COM 553

Major Project Final Report

Interactive Multimedia Design - 2014

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Peer Support Group: 7
Mentor: Dr Raymond Bond

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I would finally like to thank my father for the concept and inspiration for this project.

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1. Introduction

1.1 The Challenge

The challenge for the IMD major project in 2014 was to create something innovative in concept. Previously IMD Major Projects projects were almost exclusively websites, and often multi-platform responsively designed websites. Others however branched out and created mobile applications, both native some hybrid. I wanted to change this trend and build something unique to this discipline and thus create a product which would develop into a strong brand and have potential for later commercialisation.

To achieve this goal practical and analytical skills will have to be applied to the project coinciding with both innovation and creativity. In order to provide a quality solution, and fulfil the requirement of meeting a real world need, a special emphasis on self-management was essential to successfully producing a significant piece of work.

1.2 Aims and Objectives

"To use emerging web technologies to engage users in indoor exercise."

As the aim of this project is to use web technologies to engage users in indoor exercise, there are numerous objectives that will need to be fulfilled along the course of its process, namely:

- Make indoor exercise more interesting.
- Provide an incentive with a 'destination' giving users focus on an achievable goal and a sense accomplishment on completion.
- Make use of web technologies such as device orientation.
- Provide the capability to manipulate video speed playback according to user performance.
- Encourage users to engage with indoor exercise.
- Improved performance with regular use of the product.

1.3 Overview of work undertaken

The Gantt chart, Fig.1.3.1, portrays the development schedule of products initial lifecycle. In Fig. 1.3.1 below we can see when research was due to take place as well as when product development was undertaken. It also shows when the final product demonstration will be held along with the Viva Voice.

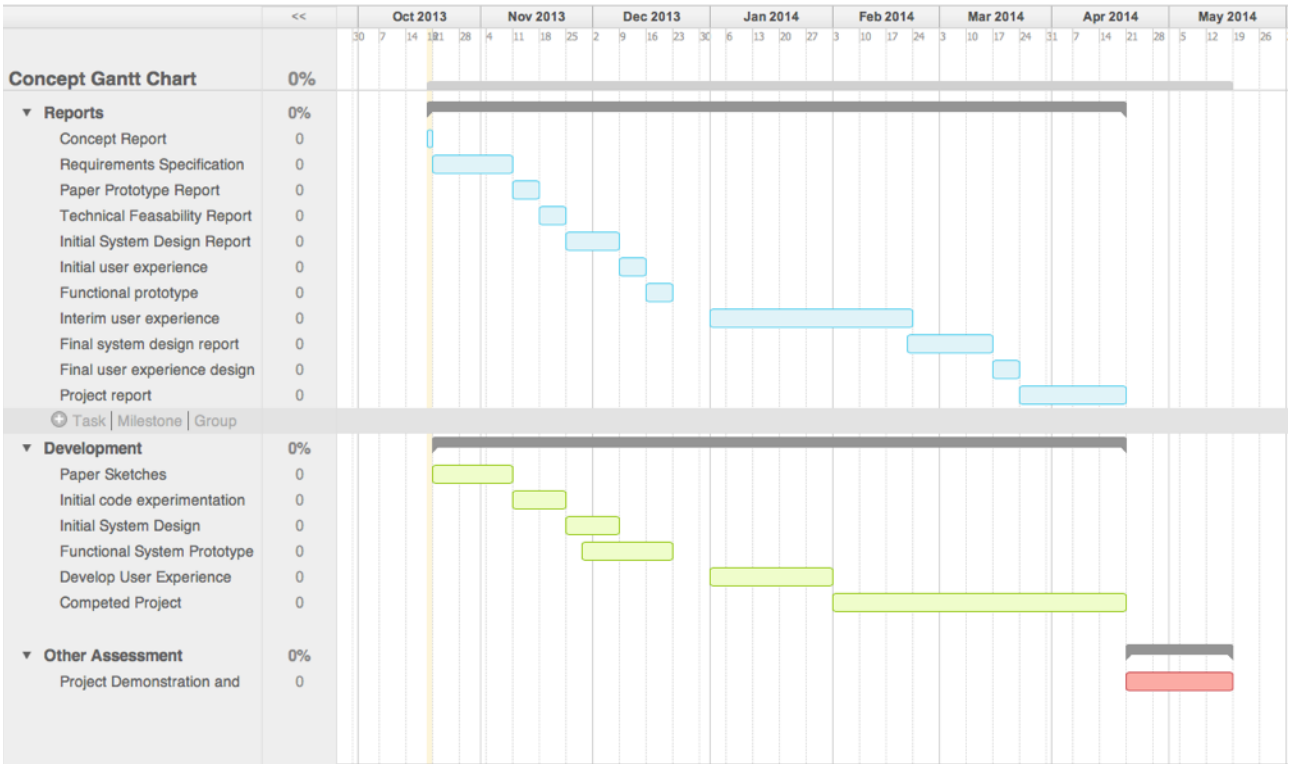


Fig 1.3.1: Gantt Chart

1.4 Overview of following Report

Throughout the course of this report documentation will be created and evidenced on the creation of this project. It will include five distinct sections Concept definition and testing, Design, Implementation, Testing, Evaluation.

The Concept Definition and testing section will cover the products Idea generation stage, requirements needed to successfully accomplish a quality product, paper prototyping the chosen solution as well feasibility testing regarding this solution, and the methodology selected which best suits the projects requirements.

The design segment of the report will include how the user experience has developed from the idea generation stage into paper prototyping and further into a solid branding solution acutely fitting the service the product provides. This section will then progress to discussing how the products system design has evolved throughout the products maturation exploring application architecture, user flow, data flow and technologies used to create the final solution. In this section there will be considerations made for both the logic and data design principles the projects encapsulates.

Implementation will examine the technologies chosen to develop this product and how their choice influenced the development process. It will also highlight the challenges faced throughout the development timeline as well as the significant achievements produced during the development of the final product.

The last two sections will cover the testing and evaluation phases in the products timeline. Testing will take place to see how the product interacts with potential future users of the product using a selection of testing methodologies, and based on the results collected from this trial prospective amendments to the product can be seen. This will lead to evaluation of the product including testing results, chosen methodology, overall plan and hence project outcome.

2 Concept definition and testing

2.1 Idea generation

The domain of this project relates to the significant growth health and fitness sector even through the current recession. In 2011 Mary Gotaas, and IBISWorld analyst, said: “Despite experiencing solid growth during the past decade (with the exception of the past two years), the market has not yet reached saturation. As a result, the Gym, Health and Fitness Clubs industry is expected to remain in a growth phase, with revenue expected to rise at an average annual rate of 2.6% to $28.2 billion in the five years to 2016” The number of gym memberships in the USA alone is projected to reach 47.5 million people by 2016 .
Obesity resulting from a lack of exercise however is a significant global health concern. Research shows 64% of adults in the UK are overweight and draws a clear relationship between this and levels of adult inactivity. A problem that is also significant across Europe and North America. This lack of exercise sees over half the adult population putting their physical and mental health at risk due to insufficient levels of exercise. Echoing the World Health Organisation, Northern Ireland’s chief medical officer has stated that "Obesity is undoubtedly the most significant public health issue confronting our generation”.

Feedback from gym members show that this much needed indoor cardio vascular exercise is tedious, resulting in a lack of motivation to exercise frequently or to a sufficient degree. Outdoor exercise is generally more engaging but difficult for adults to fit into increasingly busy schedules. Moreover, for those attempting to address a lack of exercise, and associated weight and health problems, factors such as poor weather often presents a useful excuse to avoid exercise.

This project aims to provide a solution to this issue. To achieve this the project focuses on enhancing the gym experience through utilising a wearable activity monitor and connected display that brings essential motivating factors of outdoor exercise into the gym. To realise this concept this project uses a smartphone as a wearable activity monitor to control an interactive virtual reality experience on a tablet computer. The virtual reality experience offers an interactive high definition video of an outdoor route for cycling or running that responses to the wearer’s activity levels to encourage activity and to reward improvements in performance.

This can reduce tedium and improve the frequency and degree of exercise taken by way of a blending together of the positive aspects of indoor and outdoor exercise.

There have been many studies which delve into the world of exercise and its benefits, but looking into the concept of using persuasive technology based on physical activity we find a few interesting new developments which often refer to the technology acceptance modal as a key factor. As seen in Fig 2.2.1.

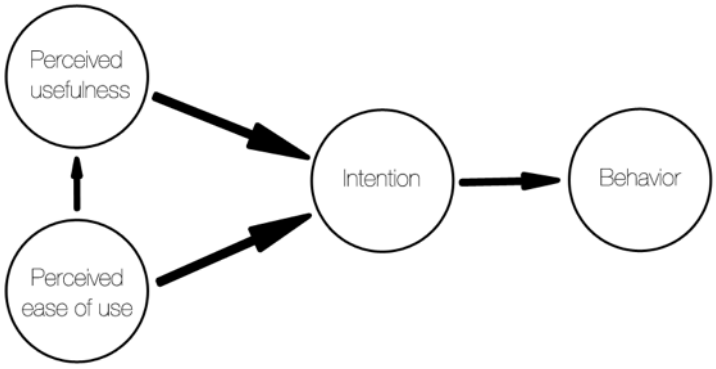


Fig 1.3.1: technology acceptance modal

This modal is a theory that has been developed showing how users come to accept and use a new technology. The theory illustrates how, after a user has been introduced to a product, they will give their verdict on its usability based on two main factors;
Perceived usefulness (PU) - was defined by Fred Davis as "the degree to which a person believes that using a particular system would enhance his or her job performance", or in this case participation and engagement in indoor exercise; and,
Perceived ease-of-use (PEOU) - was defined as "the degree to which a person believes that using a particular system would be free from effort" by Fred Davis.

There have also been studies into how to develop persuasive technologies with an eight step guide emerging on this process to structure how a project of this type can be produced. As seen in Fig 2.2.2.

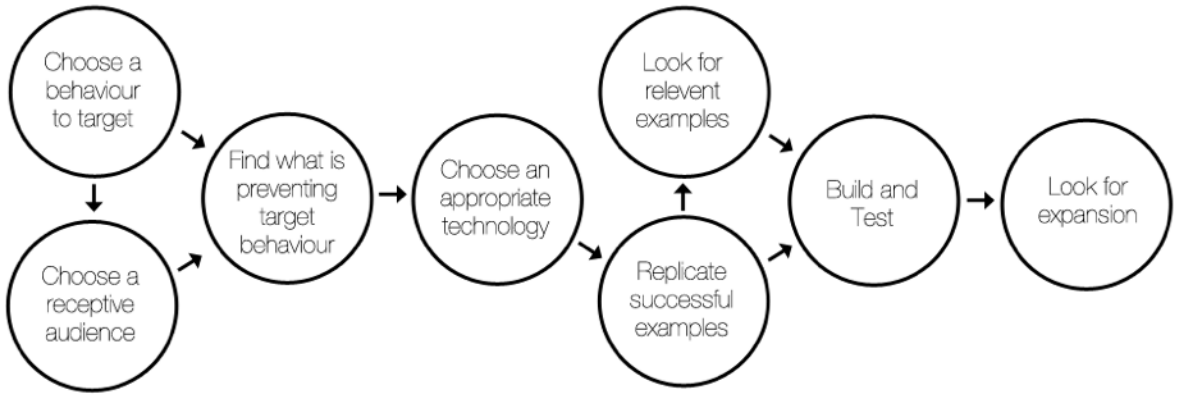


Fig 1.3.1: Eight step guide to emerging persuasive technologies

Sonia Arteaga from the University of California created a study on creating a 'Persuasive Mobile Exercise Companion for Teenagers with Weight Management Issues' and has raised three interesting theories on how persuasive technology can be used to enhance performance:
Theory of Planned Behaviour - Addresses how prior beliefs are reflected in the intentions of the user, which are then revealed in their behaviour.
Theory of Meaning Behaviour - Theorises that there are two types of motivational incentives that promote behaviour change, which can be classified as internal or external. External motivators are external rewards such as increased fitness levels while internal motivators are associated with personal rewards such as feeling healthier.
Personality Theory - Follows the Five-Factor Model of Personality and demonstrates how personalising a system for enjoyment can be more effective for people with different personality traits.

By using and adapting these three theories I will be able to create a product enabling the user to have an interactive, personalised and engaging indoor exercise experience.

2.2 Requirements specification

To determine whether a product has been successful we first need to define requirements, of which the final product will be held accountable upon completion.

These requirements can be split into two divisions:

Functional requirements - these are the fundamental or essential subject matter of the product. They describe what the product has to do or what process actions it must take.

Non-functional requirements - These are derived from the products functional constraints and focus on elements of the project which are not essential to the running capabilities of the product but may be the difference in whether the service will be a success or not. As they focus on performance and usability the end user is much more involved in the definition of these requirements. Look and feel of the service as well as non-functional usability will also need to be considered at at this point to make the product engaging.

Requirements have also been gathered for development hardware, product running hardware, development software, project running software as well as user requirements.

User requirements are normally the main focus of a products development as they will be the beneficiaries of its creation. These requirements will focus on essential factors such as usability which the developer needs to take into account when focusing the product and will need to appreciate what the user wants to achieve when using the service. Look and feel will also need to be considered again at at this point.

2.2.1 Requirement Gathering

Requirements have been collected through:

Holding Short Interviews - By holding short interviews with potential end users of this product we gain the ability to attain direct user feedback on what they would like as a product, how they see it helping them, and how they expect to use it as a service.

Questionnaires - Providing questionnaires it allows users to get large quantities of feedback data from many different sources very quickly. Therefore obtaining the capacity to see trends in data and see if there is a general consensus among user groups providing the opportunity to structure the product, focusing on larger user audiences.

Reverse Engineering - By studying other similar products available to potential users of this product we can detect what level of service this product needs to reach and surpass to create a product users will gravitate towards, and away from competitors.

This also provides the opportunity to view how successful models completed their requirements giving a guideline to development processes.

2.2.2 Volere Template

The Volere methodology on testing a product requirements states how testing should begin as the requirements are being written, therefore enabling the developer to see his/her successful or continuing progress throughout a project. To provide this feature the Volere guide represents its requirements through the use of 'Snow Cards' as seen in Fig 2.2.2.1. These cards succinctly highlight and define the type and definition of each requirement, and add fields for source, rational and satisfaction among others.

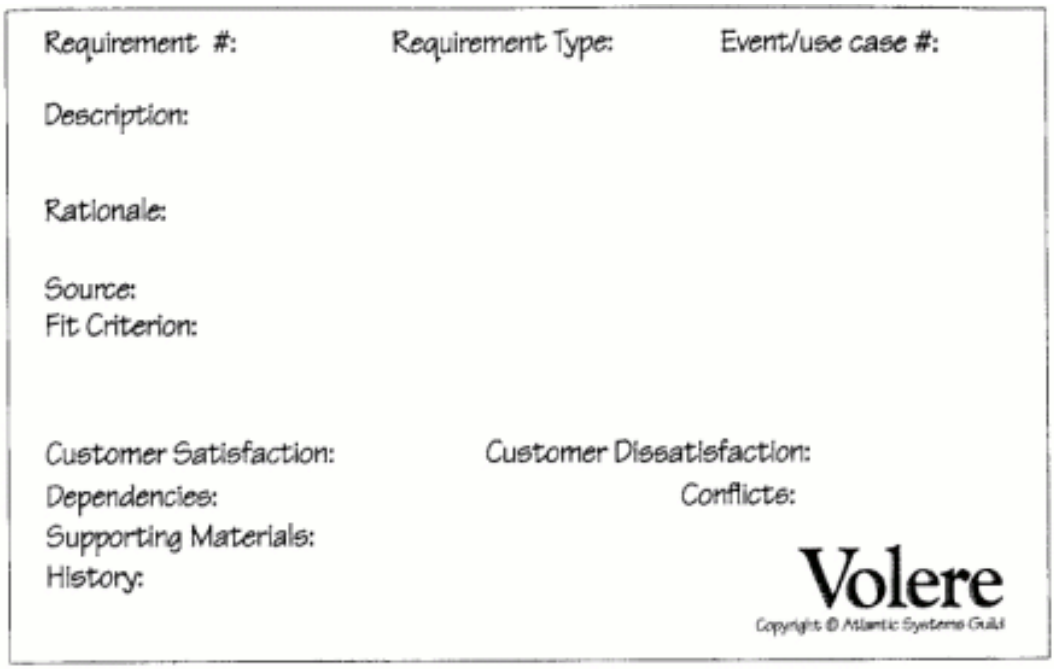


Fig 2.2.2.1: Volere template

One other important field is the Fit Criterion field which provides the developer of the project the opportunity to reference this field directly when adjudicating how close each requirement is to being fulfilled. Along with these each requirement has a Unique ID allowing each to be referenced, and therefore checked off, individually. This template is known as a 'Snow Card'.

This 'Snow Card' concept, using a more applicable format, is the choice method of presenting the requirements this product will need to complete to become a valuable product.

Below are two 'Snow Cards', one functional requirement and one non-functional requirement, which have been produced to represent the format each requirement for the successful completion of this product.

Functional Requirements

Requirement ID: 1
Description: The system will be capable of attaining device orientation and thus work out acceleration data from a mobile device.
Rational: This is needed to enable the product to use this data for video playback manipulation.
Originator: Developer
Fit Criterion: Ability to attain numerical device orientation data and thus work out its acceleration.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Non-Functional Requirements

Requirement ID: 10
Description: The system will be capable of using a QR code or unique link to create a unique login
Rational: This is needed to enable ease of use for the user and perform uniquely to each user.
Originator: Developer and User
Fit Criterion: Ability to have a easy unique login feature for users
Customer Satisfaction: 5
Customer Dissatisfaction: 4
Priority: 4
Conflicts: If this is unable be be achieved normal sign up/login capabilities will be acceptable. No other dependancies in this case.

See appendix 9.1 for remaining 'Snow Card' requirements as a collection for reference.

2.3 Paper Prototyping

To determine how a product should function successfully, we need to examine a few possible methods of achieving the products goal and hence selecting the most appropriate one for the development of the project. As this project aims to present dynamic video as its main feature this element needed to be presented as a focal point for each user, allowing him/her to fully immerse themselves in the product.

So, to find the most appropriate method of present this video element the 6-up template was utilised. This template is a fast method used to brainstorm initial design ideas to help find their benefits and flaws.

2.3.1 6-Ups

1. The first design includes a full screen video with a navigation bar along the top, similar to the JQuery mobile design. This design includes a slide out navigation panel which will allow users to switch to the view they are requesting. Fig 2.3.1.1.

These options include:

- Video
- Live Performance
- Recent Records
- Choose Route, and
- Log Out

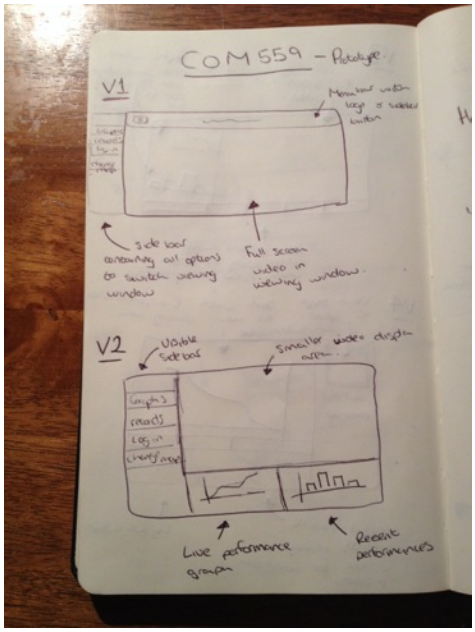


Fig 2.3.1.1: 6-UP No. 1 & 2

2. The second design allows users to see almost all options at once and still providing the user with 60% of the screen for video display. With the video being played back in the viewable area the user will also see a liv performance chart and a recent record chart below. The sidebar will always be visible in this design and will also allow users to change the main view by selecting the appropriate options, thus switching the video to the relative position. Fig 2.3.1.1.

3. Design number 3 takes a different approach, Fig 2.3.1.2. This design shows the video as a full screen display with the other main features (Live performance, recent records) being overlaid on the right hand side with half-opacity. If these features are selected from the side they change opacity to 100% making them more clearly visible. If the user still wants to make these features more visible they have options along the bottom of the screen to replace the view with the options:

- Video
- Live Performance
- Recent Records
- Choose Route, and
- Log Out

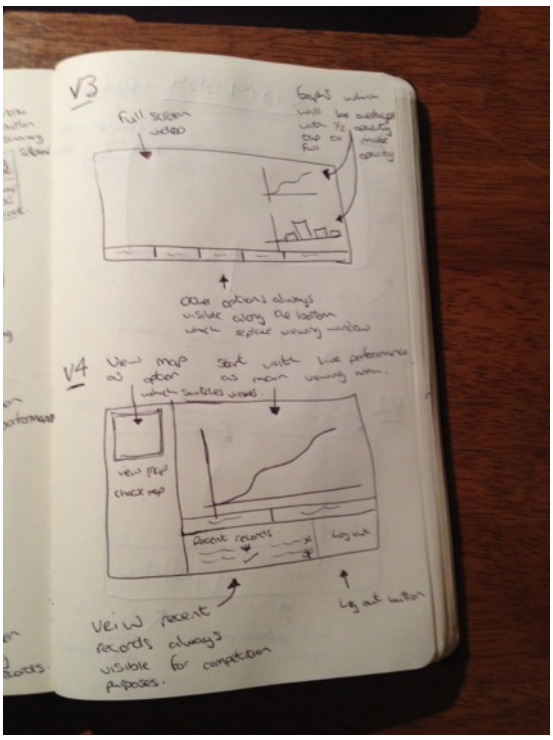


Fig 2.3.1.2: 6-UP No. 3 & 4

4. The fourth design decided to represent this feature of the application is through another, very different design. Again reducing the size of the main viable area to 60% I have initially used it to display the Live Performance chart allowing users to see a visible representation of the effort they are putting in. The sidebar will hold a small preview of the route they are traveling on along with the options to 'view larger' or to change the route they are travelling on. Below the viewing area recent records will be available along with Log In/Out options. Fig 2.3.1.2.

5. The fifth design splits the screen into two distinct sections. The top part of the page will hold the video of the route along with its title. It will also house a button on the top right hand corner linking to a sidebar which will slide in when its selected. This sidebar will allow users to Log In/ Out, change route and show Recent Records. The bottom section of the page will then provide a view of the users live performance and along with dynamic numerical stats to give the user better information to rely on. Fig 2.3.1.3.

6. The last design again splits the deign into two contrasting sections. The first section displays the video of the routes the users are travelling on and as well as a similar menu button providing a sidebar allowing the users to Log In/Out or change route. The section section is again split into to categories, each representing a quarter of the screen. The top section will hold the Live Performance chart and relative data with the bottom section showing Recent Record data. This design allows users to view nearly all available data at once saving on the need to switch viewable screens. Fig 2.3.1.3.

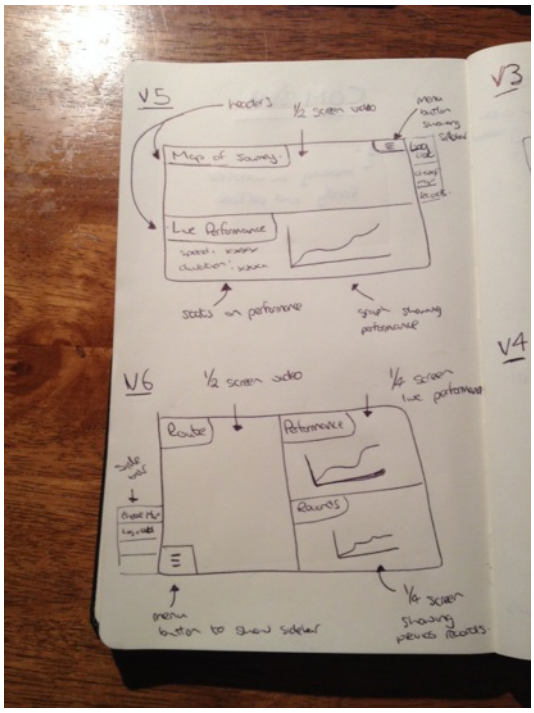


Fig 2.3.1.3: 6-UP No. 5 & 6

2.3.2 1-UP

Taking the 6-UP designs further a 1-UP, or prototype design, of the chosen design was generated. Building on the first 6-UP template, it allows the user to see the video as an immersive full screen experience giving them the best possible opportunity to engage with the application without any displayed distractions. Fig 2.3.2.1.

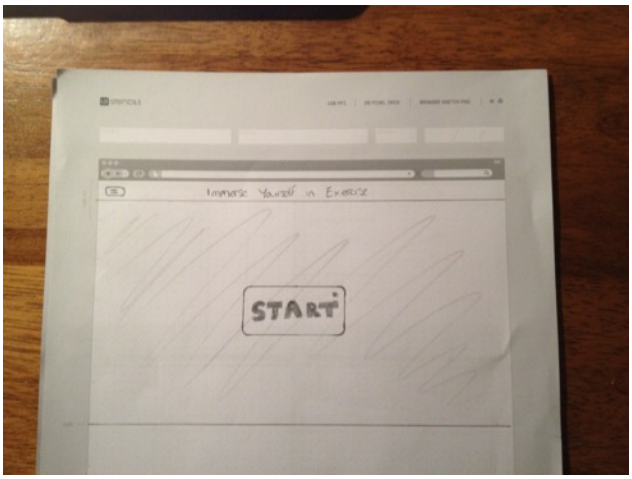


Fig 2.3.2.1: 1-UP

Developing this prototype design in more detail, considerations were taken to look at how the user would interact with the full screen video. It was decided that a large, simple button would provide the simplest application of the product and enable the user to engage directly with the service. While this button is visible the background video preview will be paused and blurred directing and focusing the user on beginning their exercise.

On the applications homepage the only other option available for the user is the menu button positioned discreetly in the top right hand corner of the header-bar, which also holds the title of the application.

As you can see in Fig 2.3.2.2, when the sidebar slides out it will give the user the option to view Video, Live Performance, Recent Records, Choose Route and Log Out. In this example the Live Performance screen has been selected. As the option was selected the option in the list darkens and then the sidebar will disappear revealing the new viewing area showing the selected, relevant data.

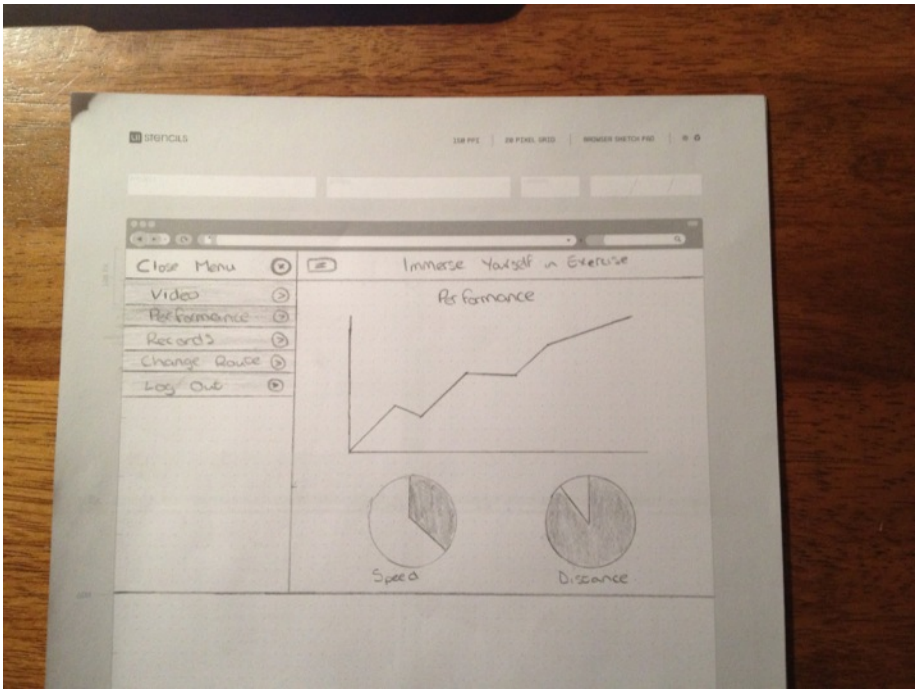


Fig 2.3.2.2: 1-UP

2.4 Feasibility testing

To determine whether my proposed product will function successfully a technical feasibility examination must take place following the development of the products requirement specification. The aim of this test is to determine the feasibility of the project with research, experimentation and product testing, identifying possible risks which may slow down, or stop, the continued development of this product.

Potential Risk Assessment

By way of creating potential risk assessment guidelines to represent the value each risk is to the success of the product we can efficiently quantitate the severity of the risk to the projects success. Seen in Fig 2.4.1. Each feature which is seen as a potential bottleneck will have a risk assessment attached.

Risk Assessment Scale

1 = Product can progress without this functionality

2 = May have minor adverse effects on products success

3 = Will effect products success but product may still work

4 = Product will be severely hindered and may lead to it being unsuccessful

5 = Will stop the products success and working functionality

Fig 2.4.1: Risk Assessment Scale

There are a 5 well-defined bottlenecks for my project:

1. The ability to obtain accelerometer data numerically from a mobile device.

2. The ability to send and store this data in a JSON file directly from a mobile device.

3. Updating a JSON file in realtime directly from a mobile device.

4. A connection between two devices which will represent data gained from the mobile device.

5. Video playback updating in realtime

- **5a.** Ability to manipulate video playback speeds dynamically.
- **5b.** Loading times.
- **5c.** Whether broadband speeds are sufficient to make this feasible.

Without finding a solution to these bottlenecks, the product's ability to perform as an engaging platform for exercise will be limited.

Risk 1: The ability to obtain accelerometer data numerically from a mobile device.

Most computers, mobile phones and other new devices have accelerometers, gyroscopes, compasses and other hardware as standard features which have been developed to capture motion and orientation data.

HTML5 DeviceOrientation and DeviceMotion events provide developers with information about the orientation and motion of the device and hence its acceleration. This acceleration data can be accessed and returned in two forms, with and without gravity, providing the ability to read and interpret this data.

The ability to access this data is an essential part of this product as it will allow the capacity to judge leg speeds (when device is attached to the user) accurately while exercising, thus providing the opportunity to chart the users progress and use the data in a numerical format to adjust video playback speeds.

Fig.2.4.2 and Fig 2.4.3 highlight examples of this code being tested by to presenting the data.

```
31  //ADDS LISTENER TO CHECK THE ORIENTATION OF THE WINDOW
32  window.addEventListener('deviceorientation', onOrientation);
33
34
35  function onOrientation(event) {
36
37      // GETS ORIENTATION VALUES
38      var rotateLR = Math.round(event.gamma * 1)/1 ;
39      var rotateFB = Math.round(event.beta * 10)/10 ;
40      var compassDirection = Math.round(event.alpha * 10)/10 ;
41
```

Fig 2.4.2: Device orientation function

rotateLR

-1

rotateFB

0

compassDirection

0

Fig 2.4.3: Orientation results

Potential Risk Assessment

5 = Will stop the products success and working functionality

Risk 2: The ability to send and store this data in a JSON file directly from a mobile device.

The ability to store this data in this way is an essential part of this product as without this ability data transfer across multiple devices becomes more difficult, often leaving the product in the one-dimensional state. Following research conducted on best to store data in this form it was decided to save the data to a JSON file through PHPs json_decode and json_encode methods.

This allows access a JSON file, opens it, decodes it and provides editing abilities. It then repackages and encodes the JSON file with the values stored securely inside.

This functionality is necessary to the product being successful as without its ability the developer will only be able to present live data on one device, and not having the ability to record or take samples of data.
In Fig 2.4.4, Fig 2.4.5 and Fig 2.4.6 evidence of testing proves this functionality for attaining device orientation data and the ability to update the JSON file, storing data successfully.

```
20
21    // FINDS JSON FILE, OPENS IT AND DECODES IT TO MAKE IT EDITABLE
22    $jsonString = file_get_contents('data.json');
23    $data = json_decode($jsonString, true);
```

Fig 2.4.4: Decoding JSON file

```
30    // RE-ENCODES JSON FILE, PUTS UPDATED VALUES INSIDE
31    $newJsonString = json_encode($data);
32    file_put_contents('data.json', $newJsonString);
33
```

Fig 2.4.5: Encoding JSON file

```
3   {"rotateLR":"-1","rotateFB":"0.2","compassDirection":"0"}
```

Fig 2.4.6: Updated JSON file

Potential Risk Assessment

4 = Product will be severely hindered and may lead to it being unsuccessful

Risk 3: Updating a JSON file in realtime directly from a mobile device.

As Fig 2.4.4, Fig 2.4.5 and Fig 2.4.6 prove we can save data to a JSON file, we do however need to update this file dynamically so data be can accessed in realtime (or close to real time).
To achieve this we require a method of updating this JSON file at a specified update rate. Using AJAX call every 250m/s to read the file will achieve this.

Without this feature the functionality to present data dynamically will be restricted and users will have to rely on one call to the JSON file leaving the user with a very limited experience as it will not feel interactive or engaging.

As seen in Fig 2.4.7 and Fig 2.4.8 it posts the data to the PHP file using AJAX, updating the JSON file, and allowing this task to be preformed.

```
// POSTS ORIENTATION VALUES TO PHP FILE - SO IT CAN UPDATE THE JSON FILE ---- ("\u0026" = & --- Concatanates additional values)
$.ajax({
  type:"POST",
  url: "update.php",
  data: ("variable1=" + rotateLR) + "\u0026" + ("variable2=" + rotateFB) + "\u0026" + ("variable3=" + compassDirection)
});
```

Fig 2.4.7: AJAX call to update PHP passing in variables

```
// FINDS JSON FILE, OPENS IT AND DECODES IT TO MAKE IT EDITABLE
$jsonString = file_get_contents('data.json');
$data = json_decode($jsonString, true);

// UPDATES JSON WITH VARIABLES FROM DATA.HTML
$data['rotateLR'] = $ajax_var1;
$data['rotateFB'] = $ajax_var2;
$data['compassDirection'] = $ajax_var3;

// RE-ENCODES JSON FILE, PUTS UPDATED VALUES INSIDE
$newJsonString = json_encode($data);
file_put_contents('data.json', $newJsonString);
```

Fig 2.4.8: Update PHP receiving and updating JSON variables

Potential Risk Assessment

4 = Product will be severely hindered and may lead to it being unsuccessful

Risk 4: A connection between two devices which will represent data gained from the mobile device.

To successfully create a product that represents data gained from a sensory device (Mobile device with device orientation and device motion functionality) and present it in any format I will need a method of connecting the two devices. Implementing this can be achieved by generating a unique URL, which users will be presented upon entering the website. This URL will either be shortened or converted to a QR code (for ease of use). The user will then go to this URL on their mobile device creating a connection and allowing the user too use the device in coalition. The preferred method of implementing this is through using the PHP method uniqid(); which generates a unique code, which can in turn be used to name the JSON file creating a unique connection. Fig 2.4.9.

```php
<?php
echo uniqid();
?>
```

Fig 2.4.9: PHP unique ID method

Potential Risk Assessment

4 = Product will be severely hindered and may lead to it being unsuccessful

Risk 5: Video playback updating in realtime

5a: Ability to manipulate video playback speeds dynamically.

This is an integral part of the engaging property of this product. Without this feature users will be unable to change the speed of video playback depending on performance and hence leave the product without its main incentive of an interactive feature. The HTML5 Video (and Audio) playbackRate attribute provides this functionality. By accessing this feature through the DOM updates can be made to the playback rate by assigning the appropriate JSON variable to Javascript variable and placing it inside a function which updates the playbackRate. Seen in Fig 2.4.10.

```
function setPlaySpeed() {
  myVid.playbackRate=0.1;
}
```

Fig 2.4.10: HTML5 video attribute update function

5b: Loading times.

Due to the high media content being accessed (video) throughout the exercise experience there needs to be a method of ensuring the video playback will not require buffering throughout the exercise. HTML5 video also has a new feature which allows developers to preload and cache videos when the page loads. Seen in Fig.2.4.11.

Syntax

```
<video preload="auto|metadata|none">
```

Fig 2.4.11: HTML5 video preload attribute

5c: Whether broadband speeds are sufficient to make this feasible.

By updating video playback rate continuously broadband speeds need to be capable of preforming this task without adverse results. To fix this issue lower quality videos may need to be used.

Potential Risk Assessment

5 = Will stop the products success and working functionality

With these 5 main features addressed the feasibility of this project will be successful and all the requirements listed in Chapter 2.2 and appendix 9.1 will be fulfilled. Therefore the schedule created to develop the project can continue without alterations. Fig 2.4.12.

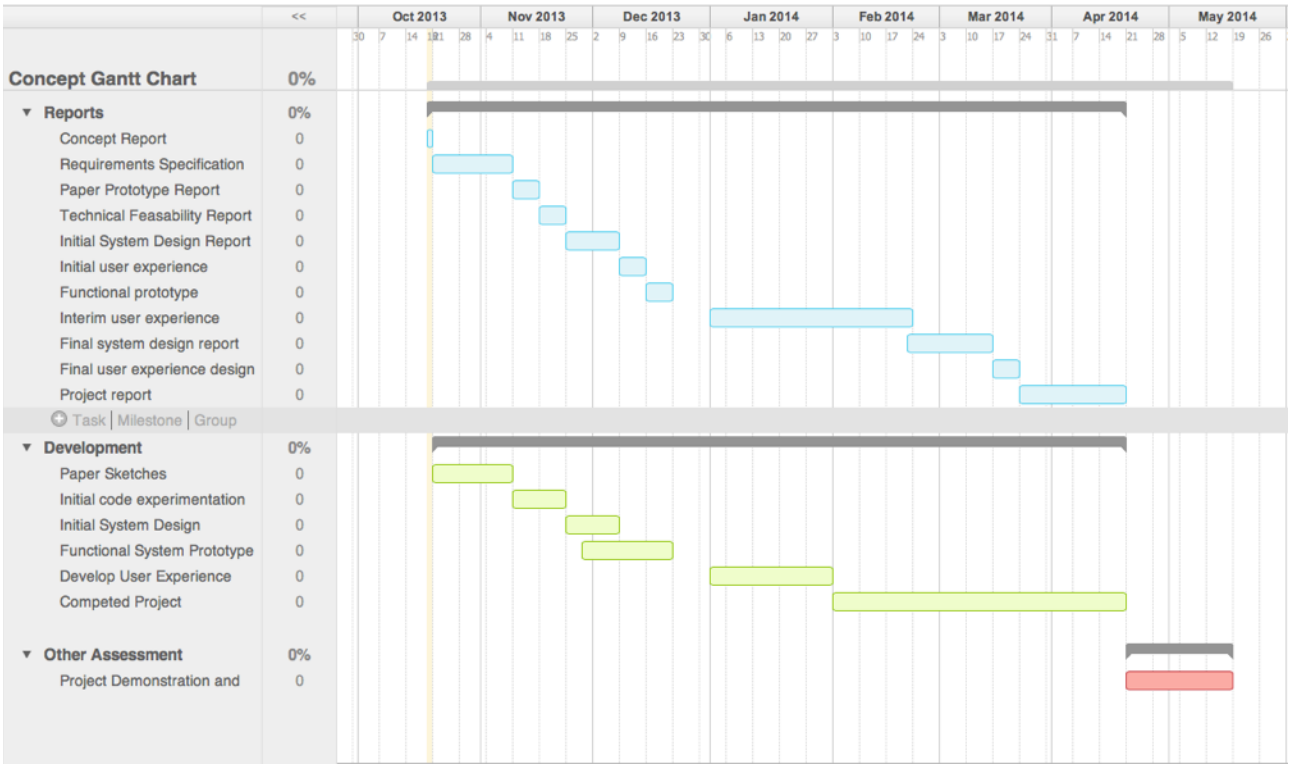


Fig 2.4.12: Gantt Chart showing successful schedule

2.5 Methodology selection

The management system used in this products development is the Prototype Methodology. Having gained experience using the Agile throughout previous development experiences, it was recognised this may not be the most suitable approach when developing this product, as there isn't an external client who will change and amend their product.

Since the creator is, effectively, his own client for this project, an evaluation will be produced based on testing, and hence further development will take one of two channels; either review design and development, or proceed to further development and a final product. This management model has a few advantages including the direct involvement of users in product development and the provision of a working model to allow users to have a better understanding of the system, so that errors can be identified quickly and missing functionality or features can be recognised and amended. However, this could lead to increased complexity within the system.

To achieve this goal a method known as the 'Bottom-Up Approach' will be used as a base of separate features will need to be developed then brought together. These individual features include collecting mobile device orientation data, using AJAX to post data to JSON file, updating a JSON file in real time with PHP, and using device orientation data to manipulate HTML5 video. Then by combining these stand-alone features the creation a larger, viable product will be possible.

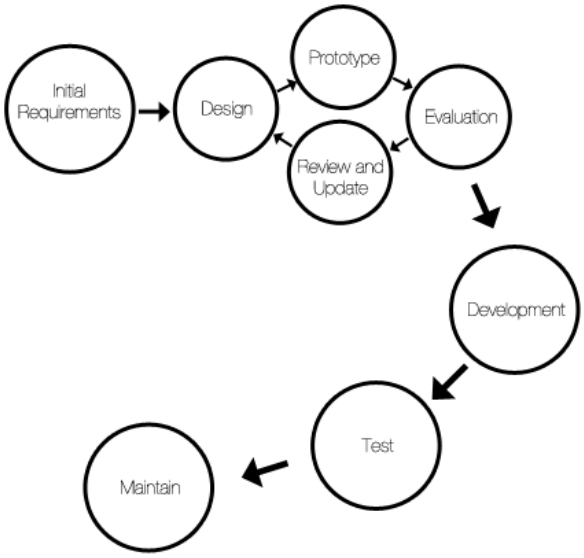


Fig 2.5.1: Prototype Model

3. Design

3.1 UX Design Evolution

As the project developed so did the design of my product, 'Immerse yourself in Exercise'. Built across two devices my product has a connected design developed to tailor a users performance and end goals.

"To use emerging web technologies to engage users in indoor exercise."

My approach in creating this product is to develop a tool that can be used to enhance a users indoor cycling experience as well as using persuasive technology to improve performance. To achieve this goal I initially began by developing a design which reflects a positive healthy lifestyle but still rendering the user with a full screen experience enabling the immersion of oneself in the product.

Design Development:

The design of this project has developed in 3 key areas as outlined below:

- 3.1.1: Video and Visual Approach
- 3.1.2: Statistic presentation
- 3.1.3: Route Display
- 3.1.4: Branding
- 3.1.5: Color Palette
- 3.1.6: Typography
- 3.1.7: Interactions
- 3.1.8: Persona
- 3.1.9 Final Design

3.1.1 Video and Visual Approach

Initially the decision was taken to use a top-bar to hold the applications brand and navigation menu button but when investigating navigation structure it was discovered this was not the most appropriate solution for this application.

By utilising the implementation of lines distinct sections of this application can be defined. The main header bar which ran the full width of the application design was seen as a distinct section through creating clean, uninterrupted line which defined this sections importance and separated it from the main display area. This gave the user a constant reference point during their experience using the application. Carrying this design feature forward it has been integrated into the redesigned sidebar, again a clean, uninterrupted line separates the menu from the engaging content. Defining sections in my menu were also separated in this way.

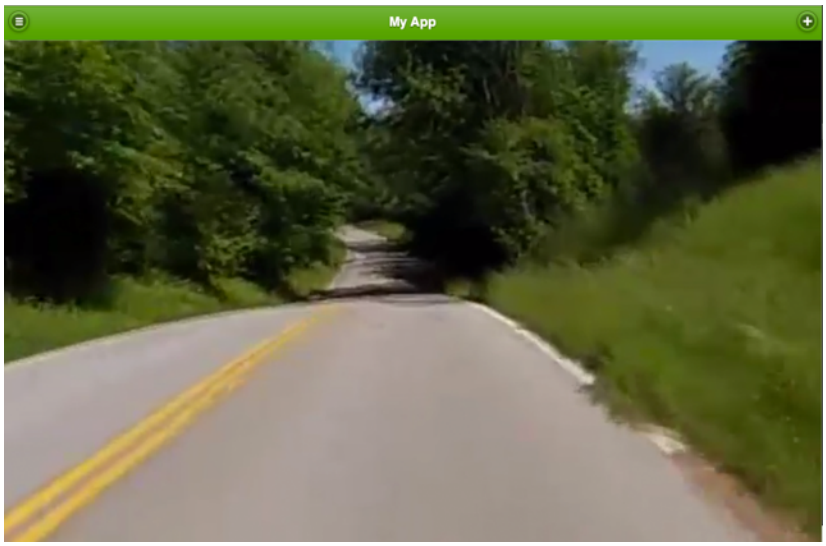


Fig 3.1.1.1: Initial concept

Seen in Fig 3.1.1.1, the top-bar has a lot of redundant space and looks lost in the experience, therefore it was decided to redevelop this design into a sidebar which will be fixed to the left hand side of a users screen. This closed menu will contain three main features: The 'Immerse yourself in Exercise' logo, a map showing the location the video is representing and a list of icons which will be used as links for navigation leaving me with the opportunity to remove the button needed for a sliding navigation. When a user hovers over the sidebar it will expand horizontally by approximately 200 pixels. This allows users to produce the word for each section which the icons represent providing the opportunity to give a clear understanding of what each section

incorporates. This design also gives the opportunity to supply the the user with a better view of the videos location on a world map.

This approach, seen in Fig 3.1.1.2 and Fig 3.1.1.3 better suits the projects needs as the user will now have access to all options with one click, shortening unnecessary user journeys. By redeveloping this navigation into a sidebar it also provides additional features while reducing redundant space leaving the user with a more dynamic, immersive encounter.

There are a few simple shapes which define this project. In most cases the overarching shape is, simply, a rectangle. As this application aims to provide the user with the best possible immersive experience for the rendering video there is be little else to obstruct the viewers vision (except the sidebar).

Fig 3.1.1.2: Final Solution

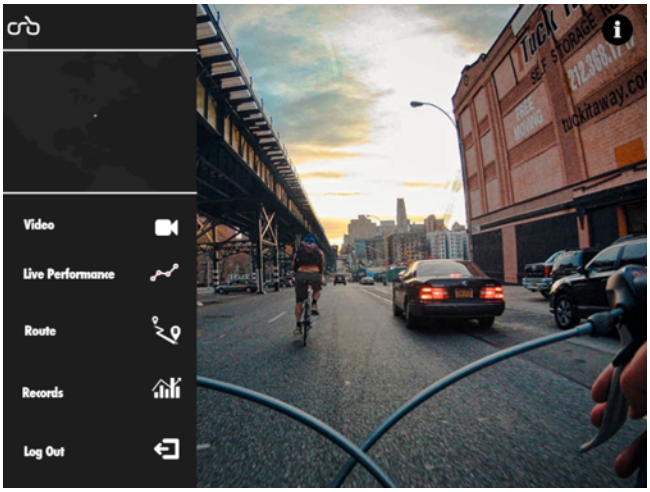


Fig 3.1.1.3: Final Solution

3.1.2 Statistic Presentation

Plans to include statistics began as as an extra feature for my application. Therefore it was decided to add these features as an overlay using the golden ration as a guideline for positional purposes as seen in Fig 3.1.2.1. However as the product developed it became clear these statistics could be a very valuable asset to the product. Through further research into how to present this data in a better format it was decided that the sidebar, which had been recently redesigned, would be utilised. By adding this feature directly to the sidebar users could presented the data a a new page. Designs for this page then began to develop this page to suit the product.

Fig 3.1.2.1:Initial Design for statistic presentation

From the data available from this application four main categories of statistics can be provided, hence the need to develop a way of presenting this data. This was done through developing and creating a creating a bottom bar to host these statistics which will be presented in a graphical format that the user can easily read while exercising. Fig 3.1.2.2.

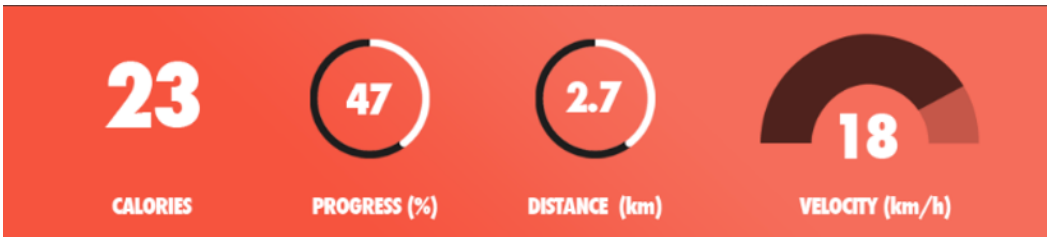


Fig 3.1.2.2: Final bottom-bar Design

The main feature of this page is a new graph, a performance chart, which has been developed to combine data calculated to find the velocity change over the duration of the exercise. Fig 3.1.2.3.

Fig 3.1.2.2: Statistic presentation Design

3.1.3: Route Display

Initial plans for this feature looked at allowing users to select what routes they would like to travel on for their journey. This feature has however changed drastically. Instead this component has developed into a feature which portrays the users route on a map in real-time. The benefits of this feature out ways the previous attraction as an initial prototype product as it allows the user to be more involved in the cycle ride as an experience rather than a spending time on an administrative process. Further developments of this product could lead to greater application personalisation as mentioned later inproduced in appendix 9.2

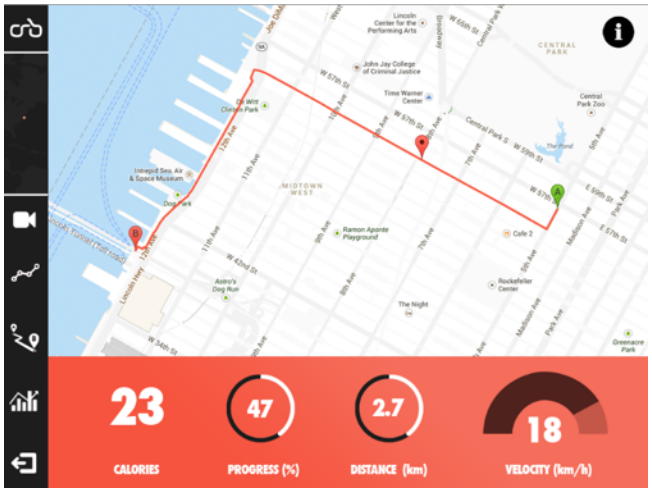


Fig 3.1.3.1: Google map design alterations

The design process began by looking at the webs leading perfumer in this field, Google Maps. By removing standard Google Maps controls and amending the typical Google Maps UI to match the colour schemes developed in the brand guidelines produced in appendix 9.2, creating connected feel which could aid the aesthetic appeal of the application.

A decision was also taken to include the same bottom bar which is featured in the 'Live Performance' section of the application as a secondary feature as users may want to reference the performance data they are generating in order to see relative performance in the real world application of their cycle.

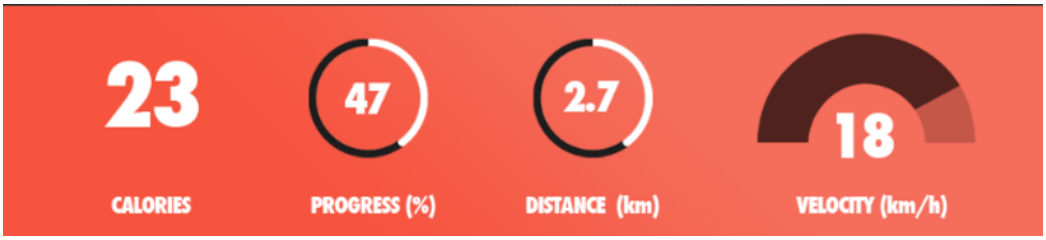


Fig 3.1.3.2: Final bottom-bar Design

3.1.4 Branding

IMMERSE YOURSELF IN EXERCISE

Fig 3.1.4.1: Monogram Design

Although other domains of exercise could potentially use this product, it is primarily geared toward cycling, which the fluid logo featuring a bicycle exhibits. Lars Haue Pederson explains that this symbol could be one of the most important tools in aiding a products growth, by including this foresight in brand details now we ensure a strong brand guide for the future of this product. However Lars Haue Pederson continues to explain how that a brand is not just a logo:

Although the physical aspects of your organisation (the logo, the letterhead, the way your people answer the phone, etc.) are key, a brand is more widely and adequately defined as a distinctive picture and association"

Brands can be powerful, they develop imaginations and can direct behaviour patterns among users of a product or application. The icon for the 'Immerse Yourself in Exercise' brand is intended to be simple yet effective. It encompasses a clean icon which takes the form of a bicycle. The products initial target audience, cyclists, will recognise this as a symbol of their field of exercise and be encouraged to explore what this application will provide them as users. The design also encompasses the sharp and intriguing name for the campaign, 'Immerse Yourself in Exercise'.

The icon itself can initially be broken down into two free-flowing shapes, which when brought together form the structure of a bicycle. The first shape represents the rear wheel and centre structure, whilst the front wheel and handle bars of the bicycle is embodied in the second shape. This design has been developed with clean, smooth linear shapes to symbolise the the healthy aspect of exercise in a lifestyle. This the icon uses the 'Futura' condensed typeface as it's bold weight and simplicity contracts with the icon itself giving a strong paired relationship between the typeface and the icon. This is further highlighted in appendix 9.2.

The purpose of minimalist art is to grab the fundamental quality and identity of a subject by removing all non-essential features. By utilising this concept this product hopes to achieve the same outcome Guillaume Seguin achieved in his redesign of NHL team monograms. Barry Petchesky writes about how the true test of a sharp, resonant logo is if it can be stripped down to its barest elements and still be recognisable. With this in mind minimalist logo designs based around sport were referenced and a new wave of excitement was found coming form clean simple logos which have been redesigned with the future in mind. S. Preston has had his minimalist rebranding of popular NHL teams featured in US Today, Sports Illustrated and Deadspin.com and it has went down a storm. Deadspin even claimed they were better than the originals. Often compared with Guillaume Seguin from Segments Design's similar simplistic approach we see how each individual teams logo is still instantly recognisable yet looks both new and fresh.

With the concept of Less is More in mind the logo design was to be made as simple as possible. Refining designs to two similar drafts illustrations began and found that the square style logo better defined this products and will give the brand a stronger identity.
Once a final solution for the focal point of my brand design was decided and illustrated a set brand guidelines have been created which, in conjunction with the colour palette, will be used as a reference when defining this products persona in the future. These can be seen in appendix 9.2

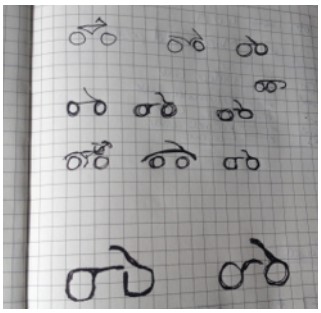
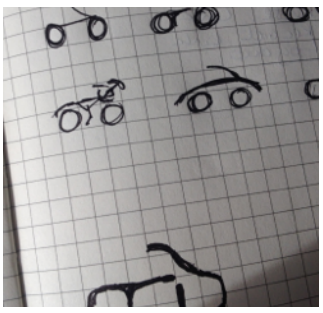
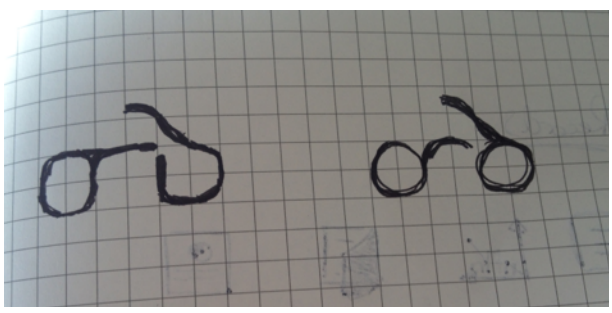




Fig 3.1.4.2, Fig 3.1.4.2, Fig 3.1.4.2: Developing Monogram Design

3.1.5 Color Palette

The goal of the application is to engage users in indoor exercise to promote fitness and wellbeing directly.

So with this focus a product needs to be created to fit the needs of its users directly. This led to a change in the colour palette of this application from green to red. Originally light shades of green and blue were chosen as they often represent health, fitness and cleanliness but as research progressed these colours were also commonly found having a calming effect on consumers and thus are frequently used at places such as health spas and massage parlours. This is not the desired effect the users desire to experience while using the application.

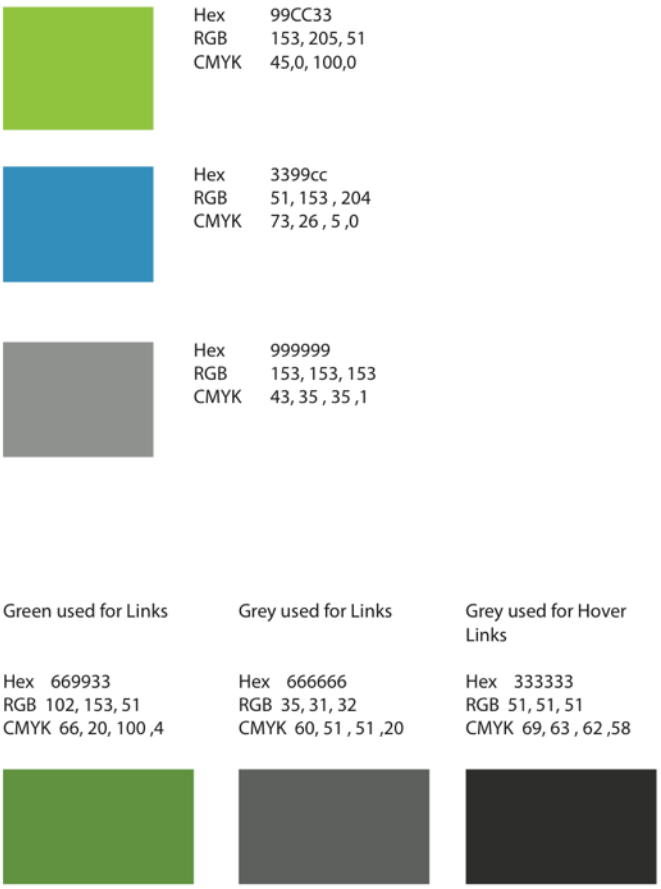
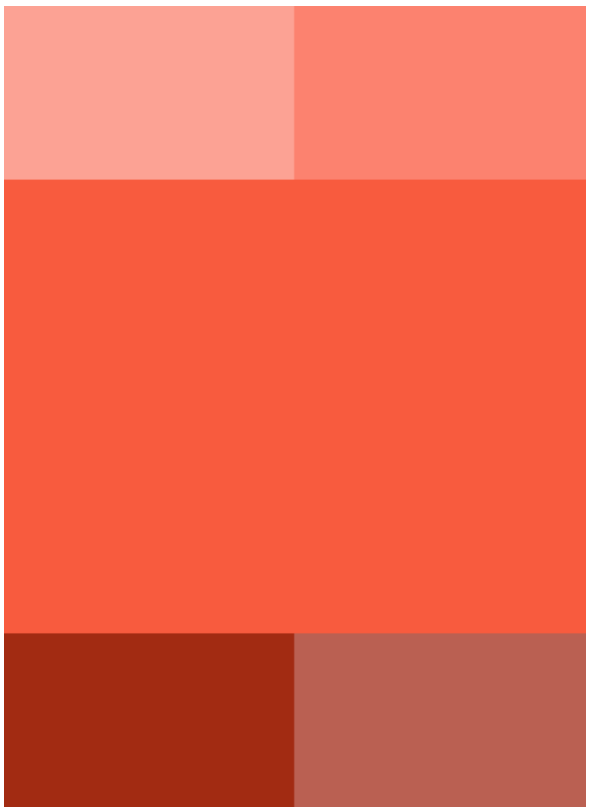


Fig 3.1.5.1: Original Color Palette

While Jean Karl Izzo studied the psychology behind colours affecting a users experience she found that "Red actually triggers the pituitary gland and speeds up the heart rate, hence causing the person seeing it to breathe more rapidly". This product aims to attain these biological traits directly. As a user cycles they will not be wanting a calming effect but will develop a raised heart rate and will want the application they are using to reflect this.

Furthermore, this instinctive response also makes emotions run high. Hirsch Fishman considered this practice and found Dark reds best represent the emotions this application wishes to embody. Emotions such as willpower, rage, tenseness, vigour, anger, leadership, and courage are seen to be represented through the use of red therefore this product aims to stimulate a passionate response from users through the use of colour - and red is always a safe bet.

Both Fishman and Izzo also state however red is also associated with danger and warning so I need to soften the tone of red so I do not shock my users away from my application.



Hex: #faa094
RGB: 250, 160, 148
CMYK: 0, 46, 34, 0
- Highlights

Hex: #fa7f6f
RGB: 250, 127, 111
CMYK: 0, 63, 52, 0
- Focus

Hex: #f6543f
RGB: 246, 84, 63
CMYK: 0, 82, 78, 0
- Links

Hex: #b85d52
RGB: 184, 93, 82
CMYK: 22, 73, 67, 8
- Background

Hex: #ffffff
RGB: 255, 255, 255

Hex: #c1c1c1
RGB: 193,193,193
CMYK: 24, 19, 20, 0
- Highlights

Hex: #1d1d1d
RGB: 29, 29, 29
CMYK: 72, 66, 65, 72
- Highlights, Links

Fig 3.1.5.2: New Color Palette

Further details can gain be seen in the brand guidelines in produced in appendix 9.2

3.1.6 Typography

Researching typography used on other exercise applications such Nike Plus became an influential factor in the choice of font used in the product. Designed by R/GA between 2006 and 2009 the design encompasses two main fonts, Futura, as the main imposing statement font and another sans-serif font which adds further tertiary information for the user.

As the product developed the choice if font altered marginally. Originally planning to use a typeface known as 'Bebas Neue', this later developed into Futura Condensed Extra Bold as though out there design process the character height of 'Bebas Neue' was often becoming an issue as it is a tall typeface.

Futura

Condensed Extra Bold

The typeface used is Futura, condensed extra bold Bold. It has a standard spacing and should not be condensed. The logo can be used both with and without the tagline. Tagline should always be the same colour as the logo to re-enforce the brand identity. This typeface will be used for all major heading and titles.

Helvetica Neue

Light

The typeface used is Helvetica Neue, light. It has a standard spacing and should not be condensed. Should not be used in conjunction with the logo. This typeface will be used for all body content including links, information, data representation and guides.

Typography: sans- serif
Font Family : Helvetica
Font type: Light
Kerning: 0

Further details can gain be seen in the brand guidelines in produced in appendix 9.2

3.1.7: Interactions

UX designer Craig Grannell states:

"Although aesthetics are important when you design interactive artefacts, you're designing objects that interact with human beings. As such, central to interaction design is the art of understanding people."

Interactions with the application will take place across two devices. The mobile device, which will be attached to a users body, will collect the data required to use the system while the Desktop device (iPad) will present the results in video and graphical format.

Mobile Device

As Craig Grannell pointed out people are at the centre of interaction design. When looking at how people interact with this product on a mobile device we have to look at both how its been done similarly in the past and how it could be done in the future. This application aims to straddle this paradigm. Fitness magazine gives guidelines on how pedometers should be worn on a users waist:

"Make sure you position your pedometer on your waistband, in line with your right knee, facing straight up and down, not tilted to the side."

On the mobile device data will be collected from the users, device orientation enabled, smart phone. To ensure we get successful readings from out device we need to create a standardised approach to attaching the device itself. So initial guidelines have been created, seen in Fig 3.1.7.3, which will help users place their device correctly. Much like the common iPhone armband runners use when training there have been bands developed to mount similar devices to a users thigh, examples include ThiPhone(Fig.3.1.7.1) and Tsaya (Fig.3.1.7.2). Although less popular and often used for different reasons these products could be used much like their arm equivalents. Armbands themselves are also commonly capable in size to fit a users leg and would adjust to suit adaptation in this case.

Fig 3.1.7.1:ThiPhone

Fig 3.1.7.2:Tsaya

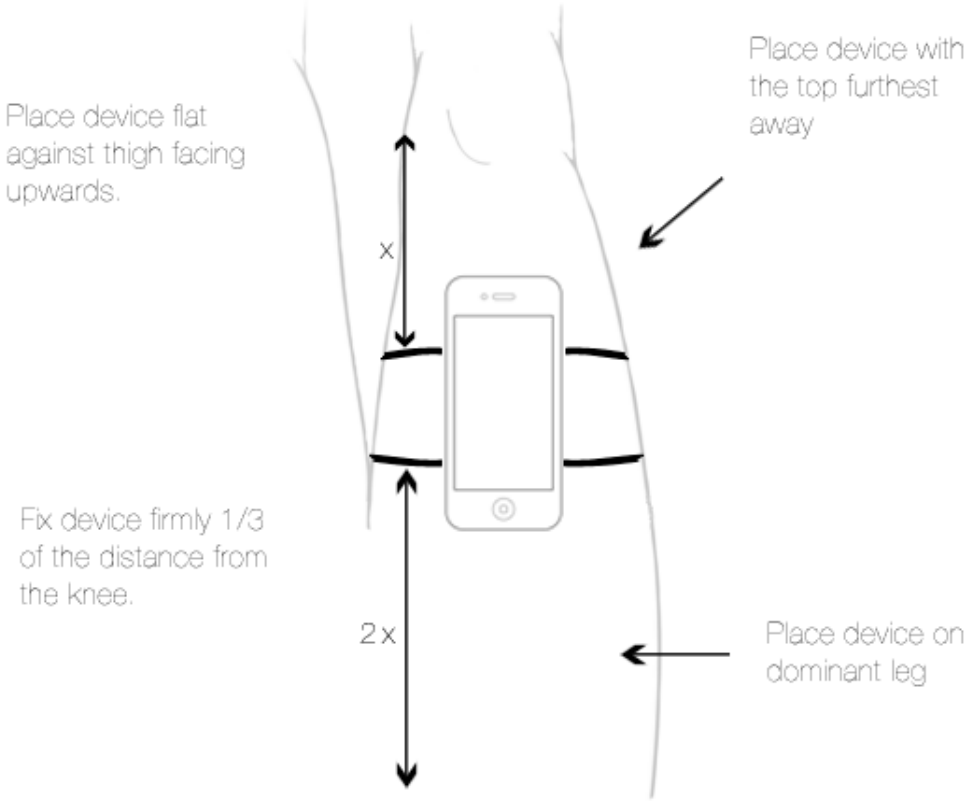


Fig 3.1.7.3: Device Position

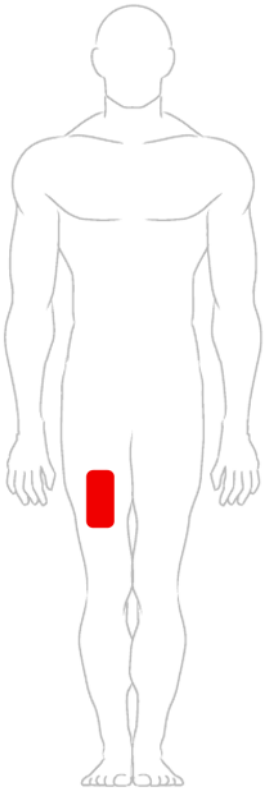


Fig 3.1.7.4: Device Position

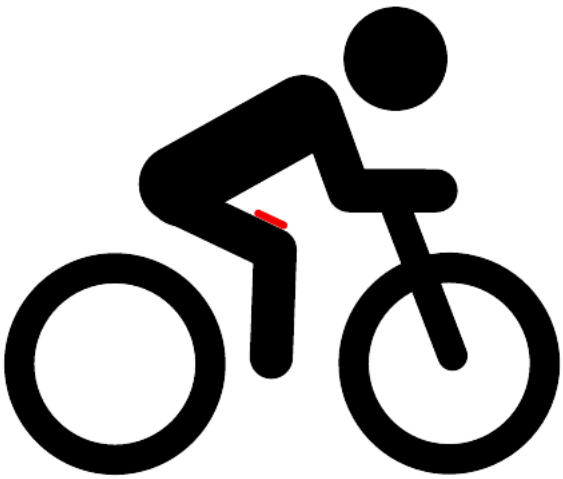


Fig 3.1.7.5: Device Position

Desktop Device

Just like on my mobile device there is provision taken to ensure appropriate application of the desktop device which will follow guidelines produced in Fig. 3.1.7.6 and Fig 3.1.7.7. The guidelines recommend where to place the device to provide the optimal immersive experience while exercising with this product. The optimum device for rendering an immersive video experience would be a tablet computer.

Desktop Device Placement Guidelines

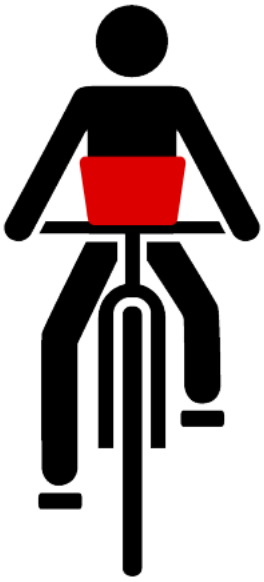


Fig 3.1.7.6: Device Position

Fig 3.1.7.7: Device Position

Now standardised data can be retrieved from the applications users algorithms can be developed to calculate results for the user.

3.1.8 Persona

Following this projects brand identity Ian emphasis was placed on how the application would feel for each consumer to use, this is an integral part of their exercise experience. As a this project has a very distinct user type a persona can be focused directly to the users needs. A large percentage of this applications user base will be people exercising, in particular - using cycling machines in a gym. Demographics for this focused user base could still be vast though with users ranging from teenage enthusiasts to obese and elderly. These people could come from many walks of like but are all using the application with one purpose - fitness and wellbeing.

As interference with the user flow would hinder the projects resultant outcome a minimalist approach needed to be taken. There are three distinct sections when it comes to reflecting a persona on this application: The video and The statistics.

The Video

The video will be the focal point of the application during the cycling process but to make full use of this focus the user must be provided with the best possible way to immerse themselves in the experience of their exercise. To do this a minimal interface is provided enhancing user experience allowing them to focus on their progress entirely.

The Statistics

The statistics will be a secondary feature for the users to benefit from. This secondary service will be found through a one click system from the main feature screen and will be a visual representation of solid performance data.

The Route

The route will be a tertiary feature for the this product. This service will again be found through a one click system from the main feature screen and will be a visual representation of position on a full screen map. Again this will immerse the user in the route they are traveling on while cycling.

3.1.9 Final Design

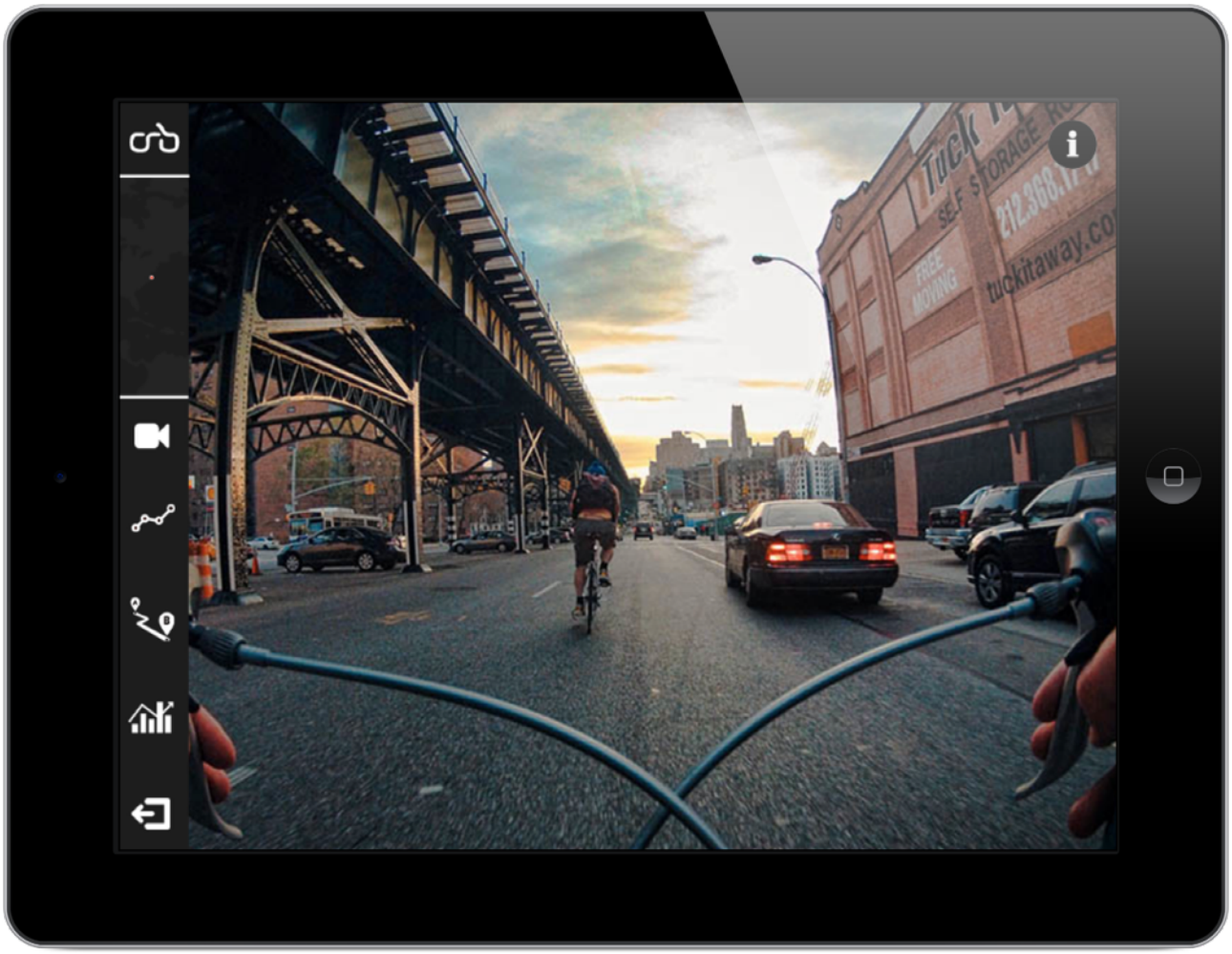


Fig 3.1.9.1: Homepage Final Design

Fig 3.1.9.2: Homepage - sidebar hidden

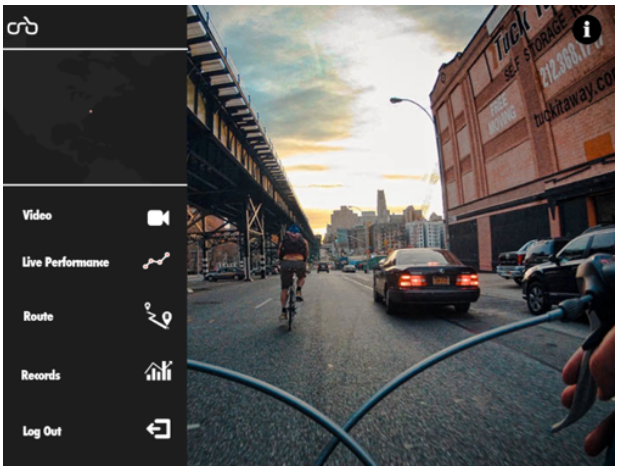


Fig 3.1.9.3: Homepage - sidebar visible

Fig 3.1.9.4: Statistics page

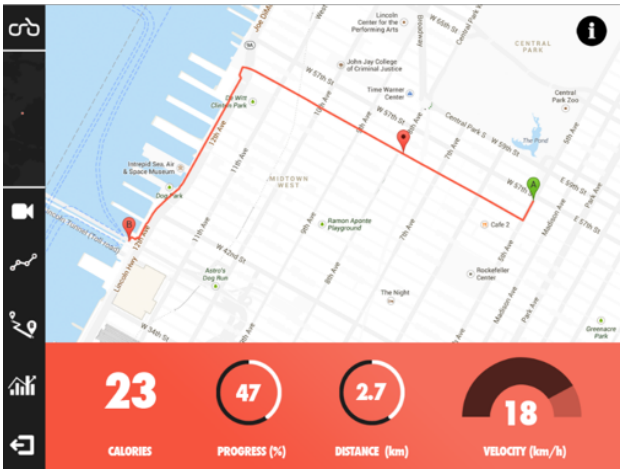


Fig 3.1.9.5: Route page

iPhone

The design for the iPhone will be minimal as this will be used to attain the gyroscope and accelerometer data and hence will be rapidly moving while the user is exercising. Some initial data for the user will be presented as they begin and end their exercise including device orientation, distance traveled and calories burnt but the main feature displayed on this device is speed as this would be the service the user would most like if they decided to look at their mobile device while exercising. Seen in Fig 3.1.9.6.

Fig 3.1.9.6:

Mobile device presentation

3.2 System design

A successful system design requires the producer of a product to identify and define the structure and technologies the product will incorporate. Following the initial product design and functional prototypes the final system design has been refined, further enabling an accurate and reliable system architecture to be developed.

3.2.1 Application Architecture

As this web application has a very unique architecture, which has very distinct sections based across both mobile and desktop platforms, an application architecture diagram has been created to show the construction framework used to develop this product. This illustration, seen Fig 3.2.1.1, also provides a guideline to the the technologies and languages used in each part of this application.

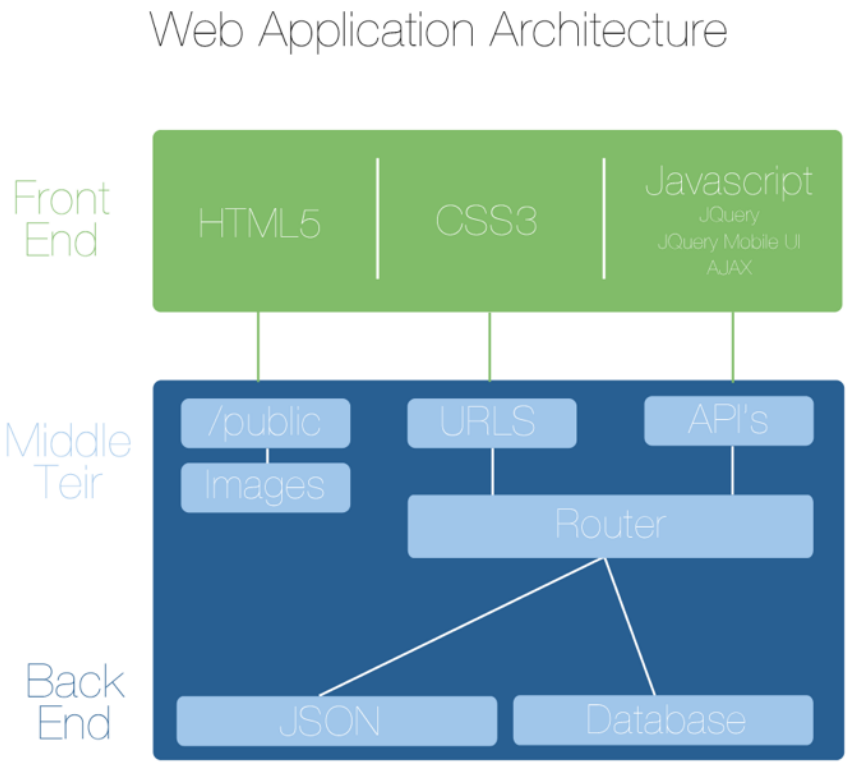


Fig 3.1.9.6: Application Architecture

These technologies will be further highlighted in chapter 4.

3.2.2 Client-Server Model

This model illustrates the divisions between the client-side technology used and its server side application technologies. It also portrays how the internet is an intermediary service allowing direct and asynchronous connection between these distinct technologies through the use of AJAX.

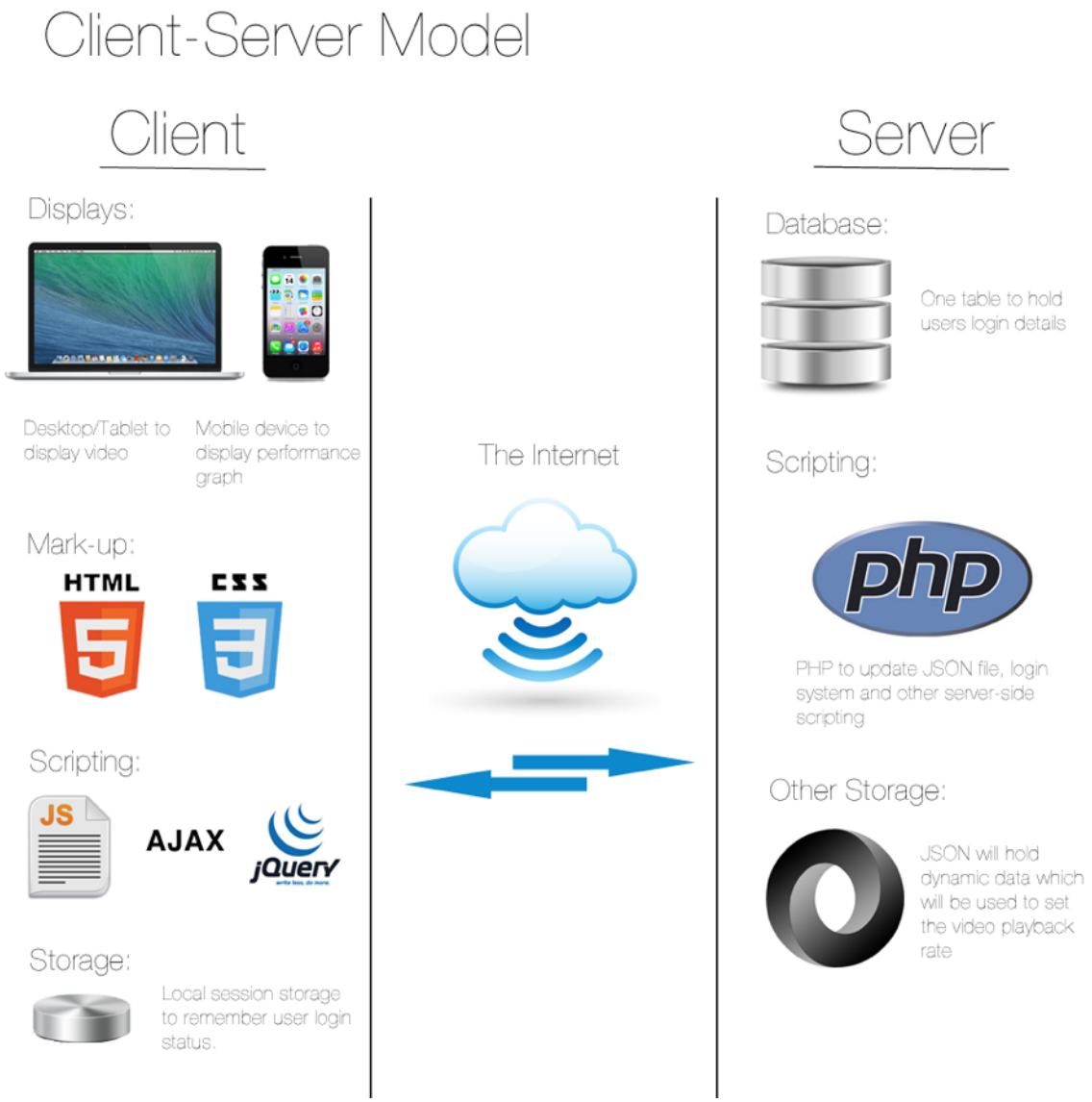


Fig 3.2.2.1: Client Server Model

3.2.3 User Flow

The user flow in this application is distinctive as it straddles two platforms. As seen in Fig 3.2.2.1 this application will have a direct user flow as the application is being used and will give the feeling of a single harmonious system, even through it will require two devices to function, as the user journeys throughout the application.

The sidebar navigation will host all other journeys throughout the application. Originally the sidebar would provide four options for a cyclist while they are exercising; video, route, live stats and records. An executive decision was taken as the product developed to remove the records option for this functional product prototype. This was due to the social aspect of product not being fully developed, this is discussed further in Chapter 8.

Fig 3.2.2.2 and Fig 3.2.2.3 are supporting images which help illustrate the complex user flow while using this product.

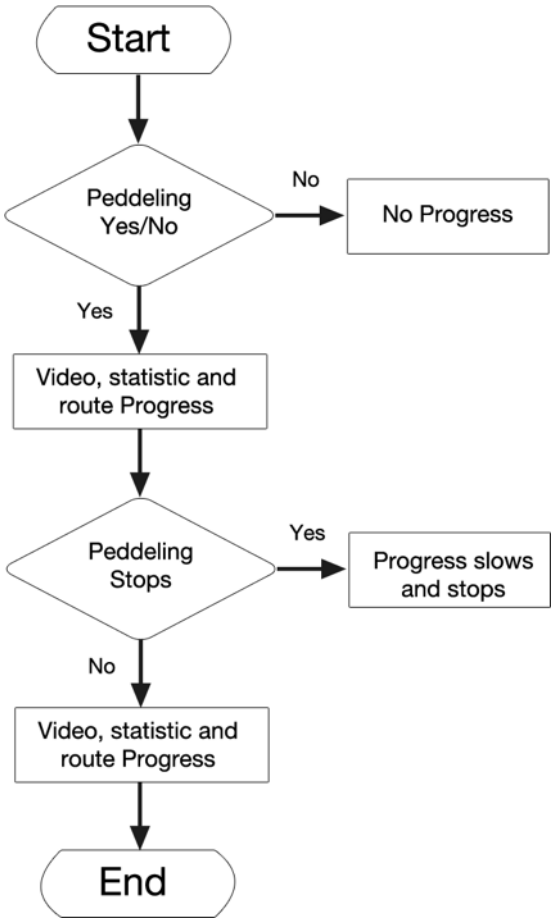


Fig 3.2.2.1: User Flow Diagram

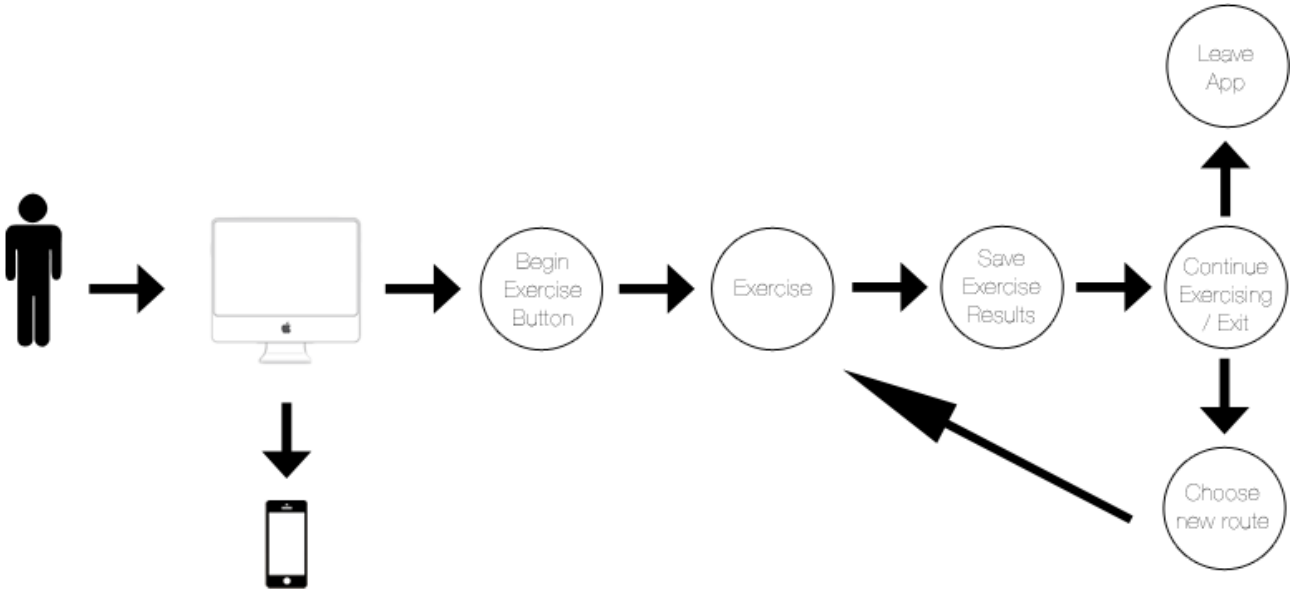


Fig 3.2.2.2: User Flow Support Diagram

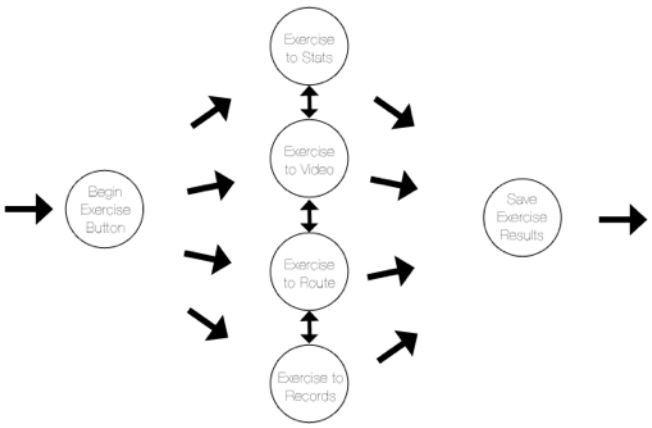


Fig 3.2.2.2: User Flow Support Diagram

```
{
  "rotateLR":"-1",
  "rotateFB":"0.7",
  "compassDirection":"0"
}
```

Fig 3.3.1.1: JSON data structure

3.3 Data and Logic Design

As dynamic data for the application will be stored in a JSON file a well defined structure is needed to ensure a standardised approach to updating the file. This standardised approach is need to allow it to be read and searched when call dynamically through an AJAX request. The application will pass 3 values into the JSON file received from the mobile device; Rotation Left to Right, Rotation Front to Back, and compass direction. Although the rotation Front to Back variable will be the only one required to calculate velocity and other statistics for this version of the product other variables are being included for future enhancement possibilities. Seen in Fig 3.3.1.1.

3.3.1 Data Flow Diagram

Using Yourdon/DeMarco notation Fig 3.3.1.2 portrays a data flow diagram which depicts how data will travel though the system. Traveling from a client client based mobile device to server and back to a desktop client device. This DFD portrays four things:

- The data that will be put into the system,
- The data that will be presented from of the system,
- Where the data will come from,
- Where the data will travel to, and
- Where the data will be stored.

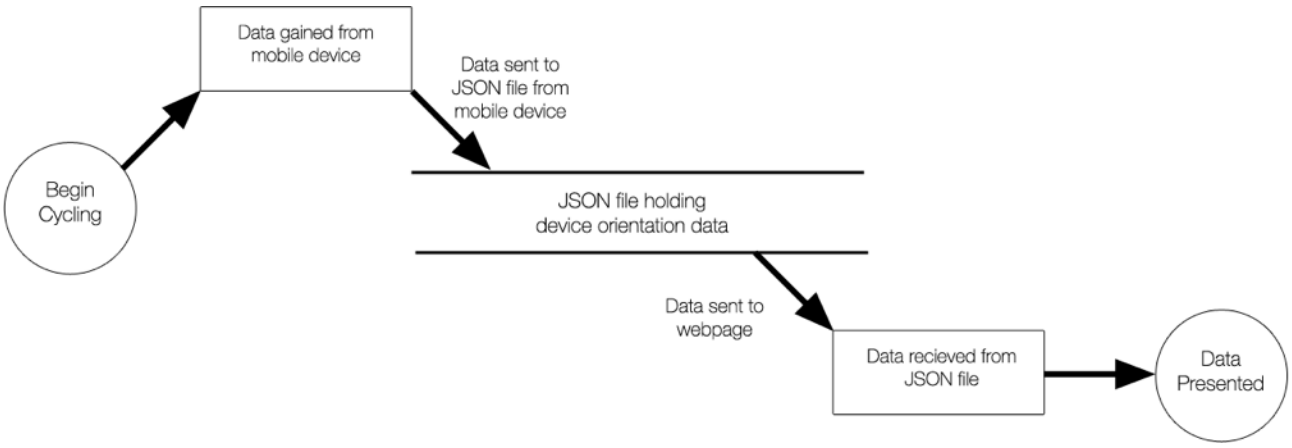


Fig 3.3.1.2: Data flow diagram

Due to the nature of this project a second illustration has been created supporting the data flow diagram to help portray this procedure. Seen in Fig 3.3.1.3.

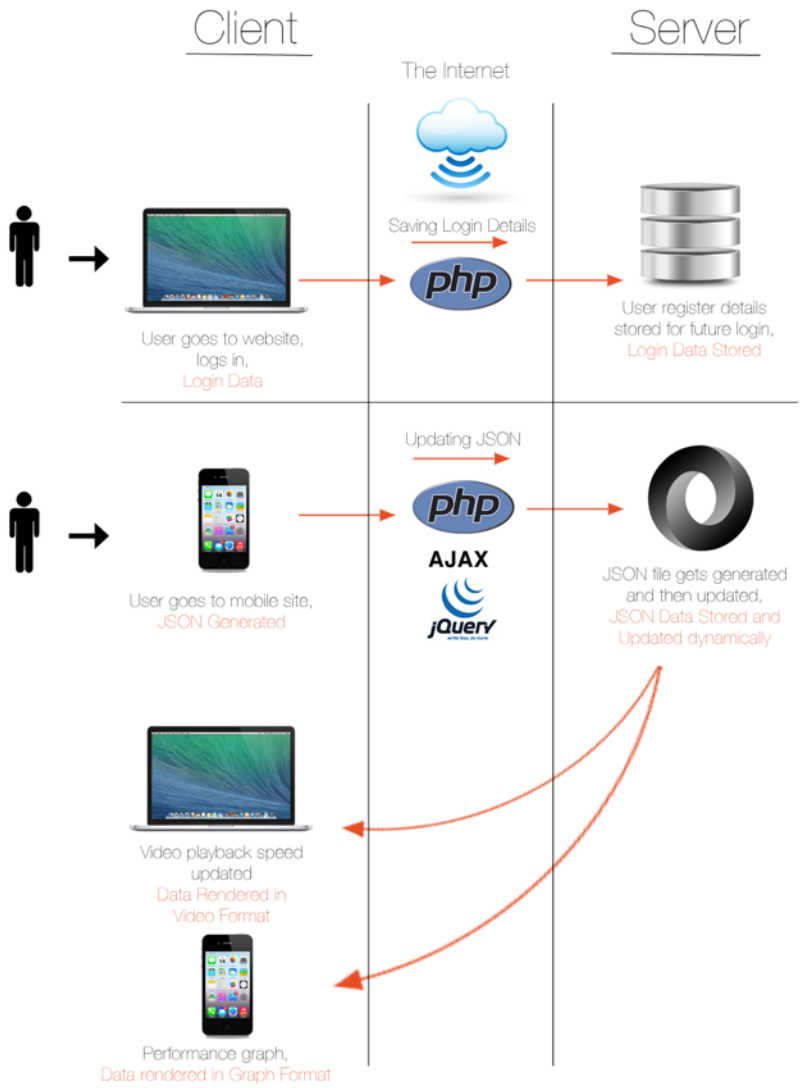


Fig 3.3.1.3: Data flow support diagram

3.3.2 Resources used in project

Four resources were used during the development of this product:

Epoly.js / Google Maps - This Javascript library complied by Mike Williams from Blackpool Community Church Javascript Team is used as part of the routing system developed for cyclists.

http://www.blackpoolchurch.org/
http://econym.org.uk/gmap/

JQuery - This javascript library is used for various small features throughout the system.

D3.js - This javascript library is used to enable visual data representation for the live performance statistics provided for the systems users.

Font awesome - This library is used as an icon font to present scalable icons enabling the service to be used across multiple devices.

3.3.3 Speed Algorithm

The video speed for this product is calculated through a method generated from the number of peddles the user takes while cycling. Each peddle is counted depending on the rotation of the mobile device placed on the users thigh, seen in Fig 3.3.3.1. If the rotation shrinks below -30 degrees the a count is concurrently added to the variable. If the variable is greater than 0 it is multiplied by the diameter of an average bicycle wheel (to calculate distance) and divided by the current time of the video, seen in Fig 3.3.3.2. This speed variable is then ran through an if statement splitting it into 10 different speeds and generating a video speed variable for each, seen in Fig 3.3.3.3. This video speed variable is then applied to the HTML5 video attribute for the chosen video.

```
if (data.rotateFB < -30) {
  count = count + 1;
```

Fig 3.3.3.1: Rotation Count

```
if (count > 0 && currentTime > 0){
  speed = (count * 5.84) / currentTime;
} else {
  speed = 0;
}
```

Fig 3.3.3.2: Speed Algorithm

```
if (speed <= 1){
  vidSpeed = 0;
}
else if (speed > 1 && speed < 2){
  vidSpeed = 0.2;
}
else if (speed >= 2 && speed < 4){
  vidSpeed = 0.4;
}
else if (speed >= 4 && speed < 6){
  vidSpeed = 0.6;
}
else if (speed >= 6 && speed < 8){
  vidSpeed = 0.8;
}
else if (speed > 8 ){
  vidSpeed = 1;
}
else {
  vidSpeed = 0;
}
```

Fig 3.3.3.1: Video speed Definition

3.3.4 Interactions

Interactions with this application will take place across two devices. The mobile device, which will be attached to a users body, will collect the data required to use the system while the Desktop device (iPad) will present the results in video and graphical format. Further detailed analysis describing both mobile and desktop application of this product has been discussed in Chapter 3.1.7: Interactions.

4 Implementation

4.1 Front-end Technology Selection

Front End Technolgies	Documentation	Experience	Suitability for my Project and how it was applied	Using this technology
CSS2	Widely available	4 years	Very suitable, as it allows style to be applied to this project using web standards. This was applied through CSS stylesheets - browser.css for all browser based application styling, and iphone.css for styling attributed to the mobile device.	√
CSS3	Widely available but is still a developing technology	2/3 years	Very suitable, as it allows style to be applied to this project using web standards as well as adding extra design features. This was applied through CSS stylesheets - browser.css for all browser based application styling, and iphone.css for styling attributed to the mobile device.	√
XHTML	Widely available	4 years	Very suitable, as it allows the production of this project using web standards. The desktop device html is held in a file called browser-data.html and contains semantically positioned elements regarding browser layout. Similarly Mobile device elements are held in a file called iphone-data.html.	√
HTML5	Widely available but is still a developing technology	2/3 years	Very suitable, as it allows the production of this project using web standards as well as adding extra design features including HTML5 Video tag which enables video playback rate edit-ability. A core functionality of this product.. The desktop device html is held in a file called browser-data.html and contains semantically positioned elements regarding browser layout.Similarly Mobile device elements are held in a file called iphone-data.html.	√
Javascript	Widely available	3 years	Very suitable, as it allows the production of this project using web standards and allowed dynamic content to be generated for to each client. Held in a file called browser.js and is used thought the application.	√

JQuery	Widely available. Very well documented	3 years	Very suitable, it provides access a wide range of features as it is an extensive library with a lot of useful attributes, its; fast, well documented, easy to use, chaining, event handlers, CSS selectors, Small (30 KB), Plugins and is especially useful when considering JQuery.AJAX calls, a core functionality of this product. It is used though out the application.	√
Google Maps API	Available	2 years	Very suitable, as it provides the ability to access, add functionality and personalise Google Maps for this project. It is used while calculating and plotting a route for users to travel on while cycling.	√
Ajax	Widely available. Well Documented.	2 years	Very suitable, as it provides the ability to use asynchronous calls to get and receive data. Another core functionality of this product. This is used to send data from the mobile device (iphone-data.html) to the JSON file though PHP. It is also used via Javascript to read the updated variables in the file. Calls are made every 250m/s.	√

4.2 Back-end Technology Selection

Back End Technologies	Documentation	Experience	Suitability for my Project	Using this technology
JSON	Available.	2 years	Very suitable, it provides the ideal platform in which to save dynamic accelerometer data. Can be easily updated with a jQuery AJAX call. This is used for storing data received from the mobile device and read from the desktop device for data presentation.	√
PHP	Widely Available.	4 years	Very suitable, allows access to a JSON file giving the opportunity to update it dynamically along with AJAX. This is used when decoding a JSON file and updating values inside it.	√

4.3 Notable Challenges and Achievements

There were a number of notable challenges facing this project primarily due to the number of new technologies being used to create this novel application.

4.3.1 Device Orientation

Device orientation has now been around for a few years and hence is now not considered a new or emerging technology. However without experimentation with this technology it may be difficult to understand and unknown accessibility issues may be prevalent regarding multi-platform use.
This challenge was solved through research and experimentation into HTML5 device motion. It was discovered two type of available data is returnable - Device orientation, normally accessed from a Gyroscope and hence Acceleration, found both with and without gravity. These features are accessed through event listeners and produce results like other functions if appropriate requirements are met, such as calling the right event handler - Rotation from Left to Right = eventData.gamma.

4.3.2 HTML5 Video Playback Rate

Similarly to device orientation the ability to access video playback rate is relatively new HTML5 feature and has little documentation regarding possible adaptations.
This again was solved through experimentation. By accessing the HTML5 video tag attribute via Javascript it became possible to dynamically update this attribute by setting its value to a variable being produced previously.

4.3.3 Updating JSON using AJAX

Although the concept of updating a JSON file in realtime isn't new or novel it was a challenge to overcome for this project as there was no past experience in producing an application providing this feature.
This was achieved via a jQuery AJAX PHP POST request from a mobile device passing the required variables on a device orientation event to an update PHP file. This was then received, passed into a data variable and stored in a JSON file via json_encode($data) and file_put_contents() methods. To present the data it was called again via an AJAX request every 250m/s from the desktop browser presentation webpage.

4.3.4 Developing an Algorithm based on user performance

Developing an Algorithm to calculate the speed of a cyclist, and hence video playback speed, was a notable challenge to overcome as it became apparent that it would mean combining all aspects of this project, across multiple devices and platforms to generate new data based on attainable orientation data.

This was achieved through a combination of factors. The video speed is calculated through a algorithm generated from the number of peddles a user takes while cycling. Each peddle is counted depending on the rotation of the mobile device placed on the users thigh. If the rotation falls below -30 degrees the count is concurrently added to a variable. If the variable is greater than 0 it is multiplied by the diameter of an average bicycle wheel (to calculate distance) and divided by the current time of the video. This speed variable is then ran through an if statement splitting it into 10 different speeds and generating a video speed variable for each. This video speed variable is then applied to the HTML5 video attribute for the chosen video. This was the most difficult challenge to the production of the product as it required all other parts of the product to function correctly including attaining device orientation data and using GET and POST AJAX requests while accessing a JSON file.

4.3.5 Multiple devices while retaining a connected feeling

Agin not a new concept but one that was nonetheless challenging for the product to maintain a successful engaging user experience. The challenge was to try an produce a connected design which works across multiple devices while maintaining dynamic data presentation.

To achieve this the design for both platforms was developed in unison. As these designs were being developed simultaneously an associative design developed across platforms creating a instant recognisable connection when viewing both devices concurrently. This however only solved half the problem. With only some data, device rotation, being calculable across both platforms it was instantly recognised the same data would not be available to present on the mobile device as would be on the desktop browser due to video playback position and duration not being passed back to the mobile platform. After careful research an experimentation with product placement guidelines and user studies it was discovered that while the product is being used it would be difficult to read the mobile platform due to continual movement. Hence it was decided to present the user with one piece of important data on the mobile device - A peddle count.

This gave the user instant feedback on the success of his/her peddle and also led to a feeling of comfort knowing the product was recognising movement. This was then reflected in the desktop by a video playback speed being increased, hence rendering a connected, immersive and engaging feeling for the product.

5 Testing

5.1 Testing approach, selection and process

The test methodology chosen looks at both interior and exterior evaluation of the product.

White Box Testing: An internal position of the system, as well as programming skills, are used to design test cases. The tester chooses inputs to exercise paths through the code and determine the appropriate outputs. This will be carried out by the lead developer of the product through the use of a standardised template based on requirements gathered from using the Volere template discussed in Chapter 2.2.2.

Black box Testing: This examines the functionality of an application without peering into its internal structures or workings and finds looks at results depending on what the software produces. This again will be based on requirements gathered from using the Volere template discussed in Chapter 2.2.2. These tests will be carried out on 10 prospective end users of the product to find how well the functionality provided performed, each category will be ranked on a scale of 1 to 5.

1 = Bad

2 = Poor

3 = Average

4= Good

5 = Great

5.2 White box testing

Number	Fit Criterion No.	Question	Result
1	1	Is the system capable of attaining device orientation and thus work out acceleration data from a mobile device.	Yes
2	2	Is the system capable of saving the device acceleration data via PHP to a JSON file.	Yes
3	3	Is the system capable of updating a JSON file dynamically via AJAX/PHP.	Yes
4	4	Is the system capable of changing video playback speeds	Yes
5	5	Is the system capable of using dynamic JSON data to update playback rate for HTML5 video's.	Yes
6	7	Is the system capable of using dynamic JSON data update a graph showing live performance data	Yes
7	28*	Is the system capable of producing a dynamic route based on user performance	Yes
8	28*	Can the user see their progress via route and statistical data simultaneously	Yes
9	11	Is the system capable using full screen video to immerse the user in the experience	Yes
10	12	Is the system capable of utilising an offscreen navigation sidebar enabling full screen video to be prioritised.	Yes
11	15	Is the system performing with sufficient speed with no noticeable lag between performance change and video playback rate change	Yes
12	15	Is the systems response time as minimal as possible to create a valuable user experience.	Yes
13	13	Will the system will meet Design Standards	Yes
14	4	Are Human-Computer-Interaction (HCI) principals and methodologies applied	Yes
15	18	Is system capable of reliably saving accurate performance data for record purposes.	No
16	27	Can the user see their performance records and compare data.	No
17	9	Is system capable of creating a unique login for its users to enable the JSON data to be unique to each user and be accessed over two devices for display purposes.	No
18	28	The user will be able to change the route on which he/she is traveling	No

* = alterations have been made to this criterion

Comments

These results indicate a successful completion of concept and functionality. However due to practicalities, such as restrictions, additional features in question 15, 16, 17 and 18 were unable to be added.

5.3 Black box testing

User Number

No.	Fit Criterion No.	Question	1	2	3	4	5	6	7	8	9	10
1	1*	Is the system capable of presenting device orientation on a mobile device	5	5	5	5	5	5	5	5	5	5
2	2*	Is the system capable of presenting a peddle count on a mobile device	5	5	5	5	5	5	5	5	5	5
3	15*	How connected does the mobile device feel to the desktop device	3	4	5	5	5	4	5	3	4	4
4	1	How capable of changing video playback speeds is the system	5	5	5	5	5	5	5	5	5	5
5	1*	How intuitive is video interaction	3	4	4	4	4	4	3	5	4	4
6	7	How capable is the system at showing live performance data on a graph	4	5	5	5	5	4	5	5	5	5
7	28*	How capable is the system at producing a dynamic route based on user performance	5	5	5	5	5	5	4	3	5	5
8	28*	How well can a user see their progress via route and statistical data simultaneously	4	4	4	5	5	4	5	4	4	5
9	11	How well does the system immerse the user in the video experience	4	4	5	4	5	5	5	4	5	4
10	12	How well does the system utilise the offscreen navigation sidebar	3	4	4	5	4	5	4	3	4	4
11	15	Is the system performing with sufficient speed with reference to lag between performance change and video playback rate change	3	3	4	4	5	4	5	4	4	4
12	15*	Is the systems speed sufficient to perform well over long periods of exercise	3	3	2	3	4	3	2	5	4	4
13	18	How accurately is the data collected?	4	5	4	4	4	3	4	4	4	4
14	7	How easy to understand is the data?	4	5	4	5	4	4	5	5	4	5
15	13	How would you rate the design of the application?	4	5	3	4	5	5	5	5	4	5
16	All Criterion	How useful would you find this application?	5	3	5	4	4	5	5	5	5	4
17	All Criterion	How would you rate this application overall	4	4	4	5	4	5	4	5	5	5

* = Related Criterion

6 Evaluation

6.1 Evaluation of Test and User Survey Results

6.1.1 White Box test Results

The results produced during white box testing reflect the successful completion of concept and functionality for most features in this application as per requirements specification. However due to practicalities, such as restrictions, additional features were unable to be added.

The functionality of features produced in this project attained positive feedback and were effective at producing the desired results when the application is in use.

6.1.2 Black Box test Results

No.	Fit Criterion No.	Question	Average Result
1	1*	Is the system capable of presenting device orientation on a mobile device	5
2	1*	Is the system capable of presenting a peddle count on a mobile device	5
3	15*	How connected does the mobile device feel to the desktop device	4.2
4	1	How capable of changing video playback speeds is the system	5
5	1*	How intuitive is video interaction	3.9
6	7	How capable is the system at showing live performance data on a graph	4.8
7	28*	How capable is the system at producing a dynamic route based on user performance	4.7
8	28*	How well can a user see their progress via route and statistical data simultaneously	4.4
9	11	How well does the system immerse the user in the video experience	4.5
10	12	How well does the system utilise the offscreen navigation sidebar	4
11	15	Is the system performing with sufficient speed with reference to lag between performance change and video playback rate change	4
12	15*	Is the systems speed sufficient to perform well over long periods of exercise	3.3
13	18	How accurately is the data collected?	4
14	7	How easy to understand is the data?	4.5
15	13	How would you rate the design of the application?	4.5
16	All Criterion	How useful would you find this application?	4.5
17	All Criterion	How would you rate this application overall	4.5

Fig 6.1.2.1: Average Results Table

By working out average scores for each question we can analyse how effective the final solution was from an end users perspective, seen in Fig 6.1.2.1. This enables an evaluation to take place on how well the technology preformed compared with initial requirement specification guidelines.
With consistently high scores across each question the product can be seen as successfully completing an end product which fulfils the Fit Criterion initially set out when designing the product.

A perfect score was found to match the criterion 'Ability to attain numerical device orientation data and thus work out its acceleration'. This was evidently a criterion which was fully considered in both application and presentation for the user.

Very high scores were also seen in the criterion matching;

- Ability to update graph values to represent exercise performance
- The user will be able to see route updating depending on performance (updated from: different routes depending on choice)
- Ability to immerse the user in the experience due to full screen video implementation

These results provide evidence suggesting the criterion was met. The faults coming from these results are likely due to presentation techniques used to deliver the data to users.

High scores were seen in the criterion matching;

- Ability to update and read JSON file in real time. (or close to real time)
- How intuitive is video interaction
- How well can a user see their progress via route and statistical data simultaneously
- How well does the system utilise the offscreen navigation sidebar
- Is the system performing with sufficient speed with reference to lag between performance change and video playback rate change
- How accurately is the data collected?

These results provide evidence suggesting the criterion was met. The faults coming from these results are likely due to presentation techniques used to deliver the data to users and accuracy in collecting data to be used to calculate velocity.

The lowest score returned received a score of 3.3 in question 12. The Criterion to match this question was 'Ability to update and read JSON file in real time. (or close to real time)'. Although the results suggest that the criterion was met it also suggests it could be improved upon. It is likely the lower result in this category is due to the method used update and call data from a JSON file. AJAX was used to make these POST and GET requests. This is an intensive procedure and resultantly causes the system to begin slowing down after a few moments use.

6.2 Evaluation of project outcomes

Due to results examined from testing the application it has been proven to meet the criteria in the requirement specification. As the aim of this project was to use web technologies to engage users in indoor exercise, there were numerous objectives that needed to be fulfilled along the course of its process, namely:

- Make use of web technologies such as device orientation.
- Provide the capability to manipulate video speed playback according to user performance.
- Provide an incentive with a 'destination' giving users focus on an achievable goal and a sense accomplishment on completion.
- Make indoor exercise more interesting.
- Encourage users to engage with indoor exercise.
- Improved performance with regular use of the product.

The first three aims of the projects was to make use of web technologies such as device orientation and provide the capability to manipulate video speed playback according to user performance while providing an incentive to exercise. These objectives were successfully met, receiving perfect and very high scores fulfilling requirement criterion as seen from the evaluation of testing in Chapter 6.2.

The last two questions in the Black box testing phase of this project were queried to help evaluate the final outcome of this product. Based on results from these two questions it is possible to evaluate whether the remaining aims and objectives of the project was successfully met. The questions;

- How useful would you find this application? and
- How would you rate this application overall?

Both questions received s very high score of 4.5/5. This leads to a decision being generated that these aims have also been met as an incentive has it is concluded that indoor exercise has become more appealing and thus are encouraged to engage with indoor exercise on a more frequent basis.

The last aim of the project was to improve performance of athletes with regular exercise use. This objective require a long period of user based research which due to time restriction was an unavailable aim to pursue at this stage of development. However promising feedback from users during the testing phase of this application suggests users a prepared to, and interested by the concept of, reuse and competition against other users. This social aspect to the platform indicates how user performance could increase due to encouragement from competition.

6.3 Evaluation of Methodology and Plan

The management system chosen for this project is the Prototype Methodology. It has proven a successful choice in methodology as favourable results have been gathered, as seen in Chapter 5, regarding this projects successful completion. As the creator was, effectively, his own client for this project, evaluations were produced based on testing during development, and hence further development took one of two channels; either review design and development, or proceed to further development and a final product.

This advantages this model provided included the direct involvement of users in product development and testing as well as a end users have a working model being generated to allow users to have a better understanding of the system through its development lifecycle. This meant errors could be identified quickly and missing functionality or features could be recognised and amended.

The ‘Bottom-Up Approach’ was used successfully to develop a base of separate features which needed to be developed individually in unison and was later brought together. By combining these stand-alone features the creation a larger, viable product was then made be possible.

This approach plan and methodology selection has been proven to be a well strategised choice reflected in the product having a positive outcome.

7 Conclusion

7.1 Project summary and Reflection

"To use emerging web technologies to engage users in indoor exercise."

This projects aim was to provide a solution to the issue of tedium resulting from the monotonous routine of indoor exercise by using emerging web technologies to engage users in indoor exercise creating an immersive experience. To achieve this the project focused on enhancing the gym experience through utilising a wearable activity monitor, based in a users own orientation enabled smartphone, and connected secondary display providing an interactive virtual reality experience that brings essential motivating factors of outdoor exercise into the gym. The interactive virtual reality experience is successfully provided through the use of an algorithm created to calculate speed resulting from a count on the number of pedals a user has taken (gained from the users mobile device) across the length of the exercise and presented on a secondary display. The secondary display achieved an interactive display by presenting a high definition video of an outdoor cycling route that responds to the users performance levels, encouraging activity and to rewarding improvements in performance.

On reflection this project fulfils all its aims and objectives as evidenced throughout Chapter 5 and 6 as it reduces tedium and can improve the frequency and quality of exercise through blending together the positive aspects of both indoor and outdoor exercise.

7.2 Reflection on the Creator Role

The role of the creator throughout this project varies drastically from application architect to development and design but as the products development continued so did the creators tasks. The motives for investigating and tackling the use of persuasive technology in indoor exercise began as a result of a personal interest in the field of cycling but also having the desire to improve the experience of the form of exercise. This came with its own challenges however, including unfamiliar technologies and new roles within a development lifecycle.

The creator aimed to provide a solution to the issue of tedium resulting from the monotonous routine of indoor exercise by using emerging web technologies to engage users in indoor exercise and hence creating an immersive experience. This aim was realised by the creator upon project completion.

Due to good time management and correct application of methodologies and procedures the creators individual tasks were preformed within, and exceeded, the appropriate timescale leaving the opportunity to develop further features for the progression of the application.
By using the Bottom up approach, and through utilising semantically created code which is refactored at regular intervals for optimum performance, the creator was then able to append these feature to the final product. This led to the application to become a much more valuable prototype product with future business aspirations.

7.3 Future Developments and Prospects

There are three future prospects for this product which would improve the application and turn it into a product with future business aspirations.

Initially however, if this project was to be further developed into a business redevelopment would need to take place to fix performance issues within the application as a users journey develops. A proposal to remedy this performance issue is to switch from using PHP and long AJAX polling to set and retrieve JSON objects to using a WebSocket protocol known as Socket.IO which is a client-side library that runs in the browser, and node.js as a server-side library. Socket.IO focuses on making realtime apps possible in every browser and mobile device. It blurs the differences between transport mechanisms. This approach would have been the preferred option at the start of the projects however with little or no knowledge of using Node.js, Socket.IO and hence getting the application hosted it became a large risk to project completion as experimentation time was limited.

The first possible additional feature would be to make use of the other device orientation variables being passed into the JSON file. These are available to be used in the display device and could be used to utilise directional movement options for users while cycling.

Secondly to create a product which is available for all users a login or unique file generation system is required to produce this. This could be achieved through a simple login system with user details or, preferably, not require a login system or user details and generate a unique file system dynamically by naming files based on a timestamp generated when the webpage is accessed. This would increase initial update of the technology and decrease time needed to set

up the application. To control user error handling when entering dynamically generated filenames on a users mobile device URL's could be shortened or QR codes could be generated creating a simple one scan option to direct the users mobile browser to the appropriate webpage, massively decreasing time needed to set up the application.

Finally, increased interaction and motivational aids could be generated by building a social engine to enhance competitive and performance sharing. These interactions could include allowing users to add personalised videos as initially discussing in the projects concept definition. Motivational aids could include competitive realtime racing with friends or racing against your own previous performances increasing users performance levels.

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9 Appendixes

9.1 Volere Requirements

Scale:
1 = uninterested / not important
5 = very interested / important

Requirement ID: 1
Description: The system will be capable of attaining device orientation and thus work out acceleration data from a mobile device.
Rational: This is needed to enable the product to use this data for video playback manipulation.
Originator: Developer
Fit Criterion: Ability to attain numerical device orientation data and thus work out its acceleration.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 2
Description: The system will be capable of saving the device acceleration data via PHP to a JSON file.
Rational: This is needed to enable the product to have values to reference when adjusting video playback.
Originator: Developer
Fit Criterion: Ability save device orientation data
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 3
Description: The system will be capable of updating a JSON file dynamically via AJAX/PHP.
Rational: This is needed to enable the product to use this dynamic data for video playback manipulation.
Originator: Developer
Fit Criterion: Ability to update JSON file
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 4
Description: The system will be capable of changing video playback speeds.
Rational: This is needed to enable the product to amend a video for the user.

Originator: Developer
Fit Criterion: Ability to manipulate HTML5 video playback speeds
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 5
Description: The system will be capable of using dynamic JSON data to update playback rate for HTML5 video's.
Rational: This is needed to enable the product to dynamically change video playback speeds according to device acceleration.
Originator: Developer
Fit Criterion: Ability to manipulate HTML5 video dynamically with JSON data
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.
Requirement ID: 6
Description: The system will be capable of using dynamic JSON data to update playback rate for HTML5 video's.
Rational: This is needed to enable the product to dynamically change video playback speeds according to device acceleration.
Originator: Developer
Fit Criterion: Ability to manipulate HTML5 video dynamically with JSON data
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 7
Description: The system will be capable of using dynamic JSON data update a graph showing live performance data
Rational: This is needed to enable the product to dynamically change graph values to show the end user performance.
Originator: Developer
Fit Criterion: Ability to update graph values to represent exercise performance.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: This could be added as an extra feature. has no other dependancies except records.

Requirement ID: 8
Description: The system will be capable of storing dynamic JSON data
Rational: This is needed to show records of previous performances for comparison purposes.
Originator: Developer
Fit Criterion: Ability to update a graph from record data to represent exercise performance statistics. Customer Satisfaction: 4

Customer Dissatisfaction: 4
Priority: 3
Conflicts: This could be added as an extra feature. has no other dependancies.
Requirement ID: 9
Description: The system will be capable of creating a unique login for its users to enable the JSON data to be unique to each user and be accessed over two devices for display purposes.
Rational: This is needed to enable the product to perform uniquely to each user.
Originator: Developer
Fit Criterion: Ability to have a unique login feature.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.
Non-Functional requirements are derived from the products functional constraints and focus on elements of the project which are not essential to the running capabilities of the product but may be the difference in whether the service will be a success or not. As they focus on performance and usability the end user is much more involved in the definition of these requirements. Look and feel of the service as well as non-functional usability will also need to be considered at at this point to make the product engaging.

Requirement ID: 10
Description: The system will be capable of using a QR code or unique link to create a unique login Rational: This is needed to enable ease of use for the user and perform uniquely to each user. Originator: Developer and User
Fit Criterion: Ability to have a easy unique login feature for users
Customer Satisfaction: 5
Customer Dissatisfaction: 4
Priority: 4
Conflicts: If this is unable be be achieved normal sign up/login capabilities will be acceptable. No other dependancies in this case.

Requirement ID: 11
Description: The system will be capable using full screen video to immerse the user in the experience
Rational: This is needed to create a more immersive experience.
Originator: Developer and User
Fit Criterion: Ability to use full screen video
Customer Satisfaction: 4
Customer Dissatisfaction: 4
Priority: 3
Conflicts: No other dependancies.

Requirement ID: 12
Description: The system will be capable of utilising an offscreen navigation sidebar enabling full screen video to be prioritised.
Rational: This is needed to enable the product prioritise full screen video rendering a more engaging platform.
Originator: Developer and User

Fit Criterion: Ability to have offscreen navigation sidebar
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All additional features depend on this requirement.

Requirement ID: 13
Description: The system will meet Design Standards
Rational: This is needed to enable progression for further developments of this product.
Originator: Developer
Fit Criterion: Using Design Standard techniques
Customer Satisfaction: 1
Customer Dissatisfaction: 2
Priority: 4
Conflicts: Future progress of this product depend on this product.

Requirement ID: 14
Description: I will apply Human-Computer-Interaction (HCI) principals and methodologies.
Rational: This is needed to enable the product to perform to the best of its ability by utilising the best methods of digital technology interacting with its users.
Originator: Developer
Fit Criterion: Using HCI methodologies.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: Successful application of this product depend on this requirement.

Requirement ID: 15
Description: System performing with sufficient speed no noticeable lag between performance change and video playback rate change is seen through fast, dynamic JSON updating and reading. Rational: This is needed to enable the product enable users to get direct feedback on their performance.
Originator: Developer and User
Fit Criterion: Ability to update and read JSON file in real time. (or close to real time)
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 4
Conflicts: Only response time is effected by this requirement.

Requirement ID: 16
Description: The systems response time will be as minimal as possible to create a valuable user experience.
Rational: This is needed to enable a valuable, tactile and engaging user experience.
Originator: Developer and User
Fit Criterion: Ability to have fast response times.
Customer Satisfaction: 5
Customer Dissatisfaction: 5

Priority: 4
Conflicts: No other requirements depend on this requirement.
Requirement ID: 17
Description: The system will be capable of storing user login details securely using MD5 encryption. (If QR link/login is not achieved)
Rational: This is needed to enable a secure platform for users.
Originator: Developer and Users
Fit Criterion: Ability to store login details securely
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 18
Description: The system will be capable of reliably presenting accurate data and thus saving accurate performance data for record purposes.
Rational: This is needed to make the user see this service as a valuable, polished product.
Originator: Developer
Fit Criterion: Ability to provide reliable data.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.
Requirement ID: 19
Description: The system will need a computer capable of video processing and having video editing software.
Rational: This is needed to enable video manipulations.
Originator: Developer
Fit Criterion: Source capable computer.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 20
Description: The system will need video camera capable of capturing video along a specific route. Rational: This is needed to enable video.
Originator: Developer
Fit Criterion: Source capable video camera.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.
Requirement ID: 21
Description: The system will need a mobile device with data orientation capabilities Rational: This is needed to attain device acceleration data.
Originator: Developer
Fit Criterion: Source capable mobile device.

Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 22
Description: The system will need a computer capable processing video through a browser.
Rational: This is needed to enable website functionality.
Originator: Developer
Fit Criterion: Source capable computers.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 23
Description: The system will need a video / code editing software to amend attained video.
Rational: This is needed to enable video manipulations.
Originator: Developer
Fit Criterion: Source capable software.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 24
Description: The system will need a browser capable of running HTML5 video.
Rational: This is needed to enable video manipulations.
Originator: Developer
Fit Criterion: Source capable browser.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: All other requirements depend on this requirement.

Requirement ID: 25
Description: The user will be able to see their progress via video distance covered and video speed playback which is based on their exercise performance.
Rational: This is needed to engage users in the experience.
Originator: Developer and Users
Fit Criterion: The user will be able to see progress via video manipulation.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: No other requirements depend on this requirement.

Requirement ID: 26
Description: The user will be able to see their performance via a simulated dynamic graph.

Rational: This is needed to engage users in the experience.
Originator: Developer and Users
Fit Criterion: The user will be able to see progress in performance in real time.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: No other requirements depend on this requirement.

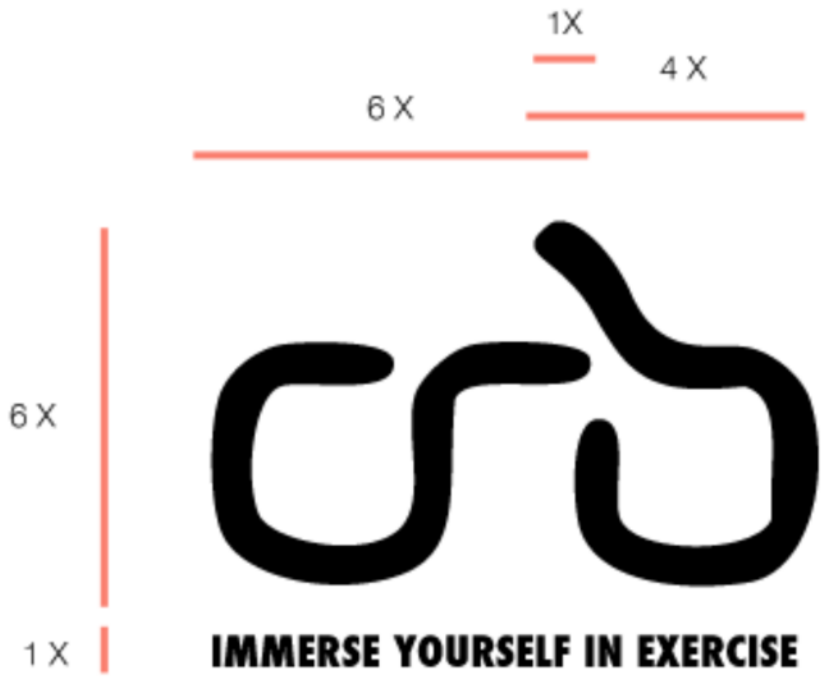
Requirement ID: 27
Description: The user will be able to see their performance records and compare data.
Rational: This is needed to engage users in the experience by making the experience competitive. Originator: Developer and Users
Fit Criterion: The user will be able to see progress or slumps depending on stored statistics.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: No other requirements depend on this requirement.
Requirement ID: 28
Description: The user will be able to change the route on which he/she is traveling.
Rational: This is needed to allow personalisation of the product and added features for second time users.
Originator: Developer and Users
Fit Criterion: The user will be able to see different routes depending on choice.
Customer Satisfaction: 5
Customer Dissatisfaction: 5
Priority: 5
Conflicts: No other requirements depend on this requirement.

9.2 Brand Guidelines

Brand Guidelines

IMMERSE YOURSELF IN EXERCISE

Alignment and Spacing



10MM (1/2X)

Logo:

Icon -

Character A from the icon will occupy 6X of the entire with of the logo. Character B will occupy 4X of the logo. There will be a 1X overlap between these characters.

Tagline -

The will be a 10mm (1/2X) between the icon and the accompanying tagline. The width of the tagline will always have a width of 9X.

Sub-branding

Colour Palette

Hex: #faa094
RGB: 250, 160, 148
CMYK: 0, 46, 34, 0
- Highlights

Hex: #a02514
RGB: 160, 37 20
CMYK:24, 96, 100, 21
- Background

Hex: #fa7f6f
RGB: 250, 127, 111
CMYK: 0, 63, 52, 0
- Focus

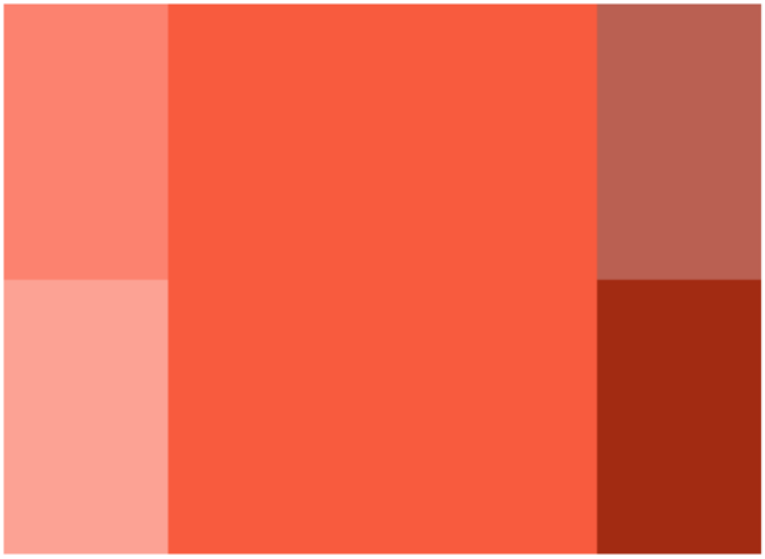
Hex: #c1c1c1
RGB: 193,193,193
CMYK: 24, 19, 20, 0
- Highlights

Hex: #f6543f
RGB: 246, 84, 63
CMYK: 0, 82, 78, 0
- Links

Hex: #1d1d1d
RGB: 29, 29, 29
CMYK: 72, 66, 65, 72
- Highlights, Links

Hex: #b85d52
RGB: 184, 93, 82
CMYK: 22, 73, 67, 8
- Background

Hex: #ffffff
RGB: 255, 255, 255
CMYK: 0,0,0,0
- Highlights, Links



The Visual Design

Desktop Service:

As mentioned previously I have redeveloped my navigation into a sidebar which will be fixed to the left hand side of a users screen. This closed menu will contain three main features: The 'Immerse yourself in Exercise' logo, a map showing the location the video is representing and a list of icons which will be used as links for navigation. When a user hovers over the sidebar it will expand horizontally by approx. 200px. This allows me to produce the word for each section which the icons represent providing me with the opportunity to give the user a better understanding of what each section incorporates. It also give me the opportunity to supply the the user with a better view of the videos location on a map. **Fig.7**. When each of these links are clicked they will run a function which overlays the respective option. By overlaying features over the video in this way it provides the user with the feeling of still being connected to the route they are travelling on.

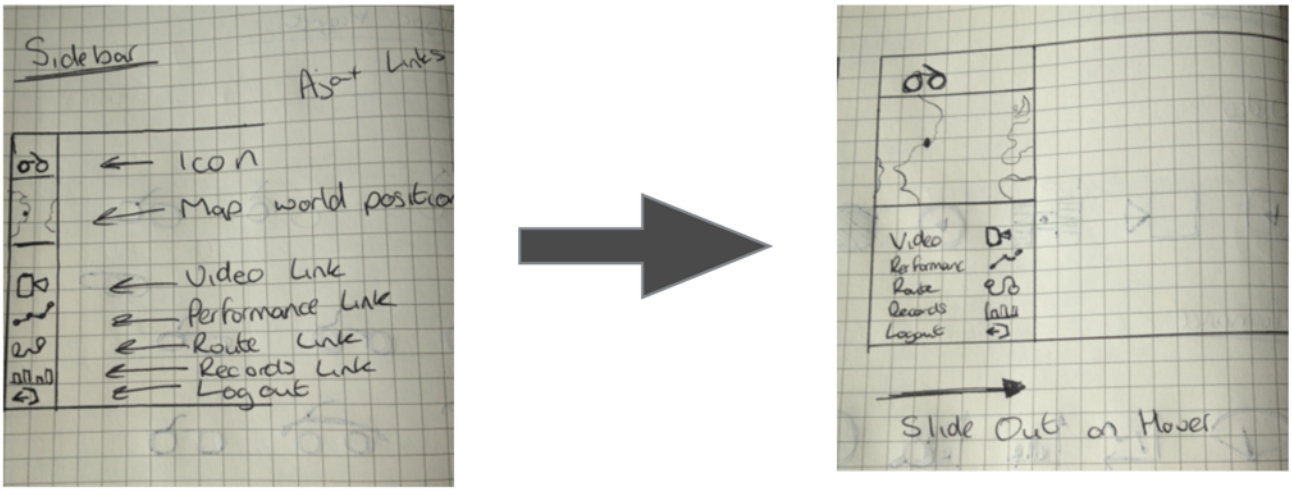
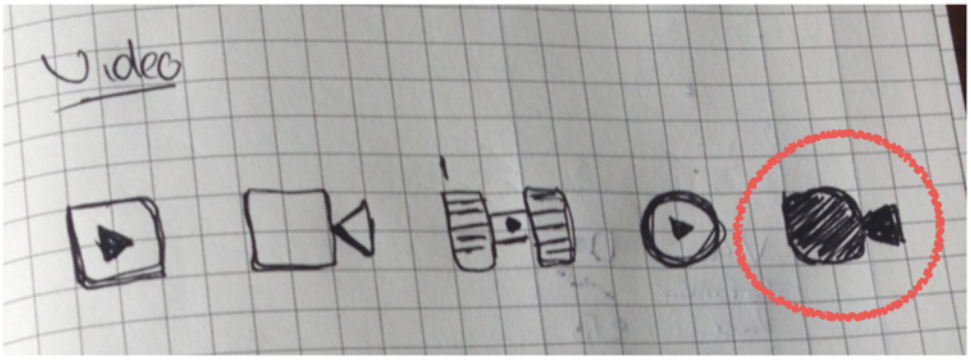


Fig.7

I have also considered the icon design for each respective section of my application as seen below.



I chose this icon from my design because I wanted something simplistic yet easily recognisable for my users. **Fig.8**

Fig.8

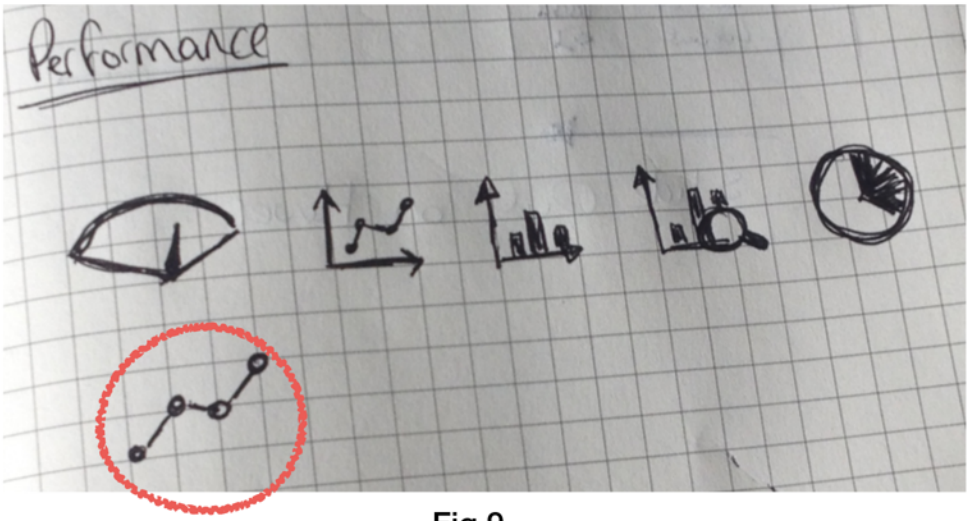


Fig.9

Choosing a performance icon was a little bit more difficult. Again going for simplistic design I decided to remove the axis to provide a more unique data representation. **Fig.9**

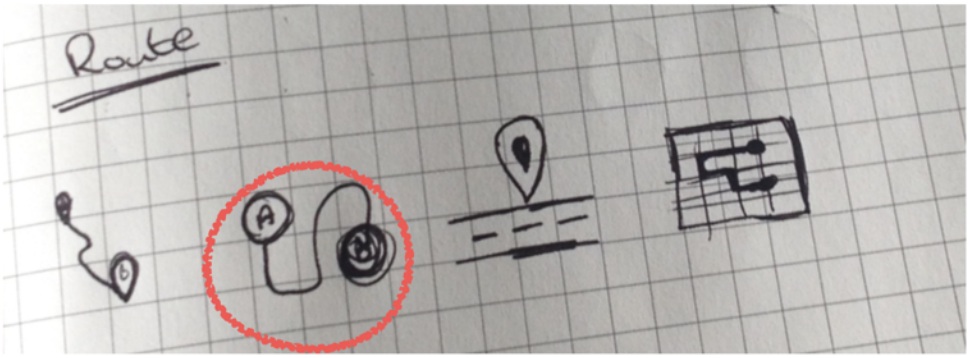


Fig.10

Again choosing a route icon was difficult but I decided to go with two markers A-B with a line connecting the points showing a route. **Fig.10**

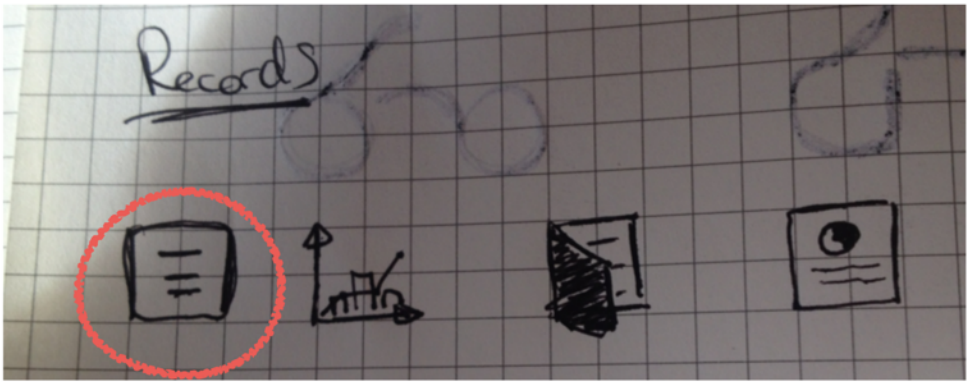


Fig.11

For my records icon I decided to look at previous record designs and liked the most simplistic design approaches leading me to a clipboard design. **Fig.11**

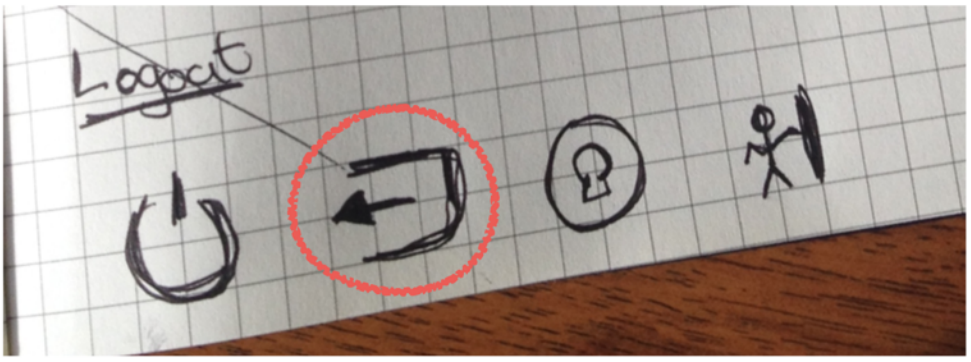
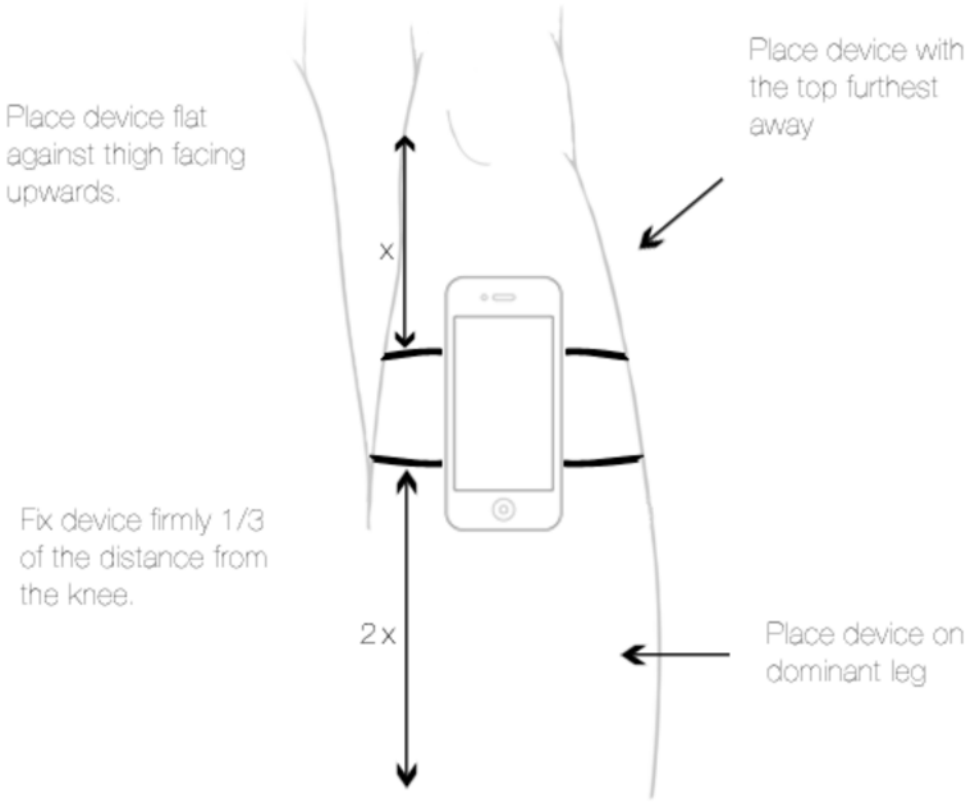


Fig.12

I wanted common icons to look familiar so I decided to use a recognisable design when I considered my logout icon. **Fig.12**

Mobile Device Placement Guidelines



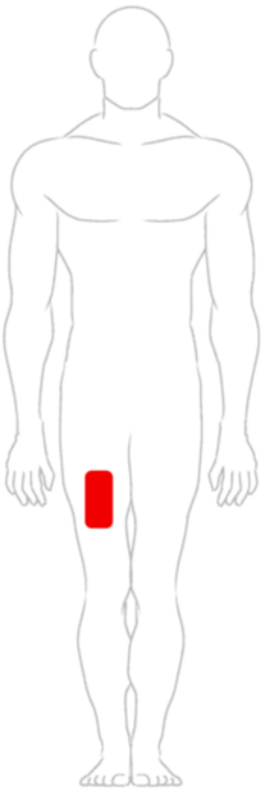


Fig.24

Fig.25

Fig.24 - This shows the position the device will occupy on a standing modal.

Fig.25 - This shows the position the users device will take while in use on a cycling machine.

Desktop Device Guidelines: