the details of the workouts done by the user is also available. We have used the UOA Calendar API in the application for the purpose of adding workouts, updating work outs and deleting them.

RELATED RESEARCH

Existing applications

Many number of existing applications have been considered for developing this web application. A web application called as Endomondo provided us with details of how a web application for fitness should look like. A website called as the mountainmadness.com provided all the information for the people who wanted to involve in mountain climbing. Another web application called as the alltrails.com gave the trail information to the hiking spots and it offered all the information needed to the hiking activity and also allowed the users to select a difficulty level. The website climbmountkilimanjaro.com provided the users with fitness and other details specifically needed for climbing Mount Kilimanjaro. We collected the information and design aspects from the above mentioned applications to help us with designing our web application.

Psychological aspects

The sedentary behavior of people nowadays are resulting in lots of health problems. People try to involve themselves in the physical fitness without much success due to variety of reasons, one being unable to fit the workout schedule in their busy schedule. People who intend to work out do not involve in physical training since they are unaware of the risks involved and they are not able to convert their intentions to actions. This intention behavior gap can be bridged by various factors like action planning, coping planning and action control and it is explained by the Theory of Planned Behavior [1, 2]. These factors have been considered for the web application that has been developed.

Goal accomplishments [6] also gives the users a sense of satisfaction and this aspect can further be utilized by providing the users with some reward smileys when a goal is completed. From research, it is seen that the Short Messaging Service (SMS) [4] can be used a way to motivate the users by sending them inspirational messages from time to time. These aspects also serve as a way to bridge the intention-behavior gap.

Personalization

Personalization plays a great role in today's web and mobile applications. The following aspects are very important to bring personalization into the application

- The application should be visually pleasing and relevant user data should be present in the application.

- The users should be able to set the goals for themselves.

- There is no personal trainer required for the usage of the application. The application takes up the role of the personal trainer.

- The application should be easy to use.

- The users should be able to connect to the social network to share their accomplishments with friends and family. This gives them a sense of satisfaction and motivation.

DESIGN PROCESS

The process for modeling and creating our application involved the following design processes: 1) to design a front end for our web application and to make use of the UOA Calendar API to create the workout details. 2) to design a back end to store all the personal details of the users and the workout schedule created by them.

Design Goal

The intended users for the web application are those people who are looking forward to become physically fit. The sedentary behavior of these people should be reduced and they should actively involve themselves in the fitness regime. This will result in the users becoming physically fit. We considered three important aspects for designing our application namely physical fitness, psychological aspects and personalization. The physical fitness aspects stresses that importance of different types of physical exercises like running, hiking, cycling, etc. The psychological aspects involve bridging the intention behavior gap [1, 2]. The personalization aspects should make the users feel that the application is personalized for their usage. The personal information, unique user logins and summary pages will cover the personalization aspects.

The application designed also conquer the following goals,

1. *Functionality*: The application must achieve the functionality it intends to do which is keeping track of the fitness regime of the users and using UOA calendar API for the same.

2. *Ease of use*: The application must be easy for the users to understand and the users should be able to make efficient use of the application.

3. *Availability*: The application must be made available to the users at all times.

4. *Performance*: The application should have a good performance without any lags so that the user does not feel frustrated after using the application.

5. *Scalable*: The application should be made scalable for any improvements and future works.

6. *Securable*: The application must be made sure that it is secured so that no one misuses the personal data of the users at all times.

Approach

We decided to use the iterative waterfall approach for developing our application. Our first phase involved the requirements gathering where we made all the analysis and gathered inputs for the development of our application. We also made a timeline chart for the activities to be carried out as part of this project. The next phase is the design where we made some important design decisions and worked on the lo-fi prototypes and functionalities to be implemented for our application. We decided on the software technologies to be used to develop our fitness application. We decided on the usage of the usability, scalability and maintainability tests to test our application. In the implementation phase, we developed our application using the technologies decided in the design phase and UOA Calendar API. During the testing phase, we tested the functionalities of the application. Since it is an iterative approach, we again made some minor changes with the design and continued the process all over again for several times.
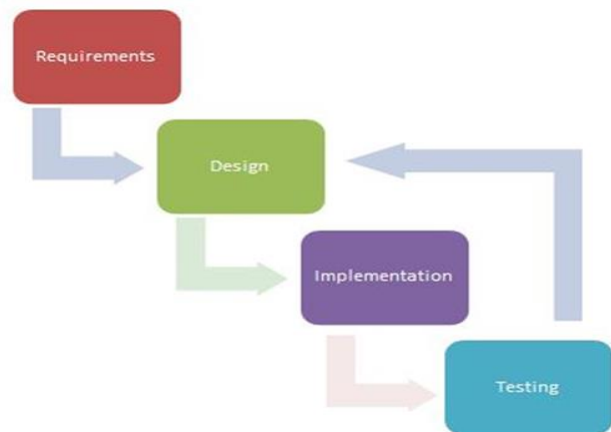
Figure 1: Approach - Iterative waterfall model

Web application over mobile application

We decided on creating a web application for the fitness training because of the following reasons

- The display size of the mobile screens are smaller than the desktops and laptops. The user will be able to view the application in a bigger screen which will enable the ease of use for the users [5].

- The hardware in the desktops and laptops are more powerful than the hardware in the mobile devices. This will result in a good performance feel for the users [5].

- The network connection for the data retrieval from the remote database for the calendar information is faster in the laptops and the connectivity speeds are lower in mobiles [5].

- The UOA Calendar can be viewed in a better way in the desktops than in the mobile phones. The UOA calendar API consists of a full-sized calendar.

TECHNICAL SPECIFICATION

The technical tools to be used in our project are decided in the design phase. The UOA Calendar API is a mandatory tool that needs to be used in our application for entering and maintaining the workout details.

UOA Calendar API

UOA Calendar API is an application program interface that is developed using JavaScript. This API can be integrated in any web application that is using calendar functionality as a key function. The API provides a token which can be obtained from a website http://diaryapi.auckland.ac.nz/ and this token can be used to develop the application. The API is stored in the npm package manager and it allows the developers to reuse the code and update them and share them with other developers. The calendar API can be easily used in our web application by calling the necessary functions by passing the API token, the calendar id and other necessary details as the parameters.

The API allows the developers to create new Calendars, find events in a calendar by searching for any particular event, update the events and delete them at will. The API allows us to view the month view, week view and day view. In order to create a new event, it is mandatory to provide the title, start and end date. The events can then be updated or deleted. The events can be easily dragged to a new location in the calendar and the database gets updated automatically when we do so. It is possible to add more than one calendar per user and calendars can also be deleted when they are not needed. The current day is highlighted in the calendar which makes it easier for the users to identify the events for the current day.
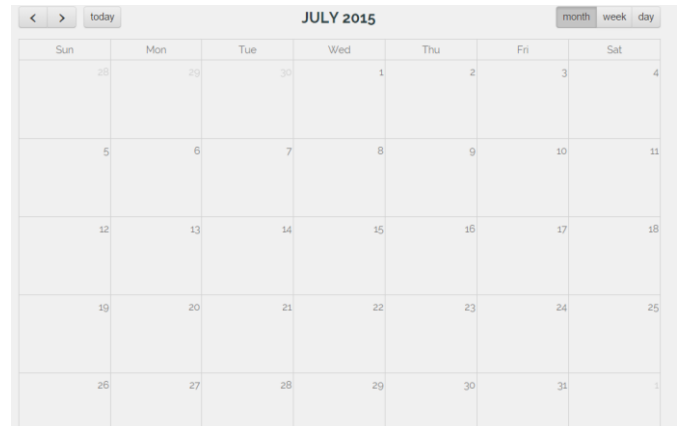

Figure 2: UOA Calendar API

JetBrains WebStorm 10 IDE

WebStorm 10 is used to create the HTML pages, the Cascading Style Sheets (CSS) and the JavaScript files that were used in the application. The reasons for choosing WebStorm is it helps the developers to develop error free code and improves the code quality. It also speeds up the development process significantly.

XAMPP

XAMPP control panel is a web server with the help of which we set up the local Apache HTTP server and the local MySQL database. The Apache HTTP server and MySQL database needs to be started before running the application. XAMPP provides support for the PHP files. There is also a log button in the control panel which can be used to view the logs in case of any errors. The admin for MySQL displays the local database where the new tables are created and the local data is maintained. XAMPP is an open source tool and it is supported across various operating systems making it a cross-platform tool. It also provides the ease of starting the Apache HTTP server and the MySQL database server by the click of a button at the same time.

HTML, JavaScript and CSS

HTML code was used to create the web pages for the front end. We used many Cascading Style Sheets (CSS) to improve the page designs. JavaScript was used in the application development since all the calendar functions used JavaScript. The main advantages of using JavaScript was that its functionality was able to be extended to the web pages.

PHP

PHP is a server side scripting language and it can be used with the HTML for developing the web applications. It enabled us to connect to the local database for storing and retrieving the data. The database connection could be easily made using the PHP It is an easy to learn and easy to use language. It is also an open source language which is stable

and very easy to fix bugs. It uses the syntax from the C programming language.

MySQL
MySQL language was used to create the database structure and the tables. MySQL is an open source technology and easy to use. It runs on all the platforms and it is scalable.

IMPLEMENTATION
The front end for the application is developed using the HTML, CSS and JavaScript. The UOA Calendar API functions are invoked using the JavaScript. The PHP language is used for creating the dynamic web pages and it enabled to connect with the backend database. (Refer Appendix section for screenshots)

The web application "Fantastic Training" for the fitness training has a pleasing home page and a navigation menu that gets displayed on the right side on all the pages for easy navigation. Our application included six main functionalities which are as follows:

Account Login/ Register
This functionality allows the user to login to the application using his registered email id and password. If the user is a new user, he needs to sign up in order to use the application. The sign up or the register page requests the user to enter a unique user name, email id and a password of his choice. The user needs to remember his password for logging into the application. The necessary validations that checks for a valid email id and existing email id have been implemented. On successful login, the user lands up in the home page. The home page provides the links to various options. The user can also sign out by using the sign out option in the navigation menu. This feature makes sure the application is personalized and secured.

View/ Edit Profile
On first time login, the user is asked for their personal information like name, height, weight and gender. The BMI of the user is calculated automatically based on their inputs and the details are saved in the database. When the user logs in after that, he is taken to the home page directly. The user is also provided with the option to view or edit the profile at all times. This can be done by using the "My profile" button at the top of the home page or using the navigation menu at the right side of the home page. The necessary validations have also been implemented and the height and weight does not allow any characters in them. This feature helps the user to feel the application is personalized for his usage.

Manage My Calendar
The user is allowed to manage his calendar. The calendar that is displayed is the UOA Calendar which allows them to view the workouts in their schedule. The user is also allowed to create new workouts by providing the workout name, start and end date as mandatory information. This pop up gets displayed when clicking on any date in the calendar. The pop up is made different from the traditional UOA Calendar's pop up. The "create new workout" pop up asks for the workout name, start and end date, distance, duration and reminder. The details entered by the user can be edited at any time by clicking on the workout in the calendar and making some changes and saving it. The workout details can also be deleted by the user. These entries are saved in the local database as well as in the database of the UOA Calendar. The entries in the calendar can be easily dragged and dropped to a new location. The calendar also allows the users to view the month, week or day view. This feature can be accessed by clicking on the option "My Calendar" in the home page or "Manage your Calendar" in the navigation menu. This feature promotes ease of use for the users to maintain their workout details.

Provide Workout Advice
This functionality provides the necessary information about the basic workouts for the users. This functionality is available in the home page. There are four divisions in the home page namely beginner's guide for exercising, sample workout for beginners, nutritional plan and Mount Kilimanjaro. The sample workouts page provides the users with details about the basic workouts they can start with. The nutritional plan page provides the users with details about the health eating and calories. Mount Kilimanjaro page provides some interesting facts about Mount Kilimanjaro which will prove to be a fascinating read for the users.

Workout Summary
The summary page in the application provides a summary of the workouts done by the user in the form of graph as well as history. The graph is plotted between the days of workout and the hours spent. The goal accomplishments can be viewed in the history page which provides the users with success smileys for the days of work out which will motivate them to do further workouts [6]. It also gives the users a loser smiley if they have not done any workouts for the day. The data stored in the local database is retrieved to summarize the details to be displayed in the summary and the history pages. This functionality can be accessed from the home page by clicking on the "My Summary" option at the top or through the "Check Workout Summary" option in the navigation menu on the right.

Contact us/ Feedback
The home page has a feedback section at the bottom of the page which will help the developers to know about the feedbacks and suggestions for improvement. A mail will be triggered to the developers when a feedback is submitted. Validations have also been implemented for checking for valid email id. This helps the users to submit their queries and the developers can answer them to improve the quality of the application and new features can also be implemented based on the feedback of the users.

Database design

The database is created using the MySQL server set up by the XAMPP control panel. We decided on the usage of three tables namely users, usercalendarmapping and events table. The user table contained all the profile information about the users with the user_id being the primary key. Every time a new user is created, a new calendar id is created for that user and an entry is made in the usercalendarmapping table. The events table contained the information about the workouts. Every event for a particular calendar is given a unique id. So every row in the events table is recognized by the combination of the calendar_id and the event_id.
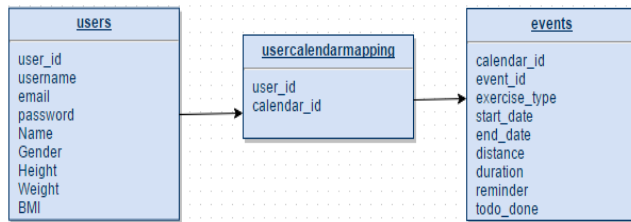
Figure 3: Database design

DISCUSSION

During the design sessions, we had planned to obtain the workout information from the UOA Calendar database server and use them for populating the summary and the history pages. However, we did not have access to that database server, so we stored all the information in the local database and used the details from our local database to populate the summary and the history pages. While discussing about the design for the user interface, we came up with the idea of having a concise layout with different sections and having only limited information in each section. This design resulted in the front end being visually pleasing for the users. We performed the usability testing ourselves every time a feature was implemented and based on the comments provided we improved the usability of the application.

FUTURE WORK

The "Fantastic Training" fitness application can be improved in the future by providing support to run the application in mobile devices. A feature to share the accomplishments to the social networking sites can be included. This will provide a sense of satisfaction for users and will also encourage other users to try out the application. Once a workout schedule is created, a feature can be included to set a reminder for the user. This can be in the form of short messaging service (SMS). Inspirational messages can also be sent to the users to motivate them to do regular fitness workout.

CONCLUSION

Nowadays, people give a lot of importance to being physically fit. They are also aware of the risks of not exercising regularly. Our "Fantastic Training" fitness application helps the people to bridge the intention behavior gap and motivates them to actively participate in fitness activities. This application can be used by all people who want to keep themselves physically fit. The integration of the UOA Calendar API has been done successfully and the users can maintain their workout schedule in these calendars. The summary page provides summary of the workout for the users. Thus, by considering all the physical and psychological aspects, "Fantastic Training" web application has been developed which is user-friendly, personalized and UI efficient.

REFERENCES

1. Fernández, B.R., Fleig, L., Godinho, Cristina A., Montenegro, B. Montenegro., Knolla, N., Schwarzer, R. Action Control bridges the planning-behavior gap: a longitudinal study on physical exercise in young adults. *Psychology & Health 10*, Vol. 30, No.8, (2015), 911-923.

   http://dx.doi.org/10.1080/08870446.2015.1006222

2. Sniehotta Dr, Falko F., Scholz, U., Schwarzer, R. Bridging the intention-behavior gap: Planning, self-efficacy, and action control in the adoption and maintenance of physical exercise. *Psychology & Health,* Vol. 20, No.2, (2005), 143-160.

   http://dx.doi.org/10.1080/08870440512331317670

3. Balas, Jiri, Ondrej Pecha, Andrew J. Martin, and Darryl Cochrane. Hand-arm strength and endurance as predictors of climbing performance. *European Journal of Sport Science*, Vol. 12, No.1, (2012), 16-25.

   http://dx.doi.org/10.1080/17461391.2010.546431

4. Schwerdtfeger, A.R., Schmitz, C., Warken, M. Using text messages to bridge the intention-behavior gap? A pilot study on the use of text message reminders to increase objectively assessed physical activity in daily life. *Frontiers in Psychology*, Vol.3 (2012), 1-9.

   http://dx.doi.org/10.3389/fpsyg.2012.00270

5. Harrison, Rachel., Flood, Derek., Duce, David., Usability of mobile applications: literature review and rationale for a new usability model. *Journal of Interaction Science,* 1.1 (2013), 1-16.

   http://link.springer.com/article/10.1186/2194-0827-1-1

6. Munson, Sean A., Consolvo, S. Exploring Goal-Setting, Rewards, Self-Monitoring and Sharing to Motivate Physical Activity. *6th International Conference on Pervasive Computing Technologies for Healthcare (Pervasive Health) and Workshops* (2012), 25-32.
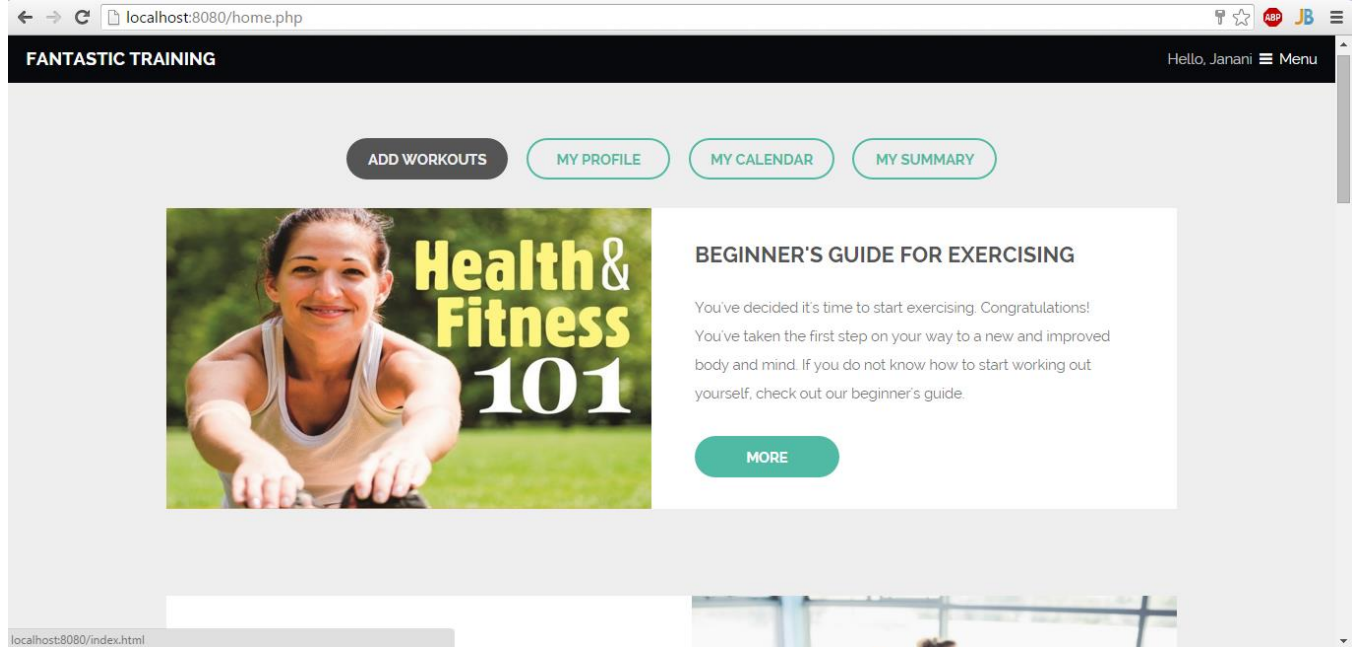
APPENDIX

Starting/ Landing page

Login page

Signup Page

Fantastic Training

John

john@gmail.com

•••

SIGN ME UP
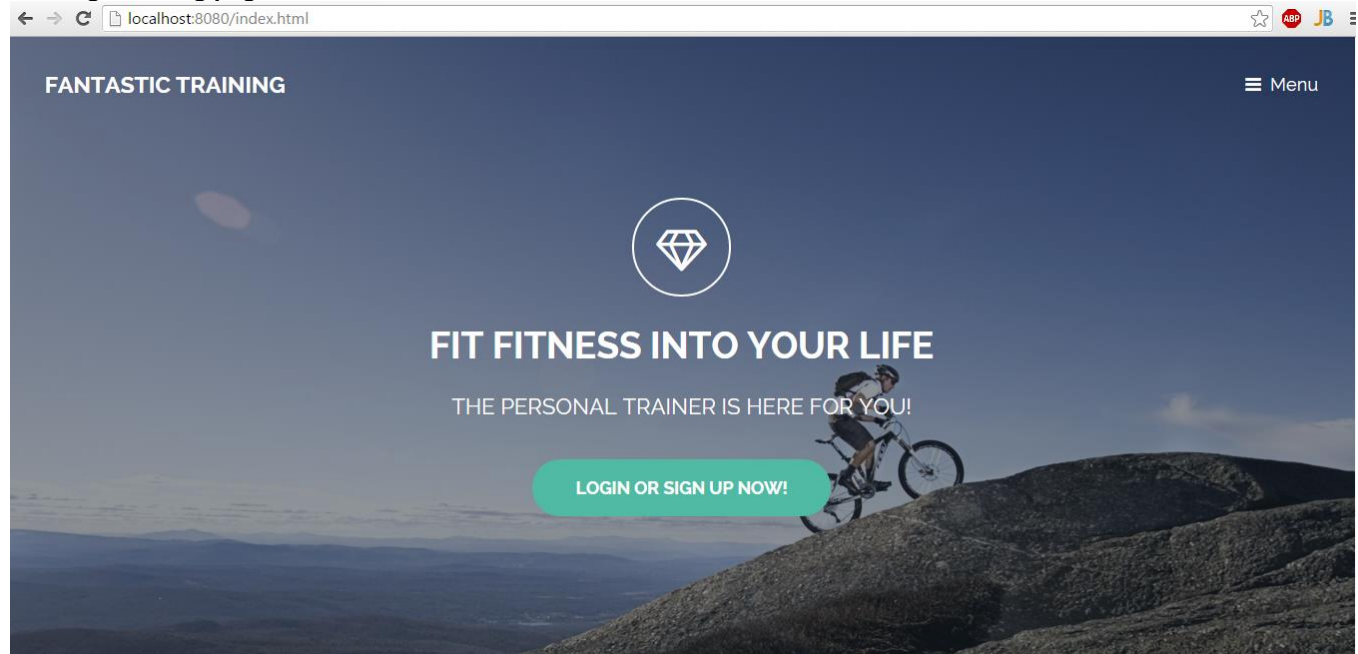
Sign In Here

Back to Home Page

Home page

FANTASTIC TRAINING

Hello, Janani ≡ Menu

ADD WORKOUTS   MY PROFILE   MY CALENDAR   MY SUMMARY

Health & Fitness 101

BEGINNER'S GUIDE FOR EXERCISING

You've decided it's time to start exercising. Congratulations! You've taken the first step on your way to a new and improved body and mind. If you do not know how to start working out yourself, check out our beginner's guide.

MORE

localhost:8080/index.html

Profile Page

FANTASTIC TRAINING   Hello, Janani ☰ Menu

| Add Workouts | My Profile | My Calendar | My Summary |
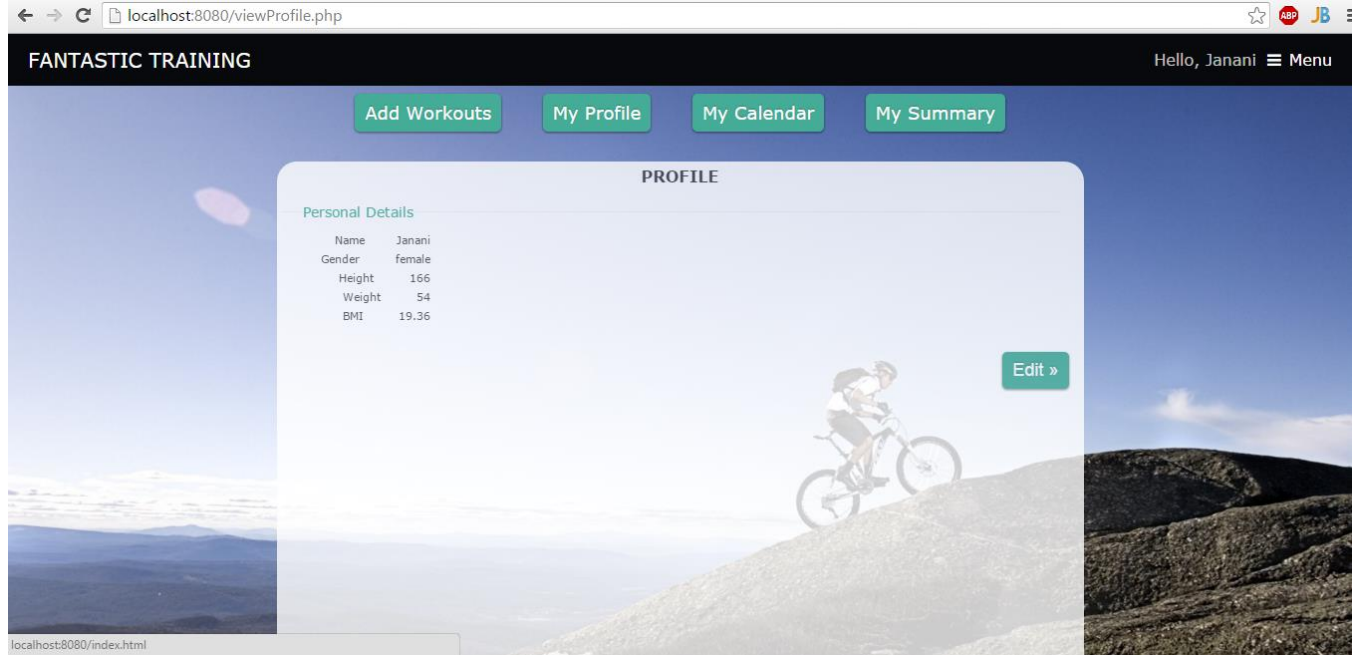
PROFILE

Personal Details

Name	Janani
Gender	female
Height	166
Weight	54
BMI	19.36

Edit »

localhost:8080/index.html

Edit profile Page

FANTASTIC TRAINING   Hello, Janani ☰ Menu

PROFILE

Personal Details
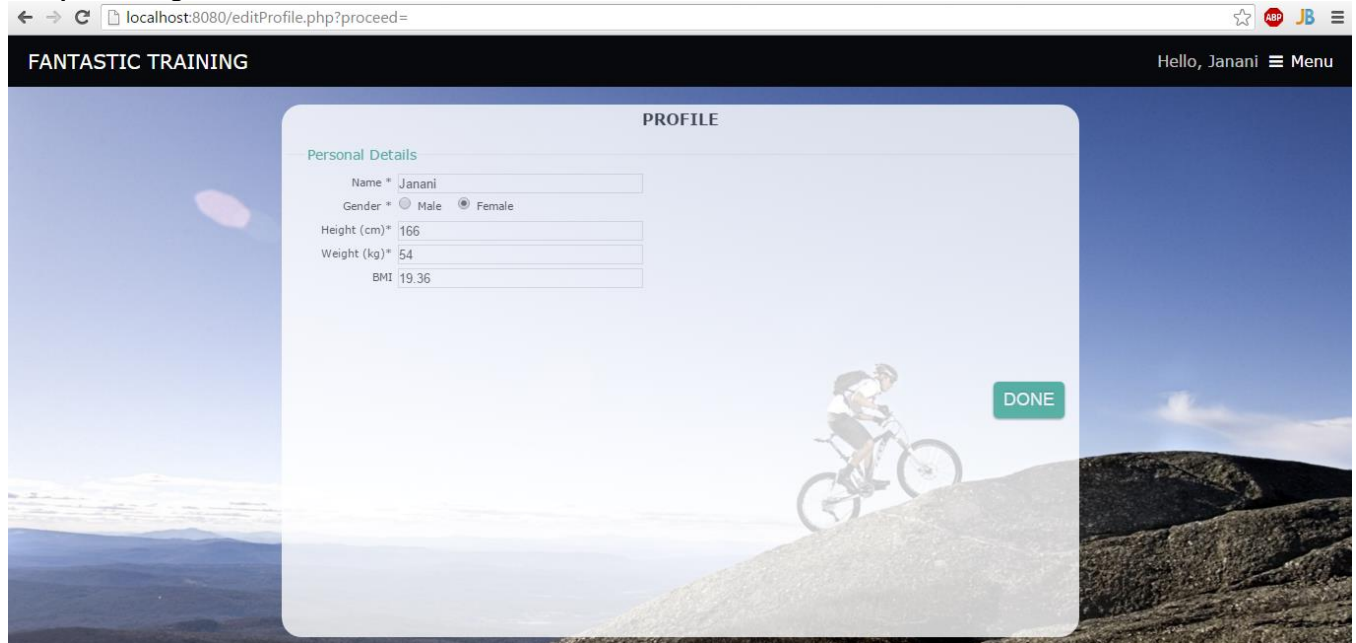
Name *	Janani
Gender *	○ Male ● Female
Height (cm)*	166
Weight (kg)*	54
BMI	19.36

DONE

My Calendar Page

Create workout popup

Navigation Menu

FANTASTIC TRAINING   ✕

ADD WORKOUTS   MY PROFILE   MY CALENDAR   MY SUMMARY

BEGINNER'S GUIDE FOR EXERCISI

You've decided it's time to start exercising. Congratul
You've taken the first step on your way to a new and
body and mind. If you do not know how to start work
yourself, check out our beginner's guide.

MORE

SIGN OUT

HOME

MY PROFILE

MANAGE YOUR CALENDAR

CHECK WORKOUT SUMMARY

localhost:8080/index.html
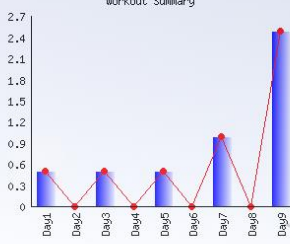
Summary page

localhost:8080/summary.php

FANTASTIC TRAINING   Hello, Janani ≡ Menu

WORKOUT SUMMARY

◉ Summary ○ History

Workout Summary

OK »

localhost:8080/index.html

History page

Feedback section