Hanyang University Personal Gym Trainer

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Abstract— **We are planning to make a website that can be used as a personal trainer in the gym of Hanyang university. This website will tell you your training schedule which includes when you will have to go and what exercises you have to do all based on the feedback data that you put in. For example: how do you feel, how much sleep did you get, how did it go last time, was the intensity appropriate…**

This website will guide beginners as well as fanatics. For beginners it will guide you every step of the way so you do not have to do all the research on your own. It will give you an easy to follow routine to begin with and with all the feedback data it will get the algorithm gets to know you better and will find a good routine that suits you and your goals that you have for the future. For gym fanatics it will also be a really helpful tool. It will make sure you do not go over your limits and it can make sure that you will reach your goal without the risk of getting injured. For the people who are new to the gym the interactive map that will highlight all the machines that you have to do for your workout will save a lot of time and for the beginners it will also provide additional information about the exercise that they want to start. Another really helpful feature of the website is that we also provide a warm up routine that fits the type of workout you want to do. To prevent injuries we first of all listen to your feedback as mentioned before but what another essential part in preventing injuries is stretching, after every workout we will provide pictures about how to stretch and an explanation which muscle you should feel during the stretch.

In conclusion, the website will provide the total personal gym trainer experience without breaking the bank. It will keep beginners on track and motivate them to reach their goal and fanatics can work towards their long term goals without worrying to much about their schedule and injuries.

Furthermore, a function provides the gym owner with information about which weights he has to order in future times based on the usage of the weights. This can be a really helpful tool for him as this keeps his customers happy as well as saving costs because he doesn't have to guess which weights he has to get to keep his customers on track for their workout.

I. Introduction

We chose this topic because we think that it can be really useful for a lot of students. A lot of students are beginning to become aware of their body and health. One of the things that they consider at that time is starting to go to the gym but most of them never go because once they start doing their research they get overwhelmed with information. Our website can stop this for the students of Hanyang University. It will have all the information in one place and create a personal schedule that will be working towards the goal the user chooses and with all the feedback data it won't be harsh on the users body. This can increase the overall health of the students. Physical health as well as mental health will cause the students to be more confident with how they look. The website will overall have a positive influence on the wellbeing of the Hanyang students. It can motivate and guide beginners through the first training sessions. Because the website will provide clear explanations about the exercises, it makes sure you do not start with too much weight and even helps you with stretching afterwards with the use of helpful videos. At the same time it can also be helpful for students who have been going to the gym for a long time and want to take their workout to the next level, making sure that they achieve their goals by slowly increasing the intensity without the danger of overloading and a possible injury. All these functionalities will increase the popularity of the gym in Hanyang and therefore will give the university a

healthier image. With this website we expect the amount of students working out to grow exponentially. This will allow the university to expand their gym and make it a place where a lot of students come together and work on their health. A healthier image in a society that values a healthy body and mind more and more can be a factor that pushes the university to the next level.

II. REQUIREMENTS

A. Account Management

The website should provide the user with the basic functions of account management. This includes creating an account when visiting the website for the first time, deleting your account or modifying basic account settings such as your password or your user ID.

The user should be able to create an account with a window on the start screen of the website. The database behind the website should be able to permanently store, modify or delete the user specific log-in data such as the username and the password.

B. Getting starting parameters

In a specific settings section the user is able to enter some body parameters of him. (height, age, weight etc.). Furthermore, the user should be able to select his workout goals. The user can then select how many repetitions he wants to do for each exercise and he will be able to set up his whole workout routine. The database should be able to store this information permanently in context with the username. The user should be able to delete or modify these parameters. All this stored data will be used to make an overview of his progress towards his goal.

C. Starting and ending workout

Before and after each workout the website has to provide the functionality of starting and ending a workout session by pressing a button. Special functionalities will be available for the user after this. (details will follow)

D. Giving feedback

The website should regularly ask the user about his physical condition. This includes asking for his self perception after his warming up set, after each exercise and after the whole workout. The feedback will be given in the form of questions, which will give several answering possibilities.

For example:

After warming up set:

How do you feel today?

-*weak*

-*weaker than usual*

-*normal*

-*stronger than usual*

very strong

After one exercise at one machine:

I managed to do…

-*all repetitions*

-*almost all repetitions (only 1-2 less per set)*

-*very few repetitions*

It felt:

-*easy*

-*normal*

-*hard*

After whole workout:

The intensity today was…

too easy

appropriate

too intense

Based on all this data it will change your training schedule for that workout to be less intense and with the feedback after the workout it can suggest lowering or increasing the number of repetitions and the weights for future workouts.

E. Entering sleep quality

The website should ask the user how much he slept last night before the workout begins. As sleep is essential for the recovery of your muscles. This will trigger a message stating to lower the intensity of the workout if you slept poorly.

F. Enter schedule

The website should provide a function, in which the user can enter his weekly schedule and other sport activities. So the user can get a nice overview of his upcoming activities on the website so that he/she can base their workout schedule around these activities.

G. Display real time user activity

At all times the user should be able to see how many users are in their training session at the moment in order to see if it makes sense to go to the gym right now as most machines will be blocked by other users. This part will include an AI that will predict when the gym/the machines you need for your workout will be busy. It will suggest when to plan your next

workout, at the least busy time, and it will also keep on showing the current amount of users.

H. Display training information

The website should show the user stretching guides after and before workout, which are appropriate for his workout at this day with detailed description and execution guidelines.

Furthermore the website should show the user pictures of how to execute an exercise properly before he starts doing the exercise at each machine.

Additionally an interactive map could show the user which machines are available at the gym and which muscles can be trained at each machine.

I. Generate workout schedule and routine.

As shown in the previous paragraphs the user permanently enters information into the System. This will allow the user to set up his own personalized workout routine that he/she can follow. The AI will then suggest when the best time/day is to do your workout so you can do it without a problem. With all the data that the software keeps it will give you graphs and numbers to see your progress and it will show you how far away you are from your goal.

J. Display training schedule

The user should be able to display his personal training schedule over the website. Time, duration and trained muscle group should be shown.

K. Showing equipment usage statistics

The gym owner should be able to look at the usage statistics of his machines stored on the database. He should be able to see which machines are used how often and which weights were put on most of the time.

III. ROLE ASSIGNMENTS

Roles	Name	Task description and etc.
User	Kobe Grobben	Give feedback about useability.
Customer	Fabian Beck	Giving requirements and setting limits to cost and time.
Software developer	Mickaël Nguyen	Developing and designing the website.
Development manager	William Chan	Making sure the project is done on time, the cost isn't too high and that all the requirements are met.

IV. DEVELOPMENT ENVIRONMENT

A. Choice of software development platform

The platform we chose for our project is the web. We chose this platform because we wanted our software to be available to as many people as possible.. By using the web we have an application, which makes it possible to use our software on every operating system and every device that is on the market.

There are a couple of reasons why we did not choose to develop our software specifically for an operating system. We did not choose Linux for the obvious reason that too few people use a linux operating system in the classical sense on their mobile devices (of course Android is Linux based, but when it comes to developing apps it's completely different from writing Linux programs). We also opted against making an app because we would make our software only accessible for one group of users, either IOS or Android users. This way we can not reach all the members of the hanyang gym and we also think it is nice that you can access all your data everywhere you go and also on your laptop which gives the user a few more use cases to use the website at home.
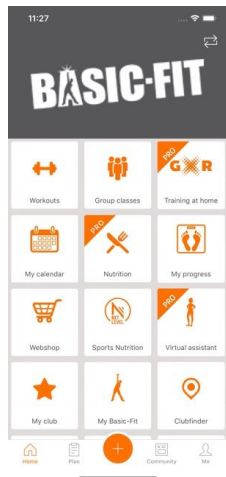
The programming languages that we are going to use are html, php, css and sql for the database. For this database we will use a local server since this is the most reliable option. We will use Sublime text for building the website and mysql to set up the database since it is a really common, easy to use and a well known language. The AI part of our software will be embedded into the code. The resources that we will use are our private laptops which are: 2 windows 10, 1 Linux Mint 18.2 and 1 MacOS Catalina laptop. This is everything we need to make this software.

The cost estimates of our project are not clear yet. But we made some time estimates for how many hours it would take to program but keep in mind that these are very rough estimates. We will work with 4 experienced programmers that will work on this project for one and a half months. Each programmer will program 5-8 hours each week on this project. This gives a rough idea how much time will be invested into this project.

B. Software in use

There is a lot of similar software available on the market but most of it is only for specific gyms or does not offer every functionality our software provides. We did some research and selected two released software products with very similar functionalities and a similar vision.

The first one is the Basic Fit application. Basic Fit is a gym chain that is spread across Europe. It has a lot of members and if you are a member you get a free fitness application which contains its personal trainer software. This application provides you with standardized workouts and programs, provides training at home, is your virtual assistant that gives you tips and tricks, gives you a nutrition plan and finally measures your progress. This application provides a lot of useful functions, the only concerns are that it can only be used by Basic Fit members as well as that it only provides standardized programs that do not adjust to your wants and needs properly. It does not change up your schedule based on how you are feeling or based on other activities you have planned.The application also does not provide an AI to predict busy times, this is something we want to focus on. That differentiates us from this application. Then finally we are going to take a look at the design of the software. As you can see this app very clearly states its functions , this is something we also want to implement in our website. It is a very intuitive software and looks easy to use which is the most important thing.

Source:https://www.basic-fit.com/en-fr/fitness/basic-fit-app

The Second application to name is called Sworkit. This application is not gym specific. You can personalize the workouts a little bit more than in the previous application but it is still not optimal. The app is focused on home exercises only and does not help you in a gym at all, we want to focus on the use at the gym and its equipment instead. We differentiate ourselves from this application by having a system that can predict the busy times and thus can suggest the best times to go and also by having all the specific information of a gym (which machines train which muscles, where are the
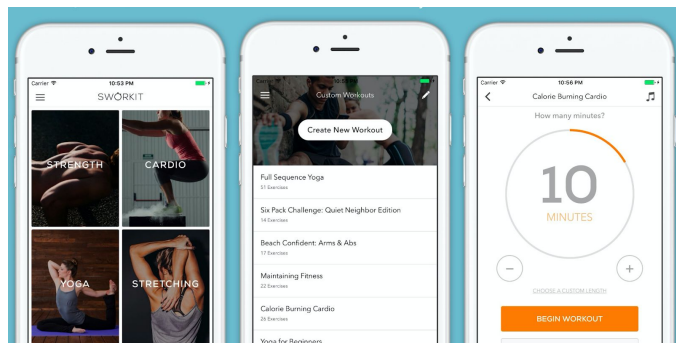
machines inside of the gym, etc.). Taking a look at the design of this software it also has a very clear and intuitive interface. But you can also see that this software has a lot less functions as it only includes things to do at home and does not give the full experience our software will give.

Source:https://sworkit.com

Criteria	Hanyang University personal gym trainer	Basic-fit	Sworkit
Standardized workouts	yes	yes	yes
Platform	Website	application	application
AI to predict best time to workout	yes	yes	yes
diet plan	no	yes	yes
Put in own workout schedule	yes	yes	no
general agenda	yes	no	no
See progress	yes	yes	yes
stretching guide	yes	yes	yes
warming up	yes	yes	yes
Gym and equipment information	yes	yes	no
Providing the gym owner with equipment usage statistics	yes	no	no
Providing a feedback option	yes	no	no

inputting sleepquality			
	yes	no	no

A. Account management

As said earlier, the website should provide the user with the basic functions of account management.

That means, if the user enters the Main Page of the website, he should be able to either log in with a simple user id and password or he can click on an icon saying "sign up", which leads him to a different view where he can create a new user entry. This entry will be stored on the backend database. Only usernames, which are not used yet should be accepted.

The login data have to be compared to the data stored on the database. If the password is wrong, the system should notify the user about it. After valid authentication is entered, the main page of the website is displayed.

Over the settings username and password can be changed.

B. Getting starting parameters

Before the user can start his first work out, he will need to enter all sorts of personal information inside a special menu in the settings, so that he/she can track the progress from working out. The software will ask for the age, height and weight. The user will also have to put his personal training goal into the software. This can vary from wanting a certain weight goal to an amount of repetitions on a certain machine. With all this data and the data the software collects from the workout feedback it can create graphs and statistics that will show the progress towards the goals the user set for itself. Of course, the user will be able to change all this data at his/her choosing. At this stage the user will also be able to make its own personal workout schedule. The user can select which machines to use each session and can also choose the amount of repetitions and the weights. This also serves as a starting point used in the statistics that the software will be able to show.

C. Starting and ending workout

The user will be able to start a workout he made at any time he wants and also end it at any time. The software will collect all data needed during the workout.

D. Giving feedback

The software will ask the user for feedback during the workout in order to ensure that the user does not overdo himself and to prevent injuries. After the warm-up it will ask the user how he/she is feeling, the user will have different options to answer. This process repeats itself a couple of times during the workout and after the whole workout the software will ask the user for his/her overall body condition. If the user is feeling good during or after the workout, the software will ask to increase the weights or repetitions of some exercises in order to make the workout more appropriate. On the other hand, went it is going poorly or if it went poorly overall the software will suggest lowering the intensity of the workout to ensure that there won't be any injuries and to ensure that the user is feeling good about his/her workout.

E. Entering sleep quality

This function works similar to the function above. Before each workout the software will ask the user if he/she slept well. Based on the answer the software will once again suggest lowering the intensity of the workout if the sleep quality was poor.

F. Enter schedule

The user will be able to schedule all his workouts in a calendar. The calendar that the software is going to use is google calendar. If the user already used this application all of his/her other activity will automatically show on the schedule and it will be automatically added to all other placed where he/she used google calendar.

G. Display real time user activity

The software will show to the user at all times how busy the gym is. But the main thing about this function is that there will be an AI integrated into this system that will be able to predict the busiest times. The software will suggest to the users times to go to the gym. the user can select the most appropriate time for him/her. The user is still free to choose any other time but then the software cannot guarantee that the gym is not super busy.

H. Display training information

Before and after his workout a stretching guide is displayed.. The stretching guide will include pictures and a detailed description in order to ensure that the user does them right.

The software will also include a detailed description and pictures for each exercise. During the user's workout it will show the user which machines he/she will use during their workout. The user can click on each exercise to get this detailed description when needed.

When users click on the map it should show all the machines they have to use for that particular workout. The ones that need to be used will be shown in a different color. When

clicking on one of the machines for the workout it will give you detailed information with a picture on how to do the exercise and it should also give you information about what weight you should use, how many repetitions and how many times per repetition.

I.   Generate workout schedule and routine

The software will generate a schedule of the workouts based on the inputs of the user. After that the software will based on the AI suggest times and days to complete each exercise and it will also make sure it is not during any activity already in your calendar.

J.   Display training schedule

When the owner of the gym clicks on this feature, he/she should get a list of all the equipment used in the gym. When clicking on a specific item he/she should get a picture and description of that item and it should also show all sorts of statistics such as how much it is used, what weights are used the most, if he should order more weights or if more machines for a certain muscle groups are needed.

K.   Showing equipment usage statistics

When the user clicks on his/her schedule he should get in full detail when his next work out will be, what the focus of that workout is and a detailed list of the exercises. The user will be able to edit the timing of the workouts and also the type of workout.

Old specification section:

We had some trouble figuring out the specifications of our project as it is very difficult to do that for a website. As a consequence we tried to give you some imagination of the main website GUI and the functions we want to call when clicking on the icons.

PAGE 1

SIGN UP:

New members can sign up before having utilities

SIGN IN:

Old members can access their account.

Utilities are accessible only if you are connected on your account.

PAGE 2

Account:

1) Provide personal information like name, age, gender, favorite machines, number of times going to the gym, weight, goal, exercises used in the past.

2) Modify User ID & Password

3) Delete account

Progress:

visualize graphs showing the weight evolution, sleep quality variation.

Notifications:

message from the owner, crowdedness alert, stretching alert, motivation message.

Schedule:

visualize the working out schedule made by AI.

GYM information:

we provide a map of machines and we can find every machine of the gym and click on the image to get information (muscles, execution guidelines and images, usage frequency for each machine)

Physical activities:

1) Provide machines and exercises used this day.

2) Provide feedback about your feelings: before and after

3) Provide your sleep quality

4) Provide your schedule.

Warming up & stretching:

We can find tutorial videos in 2 sections: Warming up and stretching.

Number of persons who went to the gym today

The number of persons who went to the gym at a certain date should be displayed continuously.

Message:

we can send a message to the owner (Subject, message content)

PAGE 1

HANYANG GYM

SIGN UP
USERNAME :
PASSEWORD :

SIGN IN
USERNAME :
PASSEWORD :

PAGE 2

Account
HANYANG GYM
234 persons
4

Progress   schedule   GYM information   Physical activities   Warming up & stretching

Contact owner :
Subject
Message :