UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Escuela Técnica Superior de Ingeniería del Diseño

TRABAJO DE FIN DE GRADO
Ingeniería Mecánica

Design and Development of *Activeli*: A new mobile App to connect sporty people.

Autor: Salvador Amorós Dobón
Tutor: Juan Antonio Monsoriu Serra
CoTutor: Juan Ángel Sans Tresserras
Curso Académico 2017-2018

This page is intentionally left blank

Abstract

Title

Design and Development of ***Activeli***: A new mobile App to connect sporty people.

Abstract

Most people tend to feel alone when traveling abroad or moving to new places, and they also give up practicing their favorite sports routines or workouts because they ignore where the places to practice them are located or they simply don't know anyone to play their favorite sports with.

Using the knowledge acquired throughout the Mechanical Engineering Degree and following my interest in sports I want to end with that struggle designing and developing a new tool, a free mobile application called **Activeli**, with one simple purpose: to create the best matches between the users and other people in their area based on their location, level of proficiency and sport interests so they can enjoy the most out of their workouts.

Whenever and wherever they want.

Key Words

Application, Programming, Entrepreneurship

This page is intentionally left blank

Resumen

Título

Diseño y desarrollo de **Activeli**: una nueva App para conectar a personas deportivas.

Resumen

La mayoría de las personas tienden a sentirse solas cuando viajan al extranjero o se mudan a otros lugares, dejando también de practicar sus rutinas deportivas favoritas o entrenamientos regulares debido a no saber qué instalaciones deportivas se encuentran cerca o por la falta de compañeros con los que practicar sus deportes favoritos.

Gracias al conocimiento adquirido durante mis estudios de Ingeniería Mecánica, unido a mi interés por los deportes, quiero terminar con ese inconveniente, diseñando y desarrollando una nueva herramienta basada en una aplicación móvil gratuita llamada **Activeli**, con un simple propósito: crear las mejores coincidencias entre los usuarios y otras personas como ellos en función de su ubicación, nivel de competencia e intereses deportivos para que todos puedan disfrutar al máximo de sus entrenamientos.

Cuando y donde quieran.

Palabras Clave:

Aplicación, Programación, Emprendedurismo

This page is intentionally left blank

Resum

Títol

Disseny i desenvolupament *d'**Activeli***: una nova App per connectar a persones esportives.

Resum

La majoria de les persones tendeixen a sentir-se soles quan viatgen a l'estranger o es muden a altres llocs, però també deixen de practicar les seves rutines esportives preferides o entrenaments a causa del desconeixement de llocs a on anar per fer-los i a causa de no conèixer a ningú amb el qual jugar als seus esports favorits .

Usant el coneixement adquirit a través dels meus estudis d'Enginyeria Mecànica i seguint el meu interès en els esports, vull acabar amb aquest problema dissenyant i desenvolupant una nova eina, una aplicació mòbil gratuïta anomenada ***Activeli***, amb un propòsit ben simple: crear les millors coincidències entre els usuaris i persones en la seva àrea en funció de la seva ubicació, nivell de experiència i interessos esportius perquè tots puguin gaudir al màxim del seu entrenament.

Quan i on vulguin.

Paraules Clau

Aplicació, Programació, Emprendedurisme

This page is intentionally left blank

Index

Technical Report

1. Objectives *15*

2. Introduction *17*

a. Motivation: The Spark of Entrepreneurship **17**

b. Academic Motivation **18**

3. Project Description *19*

4. Market Research *21*

a. Market Size **21**

b. Data collection: Ethnographic Interviews **22**

c. Data Analysis: Key Insights **22**

d. Competitor Analysis **23**

i. Atleto: 23
ii. MeetUp: 23
iii. NeedSporty: 24
iv. Dating Apps: 25
v. Conclusion 25

5. Solution Brainstorming *27*

a. Possible Solutions **27**

i. Option A: A network of physical locations. 27
ii. Option B: An online web platform. 28
iii. Option C: A mobile App 28

b. Conclusion **29**

6. Solution Execution *31*

a. Competitive Advantage **31**

b. Viable Development Operative Systems **31**

i. Programming 32
ii. Mobile Manufacturers (One Vs. Many) 32
iii. Apple App Store Vs. Google App Store 32
iv. Cost of Development 33

c. Conclusion **33**

7. App Design *35*

a. Objective **35**

i. General Objective 35
ii. Specific Objectives 35

b. Project Limitations **36**

i. GPS 36
ii. Lack of Experience 36
iii. Compilation with App Store Guidelines 36

c. Prototyping **37**

i. Prototyping Software 37
ii. Low Fidelity Prototype. 37

iii. Mid Fidelity: Digital Prototype 37
iv. High-Fidelity: Digital Prototype 38

d. Brand Identity 40

8. App Development 42

a. iPhone SDK 42
i. XCode 42
ii. iOS Simulator 43
iii. Developer Access 44
iv. Swift Language 44

b. App Development 45

9. Business Plan 48

a. Target Audience 48

b. Channels 48

c. Revenue Streams 48

10. Budget & Cost 50

a. Human Resources 50

b. Material 51
i. Hardware 51
ii. Software 51

c. Final Cost 52

11. Conclusions 54

12. Bibliography 56

13. Annex I: Mid-Fidelity Prototype 60

14. Annex II: Mid-Fidelity Prototype 68

Figure Index

Figure 1: US Sports Market Size 21
Figure 2: Mobile Operative System Share in U.S. 31
Figure 3: General view of High-Fidelity Prototype Screens 38
Figure 4: General view of High-Fidelity Prototype Connections 39
Figure 5: XCode Work Environment Scheme 43
Figure 6: XCode Work Environment for Activeli 45
Figure 7: Detail of the set up screen 45
Figure 8: Tab Controller to display the 5 main tabs of the app 46
Figure 9: Code to drive the user directly to the body of the app after logging in 46

Figure 10: Human Resources Cost 50
Figure 11: Hardware Cost 51
Figure 12: Total Costs 52

Figure 13: Mid-Fidelity Prototype: Welcome Screen 61
Figure 14: Mid-Fidelity Prototype: Sport Selection 61
Figure 15: Mid-Fidelity Prototype: Proficiency Setup 62
Figure 16: Mid-Fidelity Prototype: First Location Input 62
Figure 17: Mid-Fidelity Prototype: Users around you 63
Figure 18: Mid-Fidelity Prototype: Close-up suggested users 63
Figure 19: Mid-Fidelity Prototype: Sign Up Request 64
Figure 20: Mid-Fidelity Prototype: Profile View 64
Figure 21: Mid-Fidelity Prototype: Location input & heatmap 65
Figure 22: Mid-Fidelity Prototype: Final User Browsing 65

Figure 23: High-Fidelity Prototype: Welcome Screen 69
Figure 24: High-Fidelity Prototype: Sports Catalog 69
Figure 25: High-Fidelity Prototype: Proficiency Level Input 70
Figure 26: High-Fidelity Prototype: Catalog with selected sports highlighted. 70
Figure 27: High-Fidelity Prototype: Input search location 71
Figure 28: High-Fidelity Prototype: "Seattle" as an example for the searching tool 71
Figure 29: High-Fidelity Prototype: Search Filters 72
Figure 30: High-Fidelity Prototype: Search Results (Carrousel View) 72
Figure 31: High-Fidelity Prototype: Search Results (List View) 73
Figure 32: High-Fidelity Prototype: Group Search Option 73
Figure 33: High-Fidelity Prototype: Sign Up Screen 74
Figure 34: High-Fidelity Prototype: User Profile (Available mode) 74
Figure 35: High-Fidelity Prototype: User Profile (Unavailable mode) 75
Figure 36: High-Fidelity Prototype: Home Screen 75
Figure 37: High-Fidelity Prototype: Friends List 76
Figure 38: High-Fidelity Prototype: Search tool once logged in 76
Figure 39: High-Fidelity Prototype: Chat Room 77
Figure 40: High-Fidelity Prototype: Sample Conversation between two users 77
Figure 41: High-Fidelity Prototype: Menu Bar 78

This page is intentionally left blank

Technical Report

This page is intentionally left blank

1. Objectives

In this Final Degree Project, is explained the conception, design and development of a mobile application meant to solve a social problem related with human interaction and the practice of sports. For this, a user centered design procedure following the Lean methodology[1] has been carried out to find the optimal way to create the ultimate tool for our users, maximizing performance and usability.

In the same way, the competences that are intended to comply, strengthening the knowledge acquired throughout the Degree in Mechanical Engineering with this project are:

Specific Competences:

- Basic knowledge on the use and programming of computers, operating systems, databases and computer programs with application in engineering.

- Adequate knowledge of the concept of company, institutional and legal framework of the company. Organization and management of companies.

Transversal Competences:

- **Problem analysis and resolution:**

  Analyze and solve problems effectively, identifying and defining the significant elements that constitute them.

- **Innovation, Creativity and Entrepreneurship**

  Innovate to respond satisfactorily and in an original way to personal, organizational and social needs and demands with an entrepreneurial attitude.

[1] Lean Methodology: Continuous improvement and respect for people.

This page is intentionally left blank

2. Introduction

Both personal and academic reasons motivated this project, and they are further explained in the following points.

a. Motivation: The Spark of Entrepreneurship

My formation as a Mechanical Engineering undergraduate in the Polytechnic University of Valencia allowed me to experience an exchange in the Pierre and Marie Curie University, in Paris, France, where I had the opportunity to highly improve my expertise in structural design; and in the School of Engineering and Applied Sciences at the University of Pennsylvania, United States, where I combined my strong technical background with some business courses.

I would have never imagined I would have had the chance to meet the international experts and successful entrepreneurs I met there, and hear their advices, guidelines and experiences on how did they start businesses with their technical expertise in order to fulfil their aim of becoming an entrepreneur, which is my aspiration, with a common goal of bringing key technology of this era accessible to the regular public. Putting all the efforts in resolving real-life problems and making it more attractive, energy efficient, eco-friendly and much more accessible in a not so distant future.

Studying in such an international environment like the provided by the universities I had the luck to attend, made me realize how important is to have a multicultural and diverse team with different expertise fields to succeed in any kind of work.

This encouraged me to apply in order to participate in the Asia-Pacific Innovation Academy, the European Innovation Academy's startup accelerator program in Shenzhen, China, sponsored by the Universities of UC Berkley, Stanford, and Google Inc., where I was selected to develop the *solution* I had conceived after the research and work done through the *Entrepreneurship for Engineers* and *New Product Development* courses taken at the University of Pennsylvania.

After this experience, I have reassured myself on my will to pursue the ideation, creation and development of eco-friendly and affordable technology to solve today's problems, even if they appear to be simple and small, in order to make this world a better place.

b. Academic Motivation

The present Final Degree Project has been developed in order to assess the knowledge acquired included in the Degree in Mechanical Engineering completed at the Polytechnic University of Valencia.

This demonstrates how transversal it is, allowing me to use the theoretical and practical basis acquired in subjects such as Informatics, Business Economy, Business, Graphic Design, Computer Assisted Design, Training for Directors, Entrepreneurship, Product Design, Environmental Technology, Statistics, and Technical English to achieve said work.

For this reason, the work carried out has the purpose of completing the training received and thus, obtaining the Degree in Mechanical Engineering.

3. Project Description

Through an intense market research, I found out that people were willing to find interesting local people when traveling abroad or moving to other cities, who have the same interests and values as them, so they could spend their time together if they wanted to and, eventually, improve their skills in a specific sport with the help of those they met.

This connection was firstly conceived as a mentoring relationship with a mentor/mentee role where the non-experts could improve their skills on sports they liked, and the professionals would have someone new to practice them with.

In the process of validating this problem to achieve a market-pull issue to develop a solution, I realized the interest in this connection was mainly from the part of those willing to learn new skills or improve the ones they knew but had a little budget, but in the other hand, professional sport players had no interest in teaching or training other unknown people just for the fact of meeting new people, and this was due to the value these people give to the time they spend practicing the sports they love. And many loved this sports more than anything.

Considering all this information, the idea pivoted trying to understand how could the core problem be solved without compromising the experts and then another solution came up which was decided to be developed based on the *Lean StartUp Method* [2] : ***Activeli: A mobile app that connects sporty people based on how skilled they are.***

This social platform based on a mobile application essentially intends to connect people who practice the same sports and share a common location in a certain time, and allows them to easily find partners as good as them, through a very streamlined user interface, so they can continue with their sports routine accompanied no matter where they are.

[2] Methodology which aims to shorten product development cycles by adopting a combination of business-hypothesis-driven experimentation, iterative product releases, and validated learning.

This page is intentionally left blank

4. Market Research

The Market research held to validate the idea had four phases: Analysis of the Market Size, Data collection through ethnographic interviews, the Data analysis and the study of the Competitors Landscape. This phases will be developed in this point.

a. Market Size

The market size of the sports industry rounds $70.7 Billion only in the United States, and has an impact of $90.6 Billion worldwide, a number which increases if we take into account the indirect influence in other sectors such as telecommunications and clothing.

Moreover, considering that 76% of the Americans own a smartphone able to host smart apps and that a 19% of the US population practices sports every day, that leaves a potential market of $10.1 Million, which means enough room for new businesses.[3]

The opportunities behind this, taking into account the detected unsolved problem, led to the development a product carefully studying the solutions available in the market, their performance and the reason why they were not solving the problem they were trying to address.

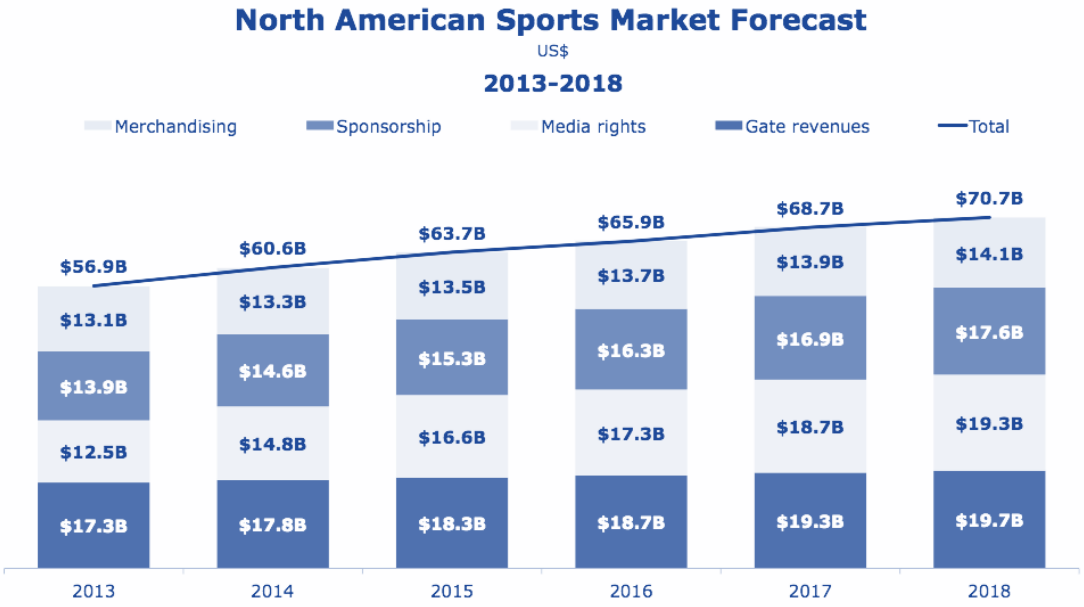


Figure 1: *US Sports Market Size*

[3] United States Census Bureau Data

b. Data collection: Ethnographic Interviews

After conducting several ethnographic interviews to people related with sports and travel, the conclusions were that they all experienced a big problem when connecting to communities which were not their regular environment.

The intention was to apply a Market-Pull[4] methodology to identify a real problem, almost a core necessity which is unmet and develop a solution for it, guaranteeing a good acceptance from the target public as it is not necessary to teach them how to use your product or service, or create the need to use your product in them.

c. Data Analysis: Key Insights

Some valuable insights were spotted which showed that people struggle so much when traveling abroad or moving to different places to find people like them, with the same interests and values.

The found key insights were:

- People are always open to make new connections and meet new people.
- They value personal growth and believe that exiting their comfort zone is essential to improve their skills and knowledge.
- They would be willing to risk meeting new people if they had a guarantee of a match in terms of interests.
- They have had difficulties learning new skills and sports on their own.
- These difficulties were always reduced when they overcame them together with other people in the same situation as them.

[4] The term 'Market Pull', refers to the need/requirement for a new product or a solution to a problem, which comes from the market place

d. Competitor Analysis

To address the issue of connection, other companies have attempted to unsuccessfully solve this problem, but the existence of competitors is not a disadvantage because it means there is a market already validated by others, and that is always followed by a business opportunity.

They were carefully studied, from the way they worked to how they performed, in order to detect the specific pain points our users were claiming they had when using them, so a solution could be provided with some innovation, taking advantage of the gaps.

The principal competitors ***Activeli*** has currently out in the market are:

i. Atleto:

It is a Social Media platform whose aim is to create a network of professional athletes so they can keep in touch between them, in their hometowns and allow them to create competitions. It does not provide any kind of search based on GPS location feature and it is addressed to senior athletes with a wide experience in the sports industry.

Different extra features shown in the user's profile create a very complex application which appears to solve many problems at once, but ends up not succeeding in any of them. In addition, it does not have enough downloads on the App Store to have a relevant rating and positioning, and that is also significant.

ii. MeetUp:

MeetUp is a social lifestyle app based on groups of people who want to gather for events they have interest on, which was created in 2002. Meetup allows its members to meet in real life through groups united by a common interest like politics, sports, culture, books, and many other subjects. Subscription on the site and mobile applications is free and does not accept advertising.

The main pain points are that the group-based app has groups where thousands of people can join, and this easiness of joining events leads to many inactive users at all of them. This situation makes active users struggle to connect with others like them, and very difficult to succeed in attending to those events because they might end up not taking place because of the lack of interested users.

Its rating on the App Store is a 4.6 out of 5, but because of the wide variety of meetups it provides, so it is not significant for the research. More than 50% of the sporty people we interviewed online and offline showed little or no interest in the sports tools offered by Meetup, even though it proved to be very useful for hobbies such as reading or painting.

iii. NeedSporty:

Need Sporty is a social network for sportsmen on mobile phones. Its goal is to make life easier for athletes by allowing them to easily find other athletes. As a concept it is basically what we aim to do, but with the difference that NeedSporty is only available in French and focused to a public who lives in France. Moreover, the way the users are shown is not convenient at all, showing a cloud of users in a map, where beginners and experts are shown the same way, and where you need to access their profiles individually by clicking on the bubble above them to see their full profile, where in addition, their level of proficiency it is not well defined.

When using it, more than 80% of the users are inactive or incomplete profiles. Right after spotting this, we observed a tendency from our interviewees to instantly delete the application, which may be one of the reasons of not having a rating on the App Store. Moreover, the people who was asked claimed they felt uncomfortable sharing their exact location with strangers.

iv. Dating Apps:

The dating Apps such as Tinder, Meetic etc. are also indirect competitors since, even though their target public is not looking for casual partners to practice sports and are more focused into formal dating, they also match people based on location and are a good tool to meet new people in an specific area, but the purpose is very different.

v. Conclusion

Unlike Atleto, our main competitor, or MeetUp, an indirect competitor, our platform is compatible with all devices, provides a one to one match with a user-friendly layout, using big data quick analysis which helps young people who are active in sports which are practiced individually who want to easily find a partner in their hometowns or while traveling, to practice these sports with by avoiding sort between tons of profiles, or joining existing groups with inactive users and enabling them to connect in an quick, easy-to-use and intuitive way.

This page is intentionally left blank

5. Solution Brainstorming

To differentiate the company from the competitors, different types of solution were thought in order to solve the problem in different ways. Advantages and disadvantages were analyzed for every and each of each one of them, so the most suitable one could be chosen.

In this section, the possible solutions are explained as well as the final decision taken.

a. Possible Solutions

i. Option A: A network of physical locations.

In order to make people meet and connect, one option was to create spaces were these people could go, so interaction could be propitiated between them and eventually reach the goal of allowing them to meet sports buddies.

The advantages were that it kept distant from the digital solutions, making possible a more human connection where the users would have a real impression of the other people thanks to the real world interaction, and its accessibility would increase interest in passing-byers who would join driven by curiosity. This would most probable improve the marketing strategy, because of the promotion by word of mouth.

The disadvantages are quite obvious. The presence of a physical location limits the action to a specific place. Moreover, the maintenance of a physical office or environment is very expensive and the need to provide something apart from the space to make people feel attracted to join would increase expenses.

Not to mention, how not convenient is for the aim of addressing travelers and active users, which would be changing location constantly and therefore, the goal would we impossible to reach.

ii. Option B: An online web platform.

Creating a web platform was also considered due to the amount of possibilities of using a web browser and a computed, either table-based or laptop. The advantages of the employment of this tool are the possibility to have a bigger screen and consequently the chance to show more options and tools to the user.

The main disadvantages are the necessity of being in a stable location where the user can use the laptop comfortably, the fact of depending on the internet connection of the chosen location and the lack of freedom for the user to use it on the go.

The Startup intends to be an easy-to-use and quick-access tool to find partners wherever you go and whenever you want. Even though it could be used by smartphones with internet access, the possibilities are reduced when being displayed inside an online screen, plus it does not make possible to use of some of the features present in smartphones today.

iii. Option C: A mobile App

The advantages of a mobile app in order to fulfill the set goal were multiple. First of all, a smartphone allows you to quickly access the tools stored on in, and creating an app makes the company able to make use of all the features present in smartphones on the market, which are many.

Firstly, data recorded by the device can be accessed, such as its GPS and accelerometer in order to provide location services and suggestions of sports venues nearby.

Secondly, people carry their smartphones with them during the majority of time, even when traveling abroad and this makes it perfect for an instant notification if someone wants to contact you, or for you if you want to look for someone in your area immediately.

The disadvantages of the creation of a mobile app are making sure to be unique from the other enormous amount of apps offered in the market, and also that it needs to rely on

the data connection of the different carriers around the world, in order to provide the service.

b. Conclusion

After a thoughtful study and several interviews to figure out the most suitable way to provide the solution, the **Option C** was finally chosen because of the following reasons:

- High portability and usability.
- Faster solution than web browsers because there is no need to load a URL.
- Possibility to be used offline since the majority of the information required is already stored in the application.
- Reduced costs of development and maintenance
- Increase in customer engagement and loyalty. (Once downloaded if it works they are less likely to delete it.)
- Better promotion with the app itself which acts as a constant reminder every time the user turns the phone on.

This page is intentionally left blank

6. Solution Execution

In this point, and in order to execute the chosen solution, the competitive advantage of the proposed alternative is stated, the multiple Operative systems are studied to select the most suitable one with strong argumentation.

a. Competitive Advantage

The unique value proposition of **Activeli** is the efficient and streamlined layout in which you can access the information you want with few steps, without compromising your privacy and focusing on the real need that needs to be solved.

b. Viable Development Operative Systems

The number of mobile phone users at a global level is expected to pass the five billion by 2019.[5]

The amount of Android users is considerably bigger than any other mobile operative system from a global perspective, but since the target market is the United States, developing an app for iOS users seems the most reasonable option as it represents almost a 55% of the mobile operating system market share currently in the US.[6]

Windows phone was not taken into account due to its lack of relevance in the studied market.

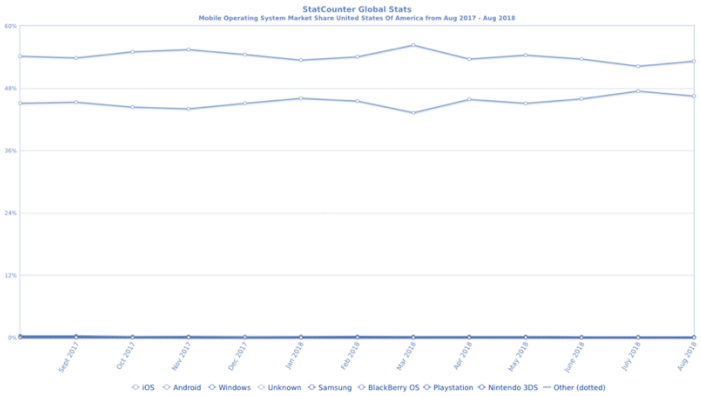


***Figure 2**: Mobile Operative System Share in U.S.*

[5] Source: Statista
[6] Source: Mobile Operating System Market Share United States Of America by *StatCounter*

There also exist various dissimilarities in the development within both environments:

i. Programming

The mobile applications developed for **Android** run in Java and C, both are common programming languages. Java was designed to be easy to use, and C which is a middle level language, combines the features of high level and low level languages.

Development for **iOS** was firstly done with Objective-C but has been replaced by Swift as a more convenient language to code with since it has an advanced error checking system which makes it faster and easier to build apps.

ii. Mobile Manufacturers (One Vs. Many)

Android OS runs in a wide variety of devices, each one with different features and specifications, battery life, restrictions etc. This is an advantage in terms of usability since it can be installed in any type of device, but because of this reason the user experience is affected as the devices are not designed to fit perfectly the operative system.

iOS is only available for iPhone and iPad, ensuring that the designed user experience will remain intact in every device, but there is less opportunities to innovate.

iii. Apple App Store[7] Vs. Google App Store[8]

Apple includes stricter requirements in its guidelines compared to Android. Before an iOS app is being published in the App Store, the mobile application is checked by Apple, without exceptions and this takes 1-2 days.

[7] It is a service created by the Apple company for its products such as the iPhone, iPod Touch, or iPad, which allows IOS users to search and download iTunes Store applications, developed with the iPhone SDK and published by Apple.
[8] It is a service of digital distribution of mobile applications for devices with Android operating system, as well as an official online store developed and operated by Google.

Android, on the other hand, does not have such strict verification procedures. That's probably the reason why fake apps are regularly appearing in the Google Play Store and used to promote inappropriate or misleading content. However, most of the fake apps are revealed quickly due to bad ratings and negative reviews.

iv. Cost of Development

The total price for developing an app depends on a list of characteristics and can't simply be estimated by generic information. The developing costs can vary widely depending of many things, from 1.000€ to 150.000€.

However, the operating system is just one of the factors that influence the cost of creating a mobile app, and developing for several platforms will definitely increase the price, plus the cost of publishing the app. For iOS, the Apple App Store charges $99 per year, while Google has a one-time fee of $25 for bringing out an Android app in their Play Store.

c. Conclusion

Considering the addressed market and the relevance of iOS devices in US, plus the similarities between both in terms of performance and the convenience of Swift as an accessible language for programmers without a software engineering background, like me, the chosen operative system to work on was **iOS**.

This page is intentionally left blank

7. App Design

a. Objective

i. General Objective

The general objective of this project is the development of an application for mobile devices for the study of healthy life habits; which will be carried out through the different specific objectives detailed below.

ii. Specific Objectives

The specific objectives to achieve the general objective are the following:

- Develop a mobile application to connect people in the same area, using the GPS integrated in a smartphone.

- Create a tailored profile with sports preferences within the application mentioned above, in order to only show people that fit the search filters.

- Ensure an easy-to-use and user-friendly layout to make the experience as streamlined as possible, fully tailored for the user.

- The information obtained by the mobile must be stored and suggestions of local sports venues and centers will be displayed as a way to monetize it.

- Allow the users to communicate between them through an in-app chat room so they can coordinate the meetups.

b. Project Limitations

i. GPS

GPS positions provided via phone are generated using multiple different methods, resulting in highly variable performance. Performance depends on the device, the cell network, availability of GPS satellites and line of sight to these satellites.

The GPS and locations services implemented by Apple on their iPhones provide a high level accuracy.

ii. Lack of Experience

The **lack of experience** of the developer in the technologies that will be used in the development of the application. This aspect can be an obstacle, since a large amount of time must be devoted to the autonomous learning of these technologies as new skills may be needed to continue developing the application.

iii. Compilation with App Store Guidelines[9]

In order to guarantee the viability and safety of the mobile applications available on the market, there are some requirements all apps need to compile with so they can be eligible to be displayed on the App Store in the United States.

The legal requirements which must be taken into account affect safety, performance, business, design and legal concerns.

[9] Basic requirements set by Apple Inc. to validate any app willing to be published in the App Store.

c. Prototyping

Once the project is clear, following the Lean StartUp method, prototypes were done at an early stage to see how the customers would interact with our product; to distinguish whether they feel attracted or not to the way it has been conceived, and to start bringing to live a basic version of the final product.

i. Prototyping Software

The used software was **AdobeXD[10] Version 10.** Adobe XD is the ultimate tool to design and create drafts and interactive prototypes to allow navigation that simulates the user's real interaction with the system.

ii. Low Fidelity Prototype.

First of all, an initial version of the product drawn in paper was conceived to start the user research from the beginning, observing people's interactions with it, how they behaved towards the screens and what features they expected to see and interact with.

This early stage is essential, and a very-low fidelity layout is necessary to avoid the customers from being afraid to tell you the real opinion and make it possible to do any necessary changes, even if they imply redesigning the app from scratch.

Thanks to this process, the basic layout of the mobile app was designed and the mid-fidelity prototype created following user's specifications.

iii. Mid Fidelity: Digital Prototype

The Mid-Fidelity prototype shows the basic functions of the app in a very basic layout, but real enough for our users to consider it as a functional application.

[10] Adobe Experience Design

iv. High-Fidelity: Digital Prototype

Taking as a basis the structure design conceived by the mid-fidelity prototype, much more attention is paid to level of detail and functionality, making it more interactive, increasing visual content, commands and essentially creating a more responsive layout, gives as a result a high-fidelity prototype.

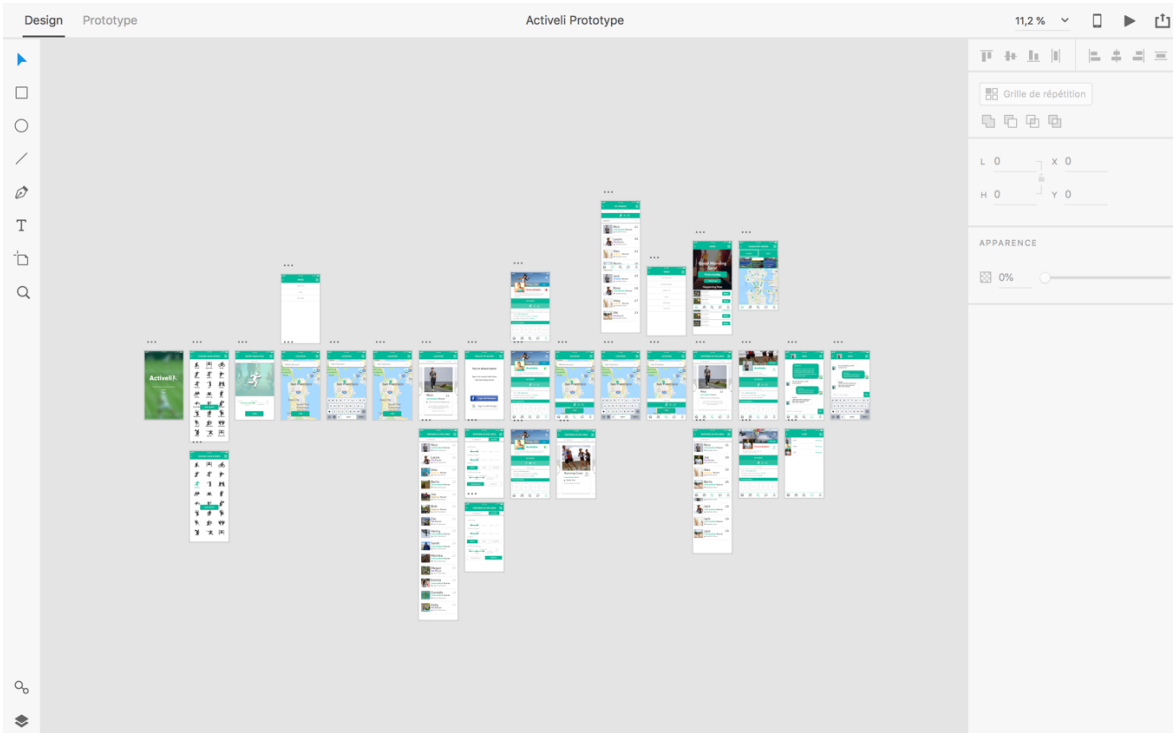


Figure 3: *General view of High-Fidelity Prototype Screens*

Once the screens have been designed, the program itself allows to create the connections between the action points, resulting in an imitation of the final coded product. In the following figure, all the connections are shown to illustrate the level of responsiveness of the App.

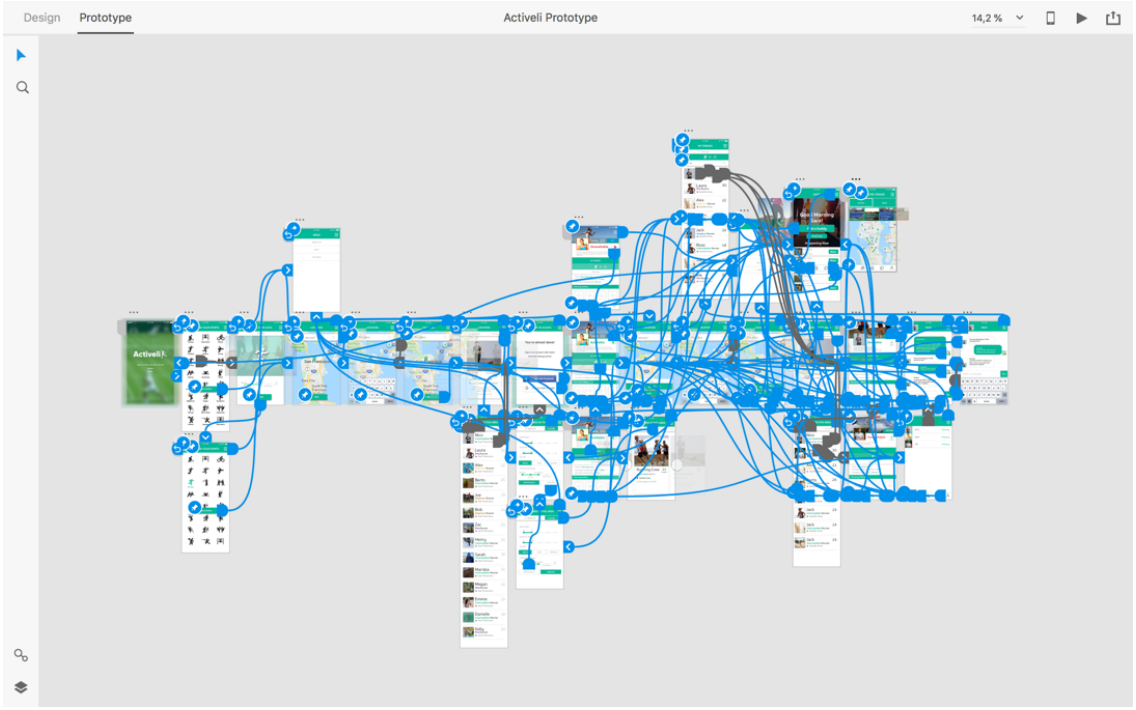


Figure 4: *General view of High-Fidelity Prototype Connections*

With this design, a final draft is created to be based on when starting the development of the final mobile application. The aim is to make the appearance shown by the high-fidelity prototype be a reality in the fully working app.

The detail of the designed screens can be observed more precisely in the Annex II.

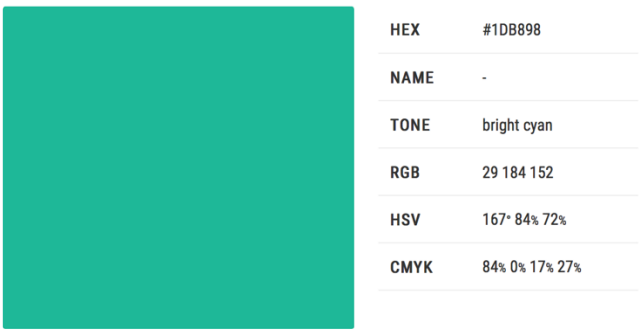
d. Brand Identity

As every other product, a mobile application needs to have a unique identity to set the business apart from any other company in your sector.

To differentiate the app, the name ***Activeli*** was acquired to guarantee a good SEO positioning[11] on web browsers and media channels, as well as because its relation with activity, sports and the characteristic fast-paced lifestyle of a sporty person.

The "***Gilroy***" typography was chosen, to reflect the young spirit of the company and its aim to address a your-adult customer, and the emblem of an active person was added to increase this perception, matching in color and size.

The color of the brand was also selected due to the relation with healthy lifestyle and trust, resulting in a bright cyan catalogued by Pantone[12] as #**1DB898**.



[11] Improved search engine positioning is the result of a thorough search engine marketing and web site optimization strategy, all with an eye to maximizing your search visibility.
[12] Pantone® Inc. Company that created the Pantone Matching System®, an identification system for comparing and communicating colors in graphic arts.

This page is intentionally left blank

8. App Development

a. iPhone SDK

In order to implement the design explained above and develop on the iOS operating system platform, some specific tools are needed. These consist, in a compiler, development environment, simulators, among others. For this reason Apple launched a software development kit (SDK) to be able to program and create applications for its different devices. This software development kit is currently only available for the MAC OS X operating system.

The SDK has various tools such as Xcode, the iOS Simulator, and the development program; which will be explained below.

i. XCode

Xcode is an integrated programming environment which allows you to design the user interface of the application, programming, debugging, analyzing and improving the performance of it.

Various versions of Xcode are available and each one of them has its particularities due to advancements in each one of the versions released , for the development of this project version 9.4.1 (9F2000) was used. The sections of the version used for the development of the application are:

- **Navigation area:** where you can organize the different project files.

- **Editor area:** where you can edit the source files, the components of the interface and configure the options of the application.

- **Debug area:** this contains panels that are used to observe the variables and how they interact in the execution of the program.

- **Utilities area:** this contains the inspectors that are used to configure the properties of the interface objects. It also shows the different libraries where the objects are found by default to be able to add them to the interface.

- **Toolbar:** it provides easy access to the main buttons needed to control the other areas.

ii. iOS Simulator

It is a simulator that can execute the application which is being programmed inside a virtual device that has iOS as an operational system. This simulator, the iOS Simulator, emulates the two platforms that currently have iOS such as the iPhone and the iPad in any of their versions.

In this project the simulator is used to observe the implementation of the graphic interface that is being developed and how it can interact with the user in real time.

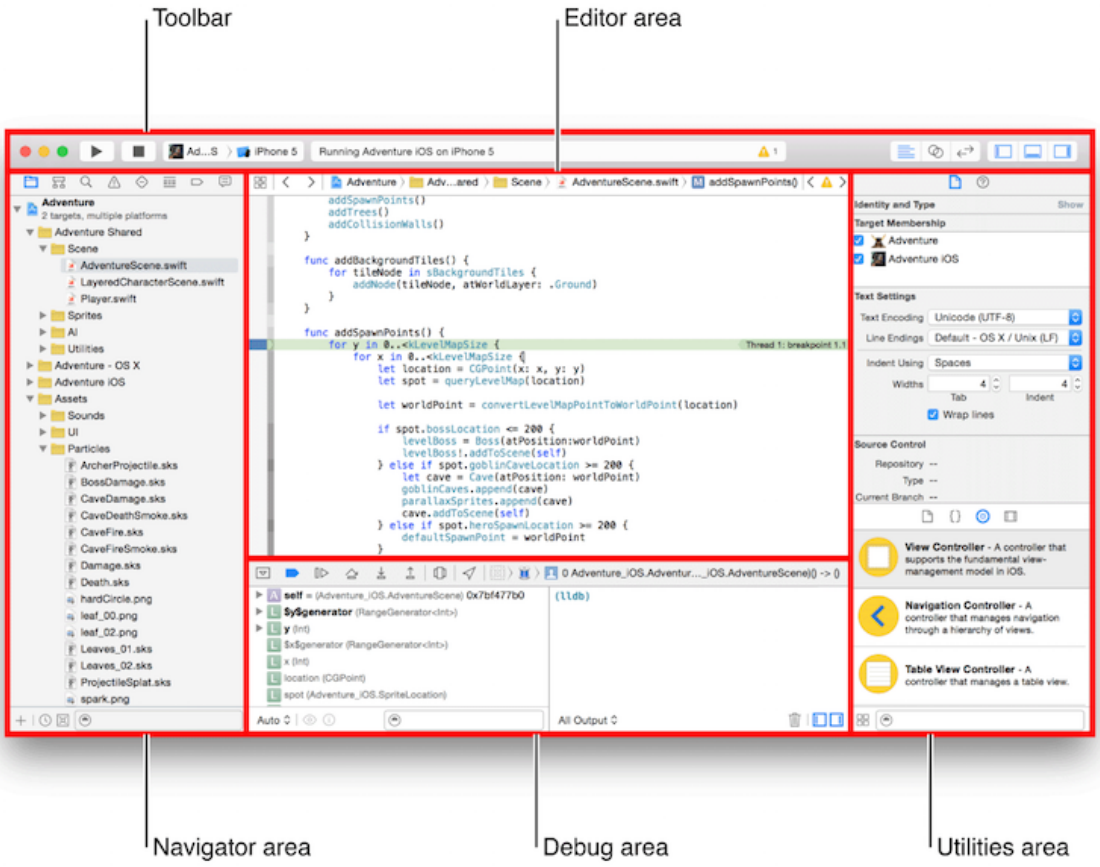


***Figure 5**: XCode Work Environment Scheme*

iii. Developer Access

Apple, in addition to launching an SDK, also launched a program for application developers. The program consists of developing, testing and distributing the developed applications.

It allows subscribing without any cost and having access to all the documentation of the different tools, libraries and applications that can be used in the development process of an application. Although, in order to distribute the applications, a price must be paid depending on whether you are a private individual or a company, depending on the type of distribution of the application.

The price with the distribution in the Apple Store for private developers is $99 US Dollars per year, while the price of a business program with distributions increases up to $299 US Dollars per year. These programs make it more difficult for individual people to freely develop applications for platforms that have iOS.

iv. Swift Language

Swift is a multi-paradigm[13] programming language intended to be safe, fast-paced and concise language, created by Apple and focused on the development of applications for iOS and macOS. It was introduced in 2014 and you can use any library programmed in Objective-C and call C functions.

[13] Multi-Paradigm means that it supports various programming languages allowing expert coders to use different languages depending on what they want to do or consider more convenient for each task.

b. App Development

Using the resources offered by XCode, the mobile application development started.

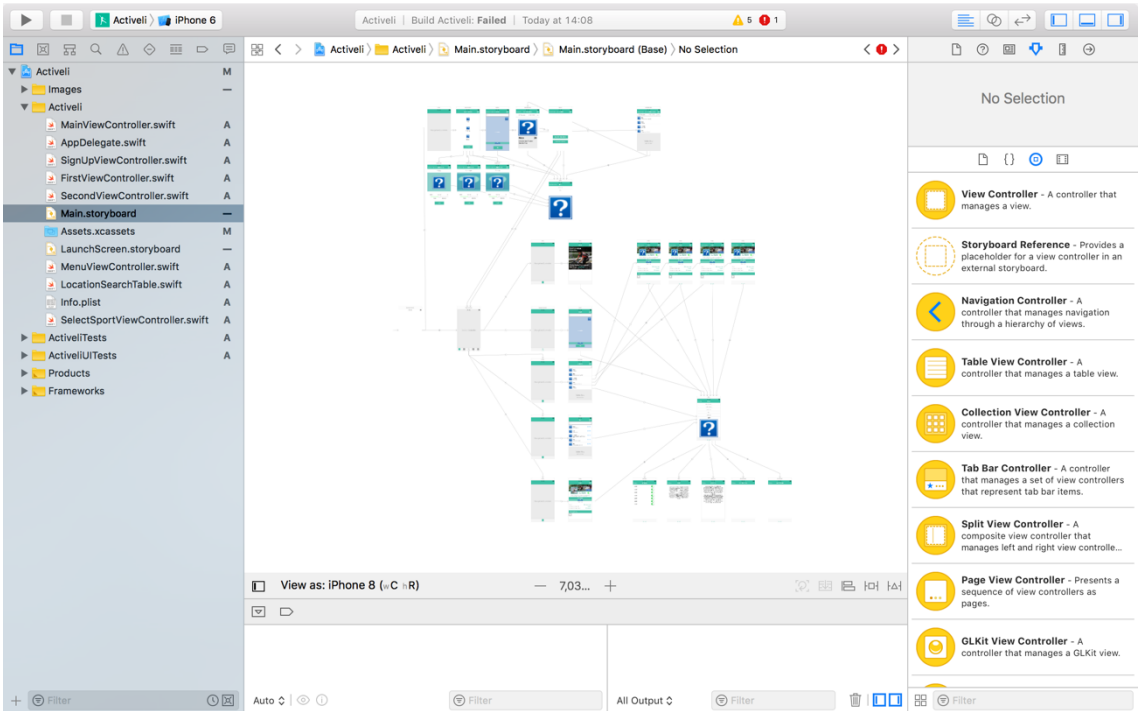


Figure 6: *XCode Work Environment for Activeli*

First, the welcome screen and sign up process was implemented. Since it's a one use screen which will only be launched the first time the app is downloaded, or if the user logs out of their account, a path was created with only three sports to achieve the Minimum Viable Product and focus on the other features.

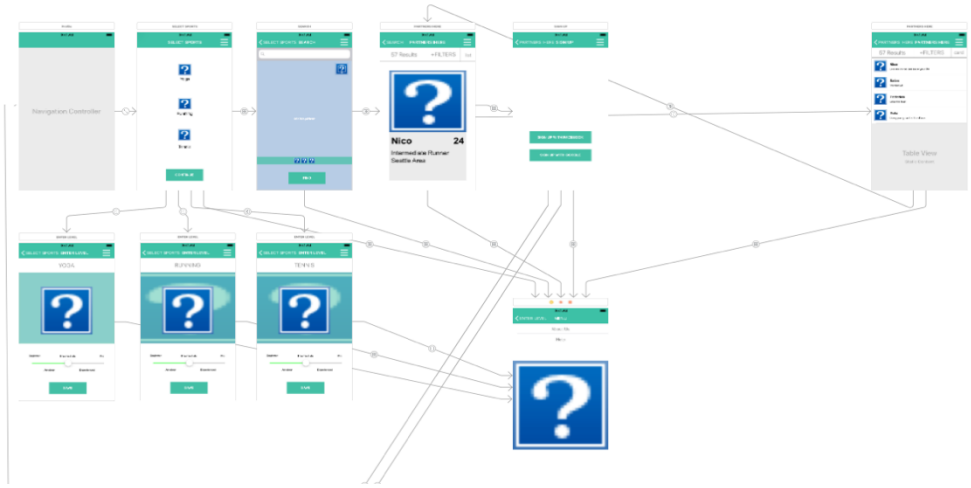


Figure 7: *Detail of the set up screen*

After the log in screens, the main body of the application is created using a Tab Bar Controller to display the five different screens representing the options showed on the bottom Tab Menu Bar.

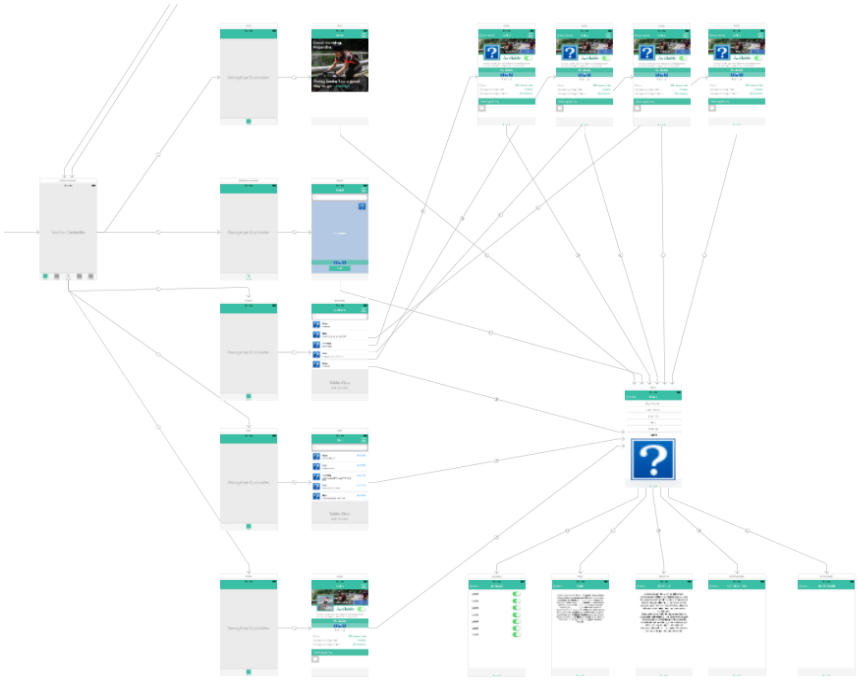


Figure 8: *Tab Controller to display the 5 main tabs of the app*

An external View Controller called "*Menu View Controller* " is set up with the following lines of code to make it possible to jump over the set up part once the user has logged in:

```
class MenuViewController: UITableViewController {

    override func viewDidLoad() {
        super.viewDidLoad()

        // Do any additional setup after loading the view.
    }

    @IBAction func logOut(_ sender: Any) {
        let mainViewController =
            self.view.window!.rootViewController as?
            MainViewController
        mainViewController?.isSetupDone = false

            self.view.window!.rootViewController?.dismiss(
            animated: false, completion: nil)
    }
```

Figure 9*: Code to drive the user directly to the body of the app after logging in*

Unfortunately, due to a rendering error the images and icons used in the different view controllers of the app development are not displayed, but they refer to the equivalent screens shown in the High Fidelity Prototype (Annex II).

The general layout of the mobile application was designed using the drag&drop tool provided by Xcode, allowing an easy building process. The essential value of the app was created, and the project was considered finished since in order to create a user database and develop the AI matching technology a senior developer is required, something impossible due to time constrains and budget limitations in this case.

9. Business Plan

The Business Plan defines what you will offer the market, how you will do it, who will be your target audience, how will you sell your product or service and what will be your method to generate income.

a. Target Audience

The costumer target identified is composed by young people and young adults interested in practicing sport activities.

b. Channels

The main channels which will be used for the promotion of this app are Social Networking Platforms such as:

- Facebook
- Instagram
- Twitter
- Snapchat

And also via Google AdWords and SEO Positioning.

c. Revenue Streams

Various revenue models were studied to check which one fitted the best to this product. It was decided to pursue a Freemium model offering free downloads, but giving the opportunity to upgrade the user's accounts and access premium features, such as personalized spaces for their sports.

Moreover, local sports venues willing to sponsor us will be displayed as suggestions for the users to go and practice sports with their fellows, as well as ads from their favorite brands, related with the sports they inputted in first place.

This page is intentionally left blank

10. Budget & Cost

The aim of this chapter is to make an estimation of the total costs and necessary budget to execute the Project, as if it had been done by a professional.

The following considerations were taken into account:

- The Project will be developed by a single person with a professional level equivalent to a junior engineer.

- The estimated timing is around 5 months from conception to development, without a full-time dedication, as work has been done based on time availability and throughout some related courses and programs which helped its development, therefore being able to have an estimation of the total work hours.

The budget will be divided into two sections: human resources and materials, as described below.

a. Human Resources

Throughout the execution of this Final Degree Project, the working hours have been noted down in an approximate way. The total number of work hours has been around 350 hours.

To calculate the human resources costs, we consider that a Junior Engineer makes up to 20€/h, leaving us with a total cost of 7.000€. The following table specifies the costs associated with labor for certain hours of work:

Position	Fare	Hours	Total
Junior Engineer	20€/h	300	6.000€

***Figure 10**: Human Resources Cost*

b. Material

The costs associated with the acquisition of the material necessary for the project execution as well as for the implementation of the proposed devices throughout the study are shown in the following tables: One for the used hardware, and the other one for the used software.

i. Hardware

Considering the necessary materials and the time and resources spent with it, the cost of the Hardware amortization is:

Material	Total Price	Amortization Period	Usage Period	Amortization Cost for use
Computer: MacBook Pro (Retina, 13 inches) Processor: 2,6 GHz Intel Core i5	1.505,59 €	24 months	4 months	250,93 €

Figure 11: *Hardware Cost*

ii. Software

Considering that the prototyping tool, **Adobe XD**, is available for free and that the coding environment, **Xcode,** is also free of charge if you have an Apple ID account, as I do, the only relative cost would be the one related with the Operative system used.

In this case, the Operative System is **macOS High Sierra,** and since it is free for MacBook users as in this case, the cost is null. Therefore, the cost of the diverse software licenses used is 0€.

c. Final Cost

The total cost of bringing this project to life is **7.563,63 €** assuming that the junior engineer will be able to conduct all the different stages of research, design and development of the app, like I did.

The final costs are gathered in the following table:

Service	Price
Computer: MacBook Pro (Retina, 13 inches, mid 2014). Processor: 2,6 GHz Intel Core i5	250,93€
Junior Engineer	6.000€
TOTAL (before IVA)	**6.250,93€**
IVA (21%)	1.312,69€
TOTAL (after IVA)	**7.563,63€**

Figure 12: *Total Costs*

If a more detailed and developed app is desired, a senior engineer and a graphic designer will be needed, increasing considerable the costs.

This page is intentionally left blank

11. Conclusions

In the carried out project, an application was developed for mobile devices with iOS operating system, capable of creating a match between two users when same interests and proficiency in sports were input in the app, and when they both are located in the same area.

The application developed has been validated with the iPhone 6 mobile device, proving to run the Minimum Viable Product.

The following is a summary of the main results obtained after the development of this project:

- The graphic interface of the application has been designed following the type of application of tabs proposed by the Xcode development environment, in order to design the different sections, user interface and information input by the user.

- The sports selection tool determines the user's favorite sports and the level of proficiency in each one of them, storing the information to build a personal profile.

- The necessary functions have been implemented in Swift, gathering the data from the built-in GPS of the smartphone, and the personal Facebook profile from which the main personal data is taken to validate the app profile.

This page is intentionally left blank

12. Bibliography

1. *The Lean Startup*, Eric Rise, 2011.
2. United States Census Bureau <http://www.census.gov/>
3. Statista, Statistics website <https://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/>
4. *Stat Counter* Global Stats, Statistics website < http://gs.statcounter.com>
5. Apple Inc. iOS Developer Library. *Tools for iOS Development*.
6. Apple Inc. iOS Developer Library. *Data Management.*
7. Apple Inc. App Store Guidelines < https://developer.apple.com/app-store/review/guidelines/#safety >
8. Pantone, Pantone Matching System, < https://www.pantone.com>
9. Apple Inc. XCode User Guide < https://developer.apple.com/support/xcode/>

This page is intentionally left blank

Annexes

This page is intentionally left blank

13. Annex I:
Mid-Fidelity Prototype

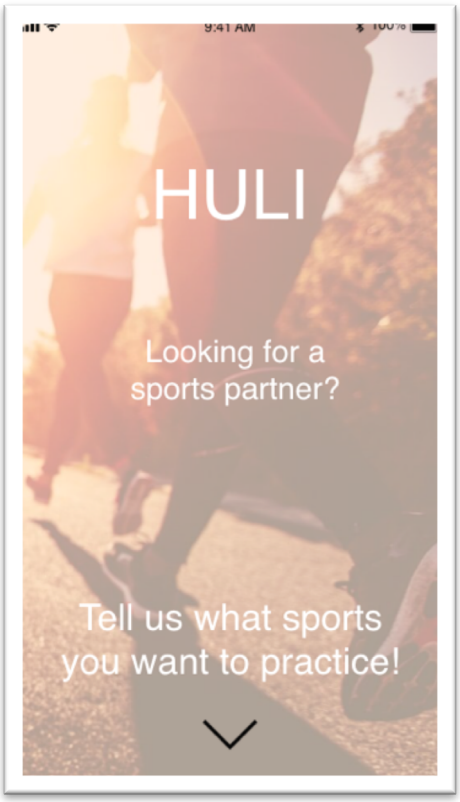


Figure 13: *Mid-Fidelity Prototype: Welcome Screen*

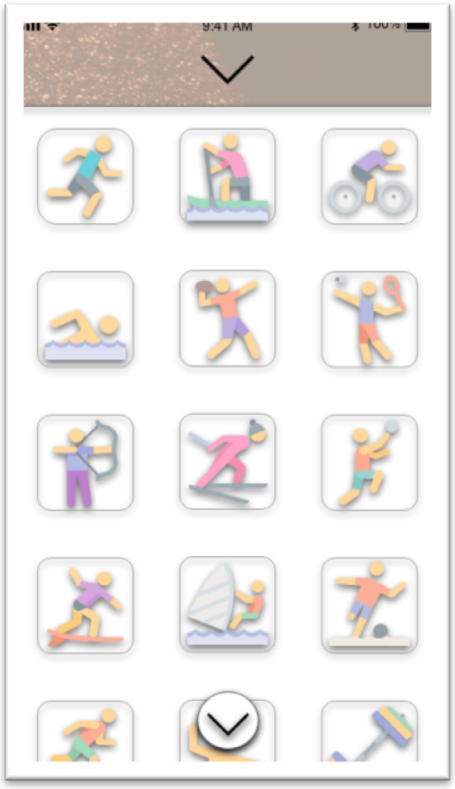


Figure 14*: Mid-Fidelity Prototype: Sport Selection*

Figure 15: *Mid-Fidelity Prototype: Proficiency Setup*

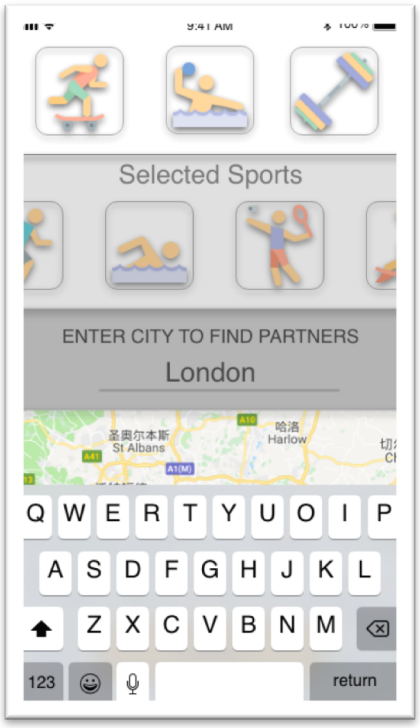


Figure 16: *Mid-Fidelity Prototype: First Location Input*

Figure 17: *Mid-Fidelity Prototype: Users around you*

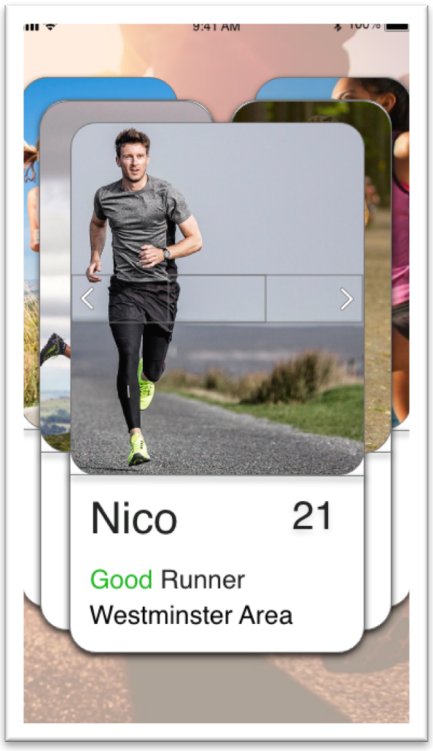


Figure 18: *Mid-Fidelity Prototype: Close-up suggested users*

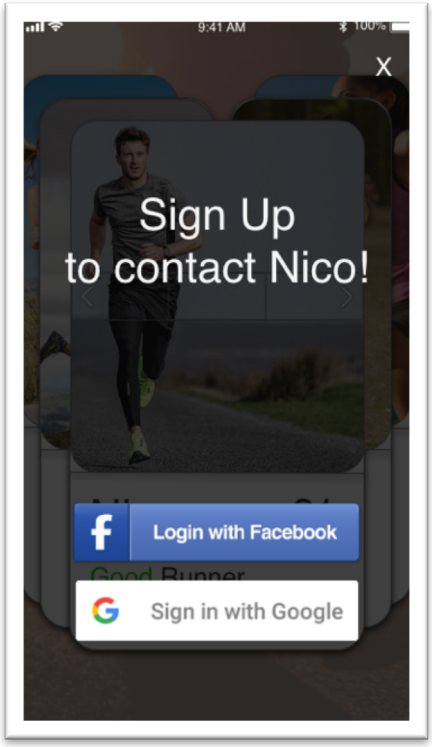


Figure 19: *Mid-Fidelity Prototype: Sign Up Request*

Figure 20: *Mid-Fidelity Prototype: Profile View*

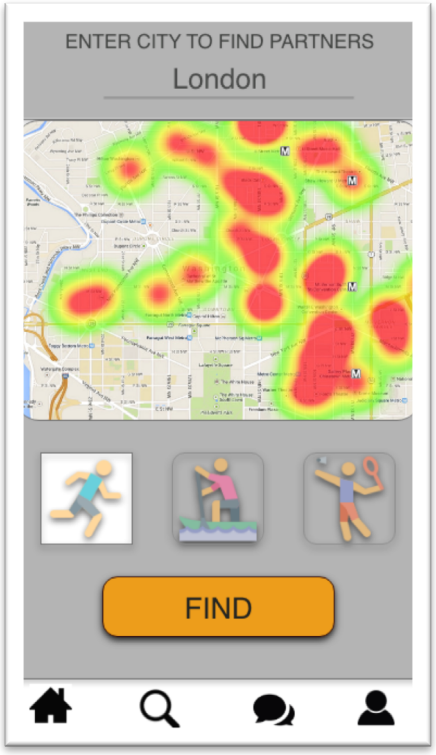


Figure 21: *Mid-Fidelity Prototype: Location input & heatmap*

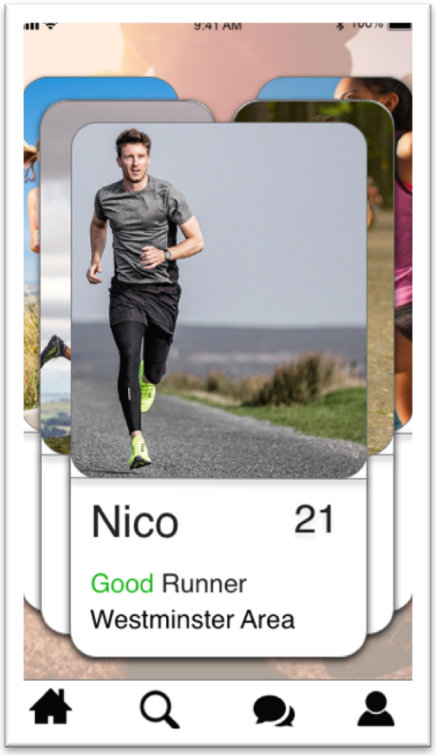


Figure 22: *Mid-Fidelity Prototype: Final User Browsing*

This page is intentionally left blank

This page is intentionally left blank

14. Annex II: High-Fidelity Prototype

***Figure 23**: High-Fidelity Prototype: Welcome Screen*

***Figure 24:** High-Fidelity Prototype: Sports Catalog*

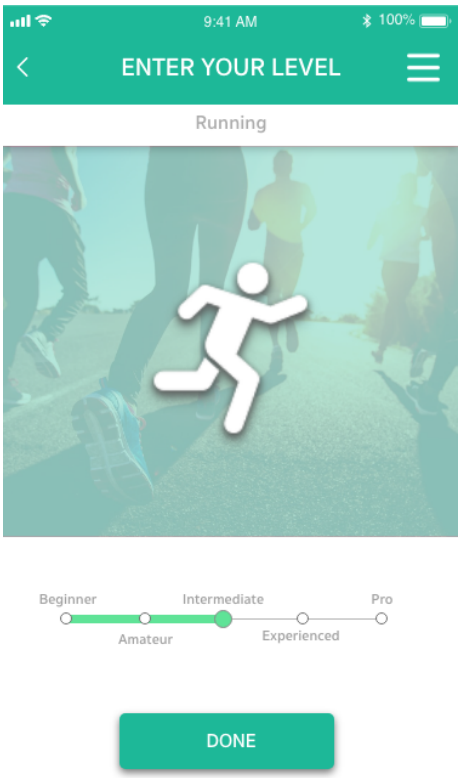


Figure 25: *High-Fidelity Prototype: Proficiency Level Input*

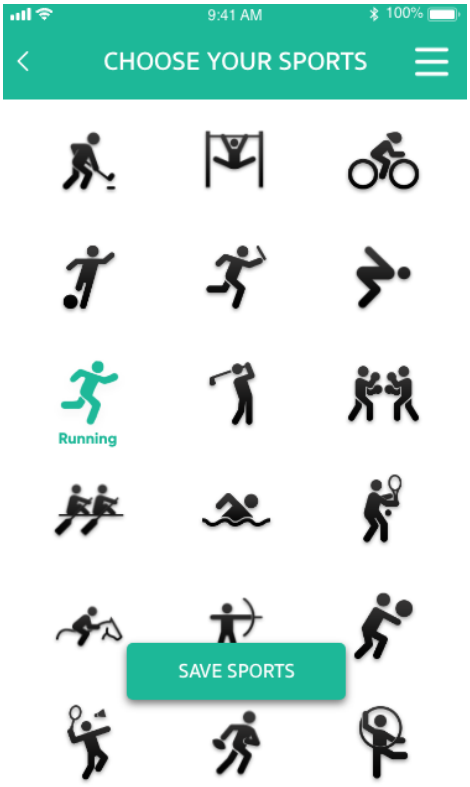


Figure 26: *High-Fidelity Prototype: Catalog with selected sports highlighted.*

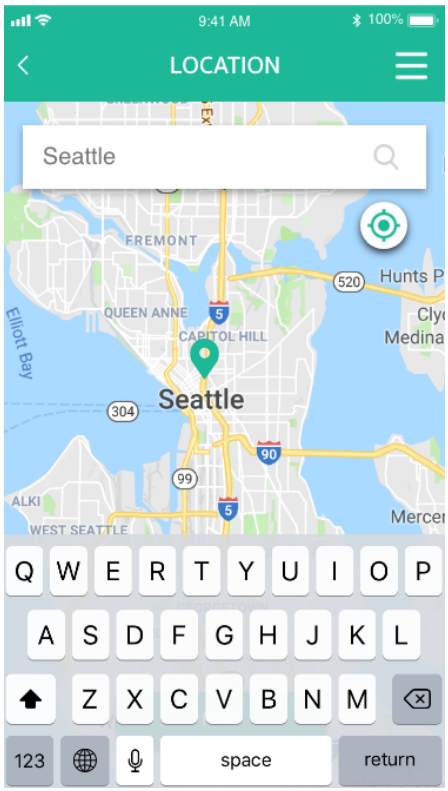


Figure 27: *High-Fidelity Prototype: Input search location*

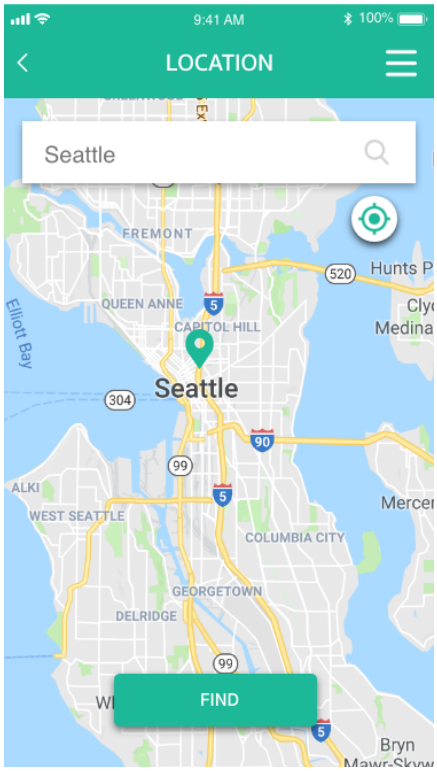


Figure 28: *High-Fidelity Prototype: "Seattle" as an example for the searching tool*

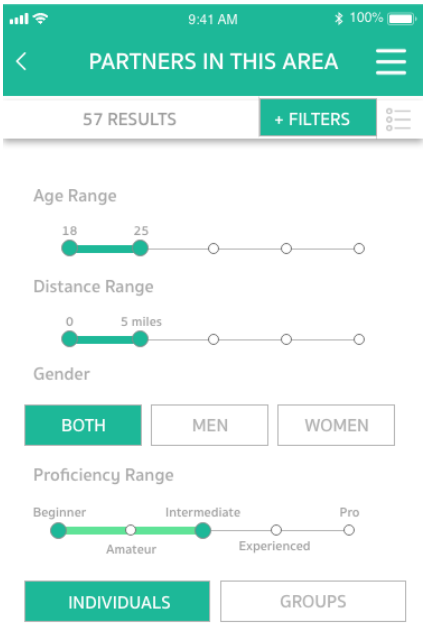


Figure 29: *High-Fidelity Prototype: Search Filters*

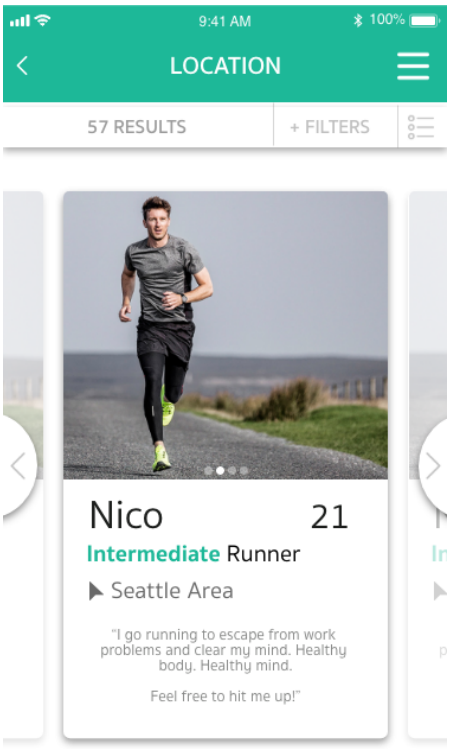


Figure 30: *High-Fidelity Prototype: Search Results (Carrousel View)*

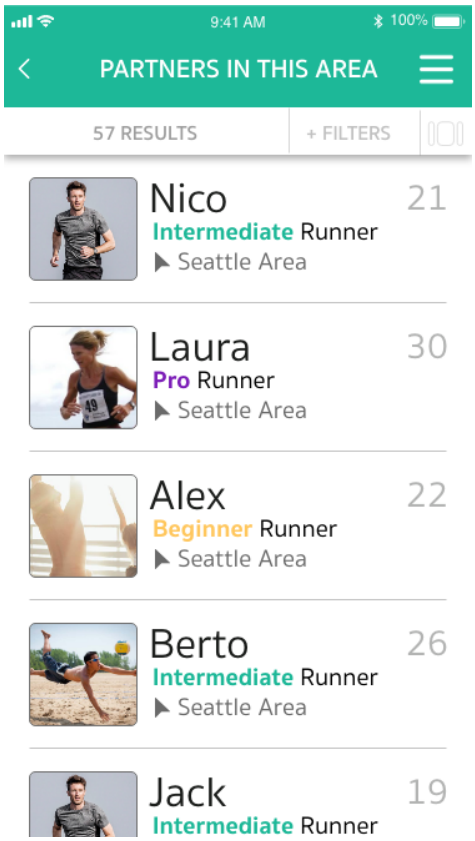


Figure 31: *High-Fidelity Prototype: Search Results (List View)*

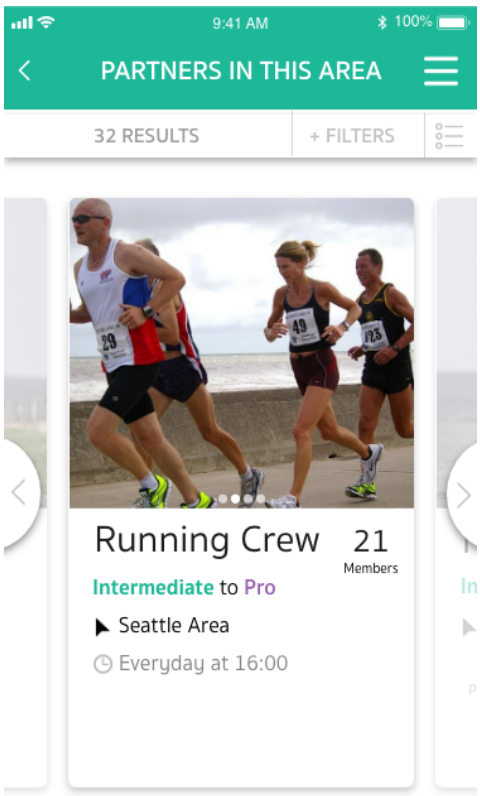


Figure 32*: High-Fidelity Prototype: Group Search Option*

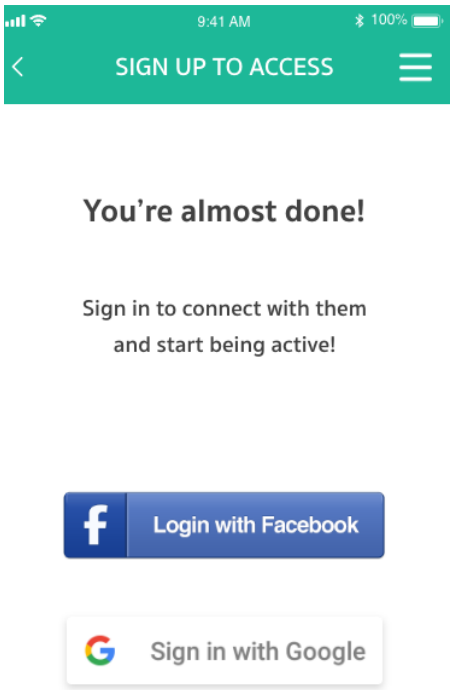


***Figure 33**: High-Fidelity Prototype: Sign Up Screen*

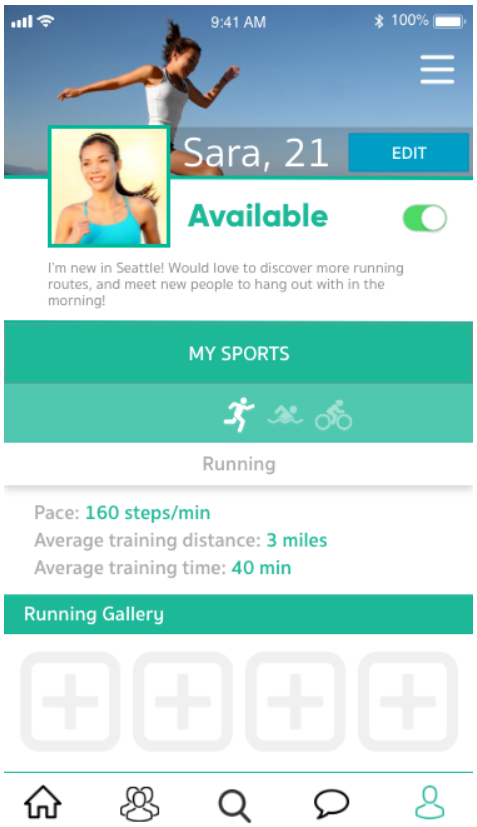


***Figure 34**: High-Fidelity Prototype: User Profile (Available mode)*

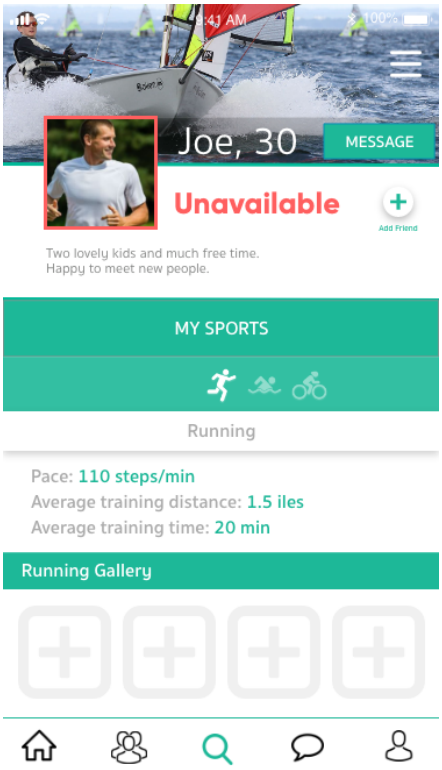


Figure 35: *High-Fidelity Prototype: User Profile (Unavailable mode)*

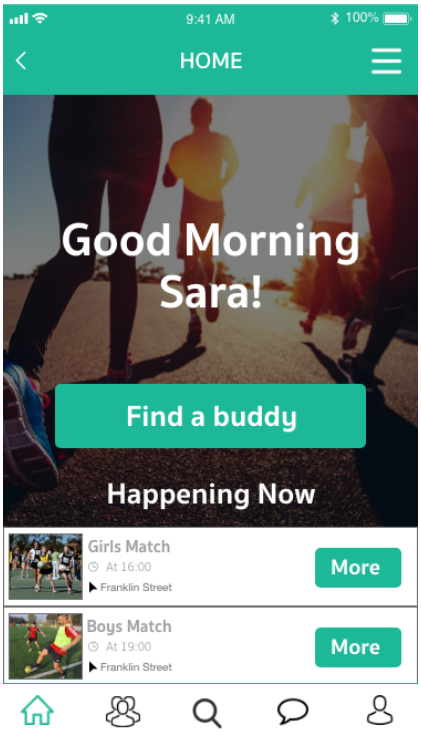


Figure 36: *High-Fidelity Prototype: Home Screen*

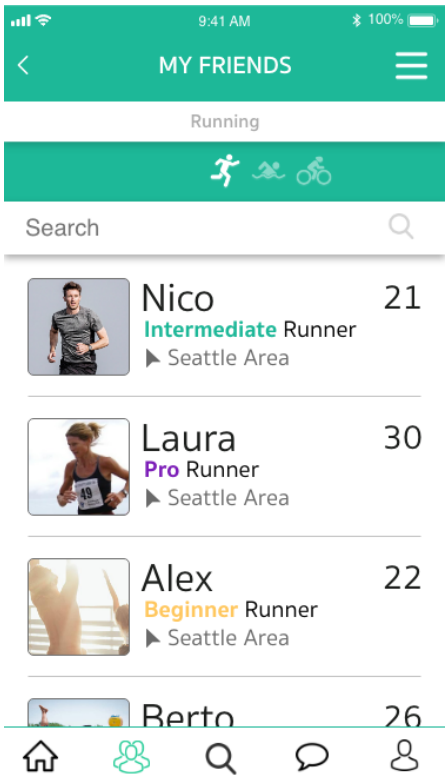


***Figure 37**: High-Fidelity Prototype: Friends List*

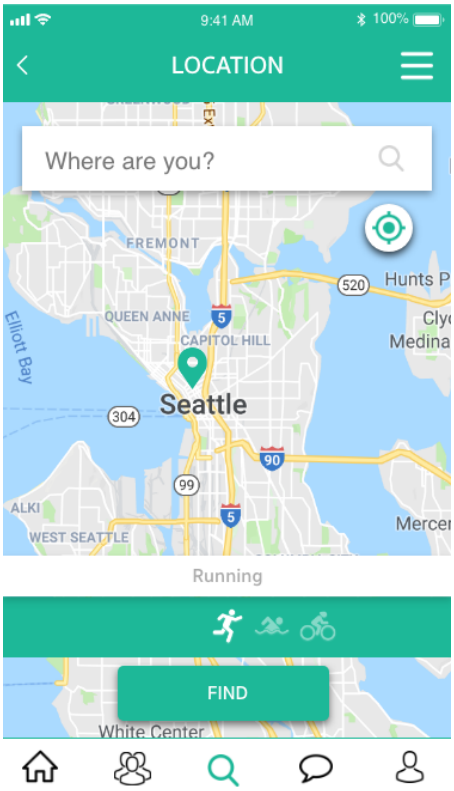


***Figure 38:** High-Fidelity Prototype: Search tool once logged in*

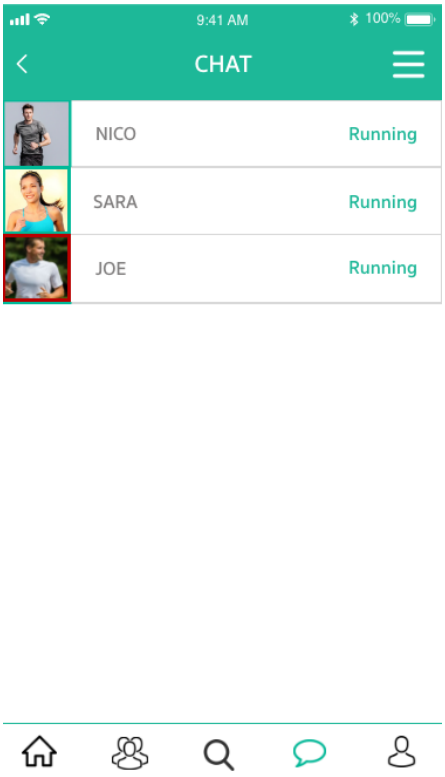


Figure 39: *High-Fidelity Prototype: Chat Room*

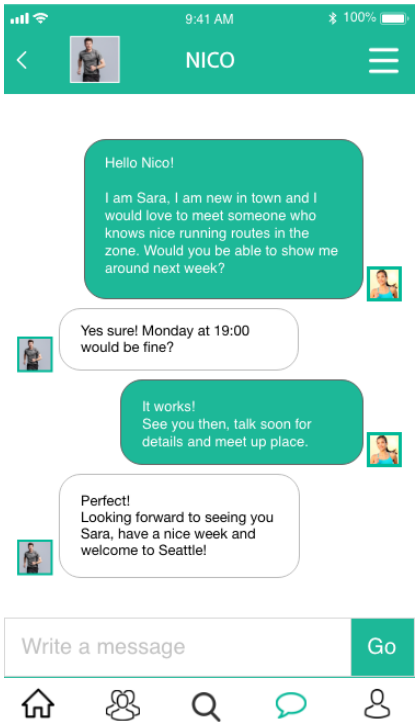


Figure 40: *High-Fidelity Prototype: Sample Conversation between two users*

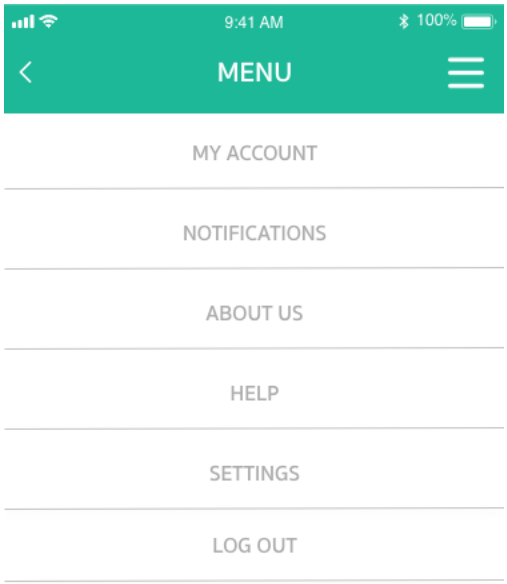


Figure 41: *High-Fidelity Prototype: Menu Bar*