DESIGN PORTFOLIO

2021

CHEVALIER-LANCIONI
Jean-Philippe

DESIGN ENGINEER

An insight into
my projects

1.

MOTIV'HANDED

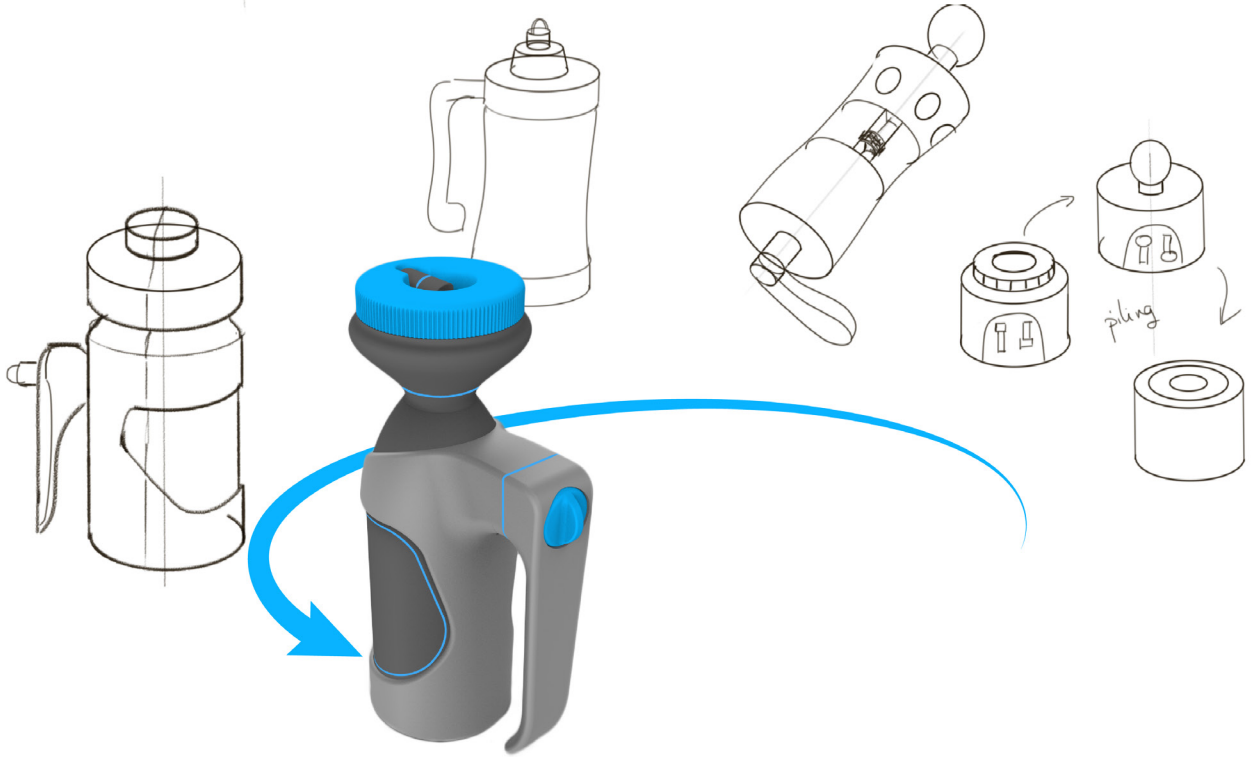
Master Thesis (Pair Work)
2019 - 2020

A new home-based hand rehabilitation device for post-stroke hemiparetic patients.

Brief

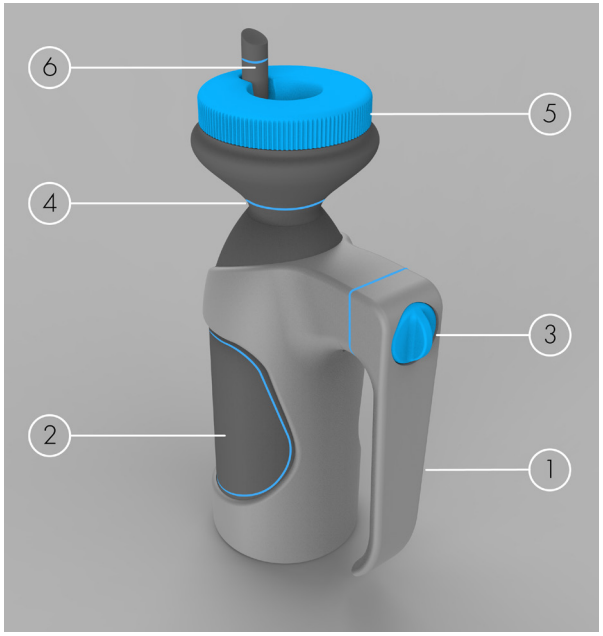
Develop an unobtrusive product that will motivate patients to train in any circumstances, whether it is at home or outside.

Ideation

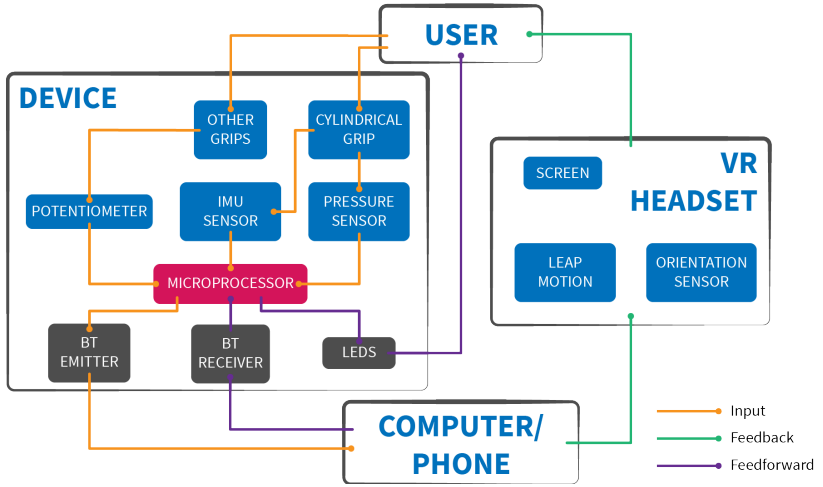


Working as a pair we started studying the market and research papers to find already implemented solutions.

Concept



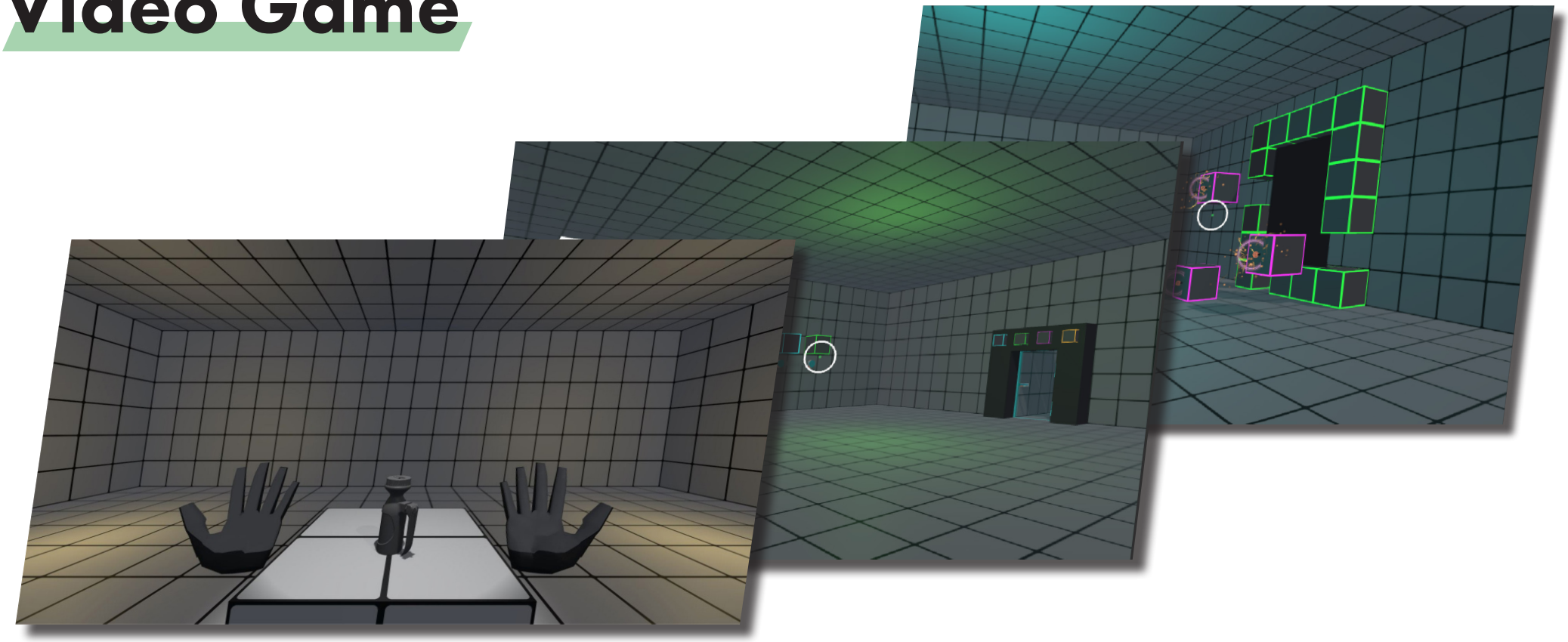
1. Handle
2. Power Grip
3. Pinch Grip
4. Spherical Prehension
5. Cylindrical Prehension
6. Tripod Grip



An ADL-based product
Our product revolves around the use of grips that allow us to simulate Activities of Daily Living tasks such as opening a door or opening a jar. The goal is to be as close as possible to reality thus motivating the patient to keep training.

A «hybrid» product
Our product comes with a 3D Virtual Reality game to help making the experience more entertaining for the user.

Video Game

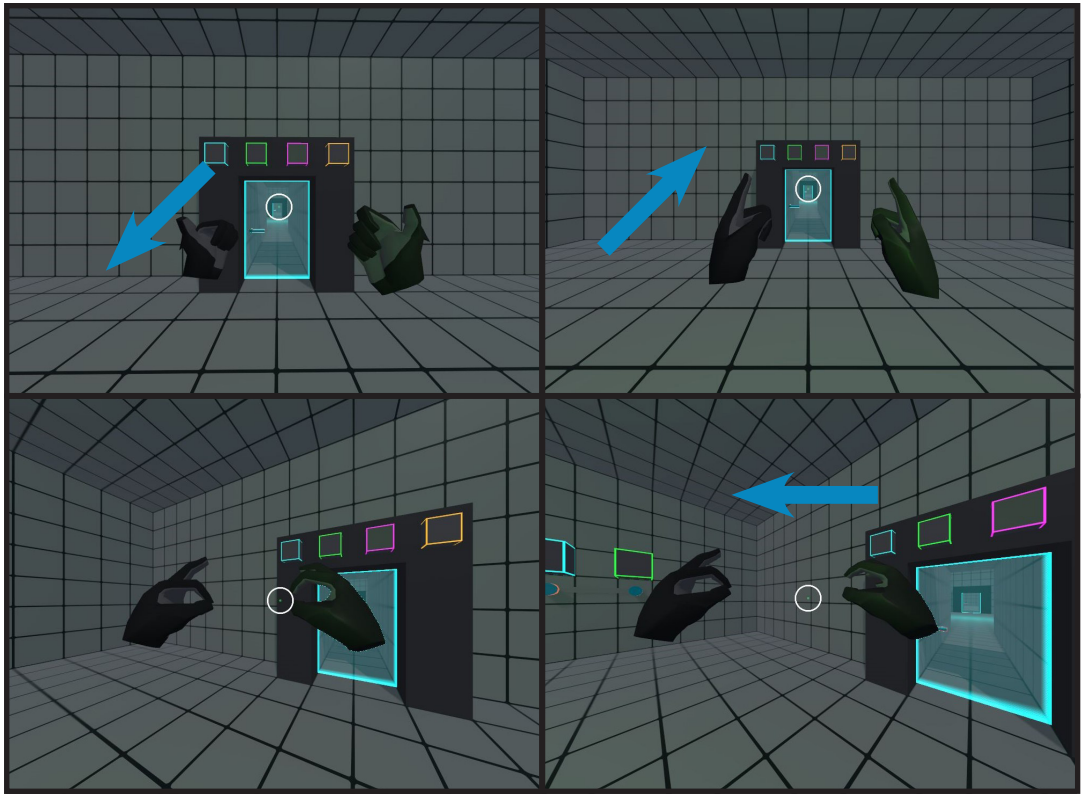


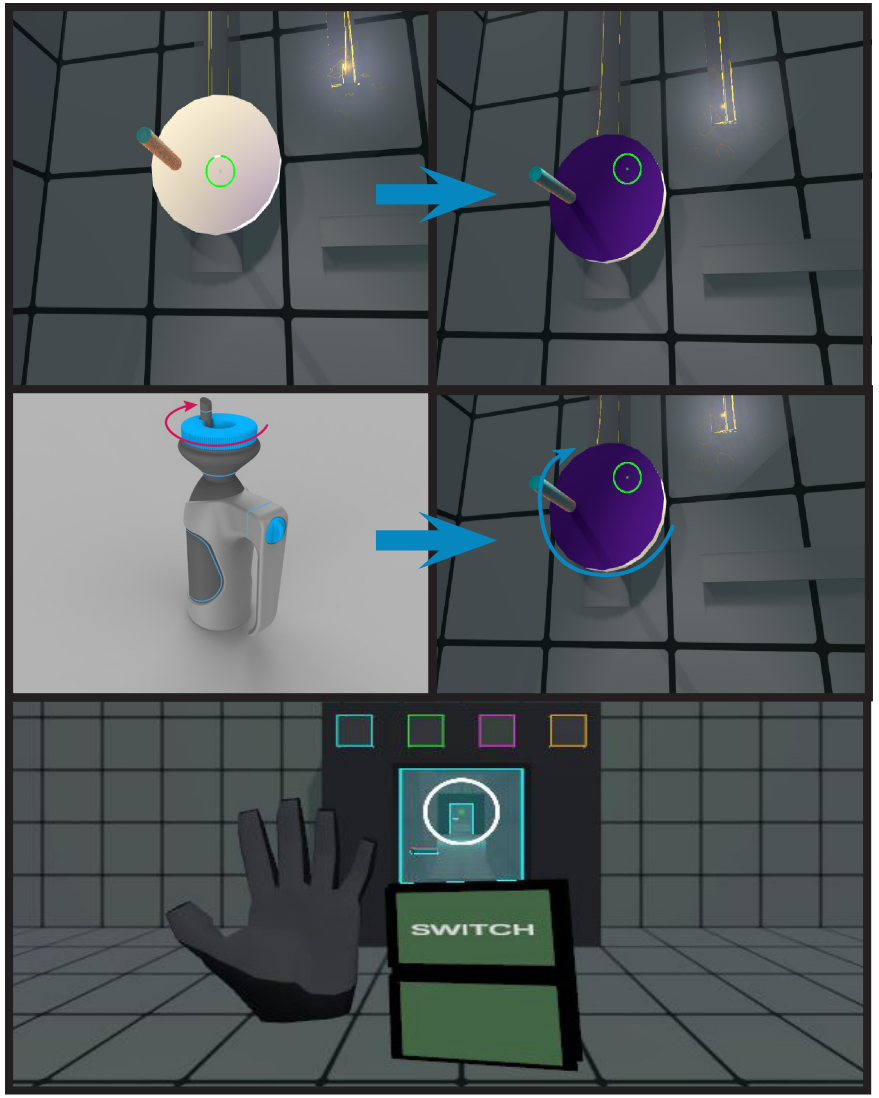
Developed using Unity
Made using Unity, for use with a Leap Motion hand tracking sensor and VR headset such as the oculus rift. The interaction revolves around shaders. The coding is thought as modular, using components according to function of the game objects, facililitating the open source approach.

I.O.T Interactive
Inside the game there are two ways to interact:

- The first is using the leap motion which tracks your hands in real time, allowing to interact with certain objects and to move around.
- The second is done using the various grips on our device that allow to perform actions on different key objects inside the game.

Interaction

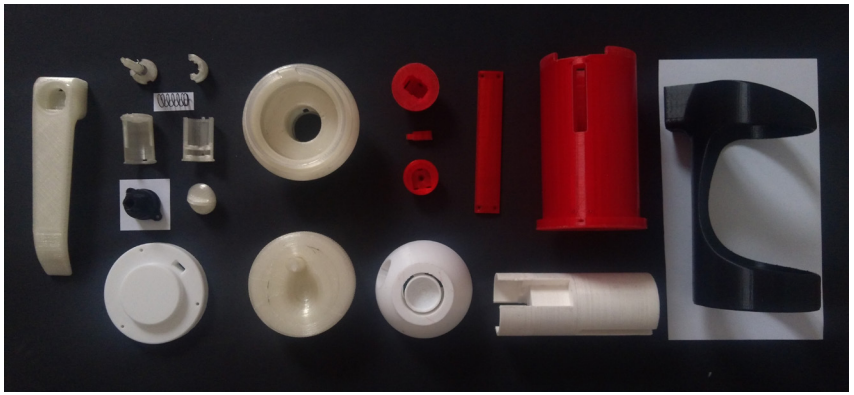


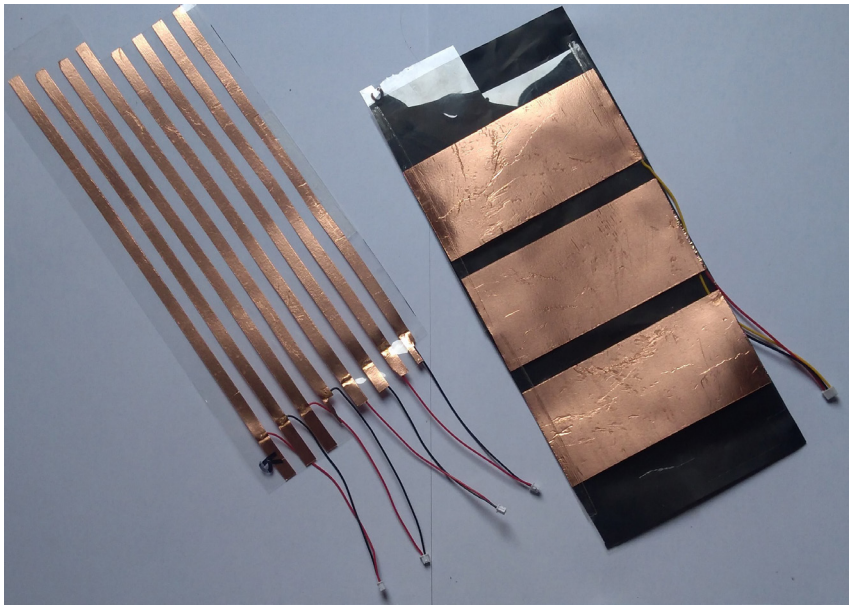


A Seamless interaction

The interaction inside the game was thought as being as natural as possible and intuitive. Shaders changing the appearance of game objects according to their state are used to guide the users through the levels.

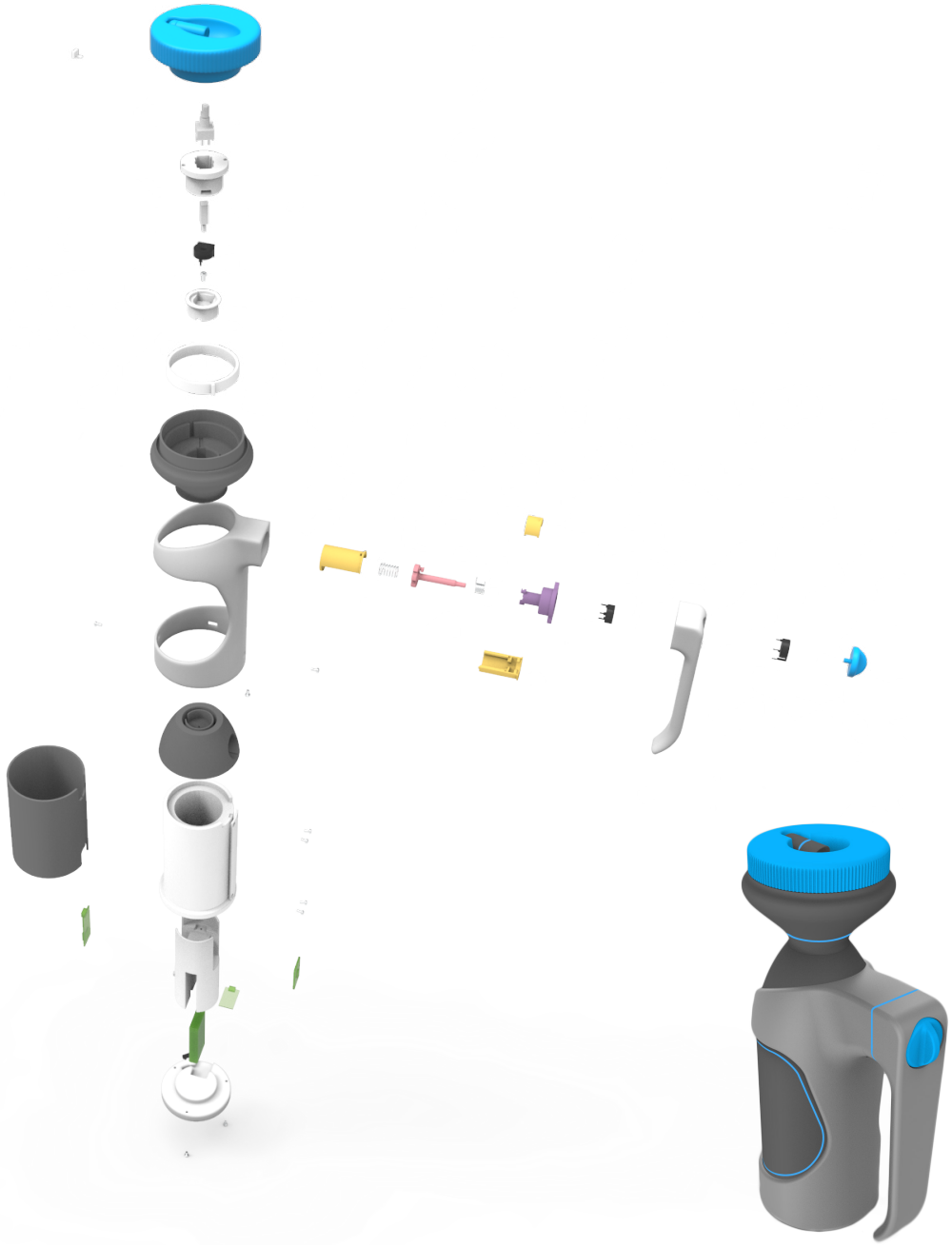
Prototyping





3D Printed functional prototype
To prove the feasibility of our product we then made a physical prototype of our product. All the designed parts were 3D-printed and all the electronical components bought, and connected.

Renderings



Exploded View
Our model contains 19 printed parts, an arduino board, a pressure sensor made of velostat, a multiplexer, a battery, encoders and potentiometers.

Role

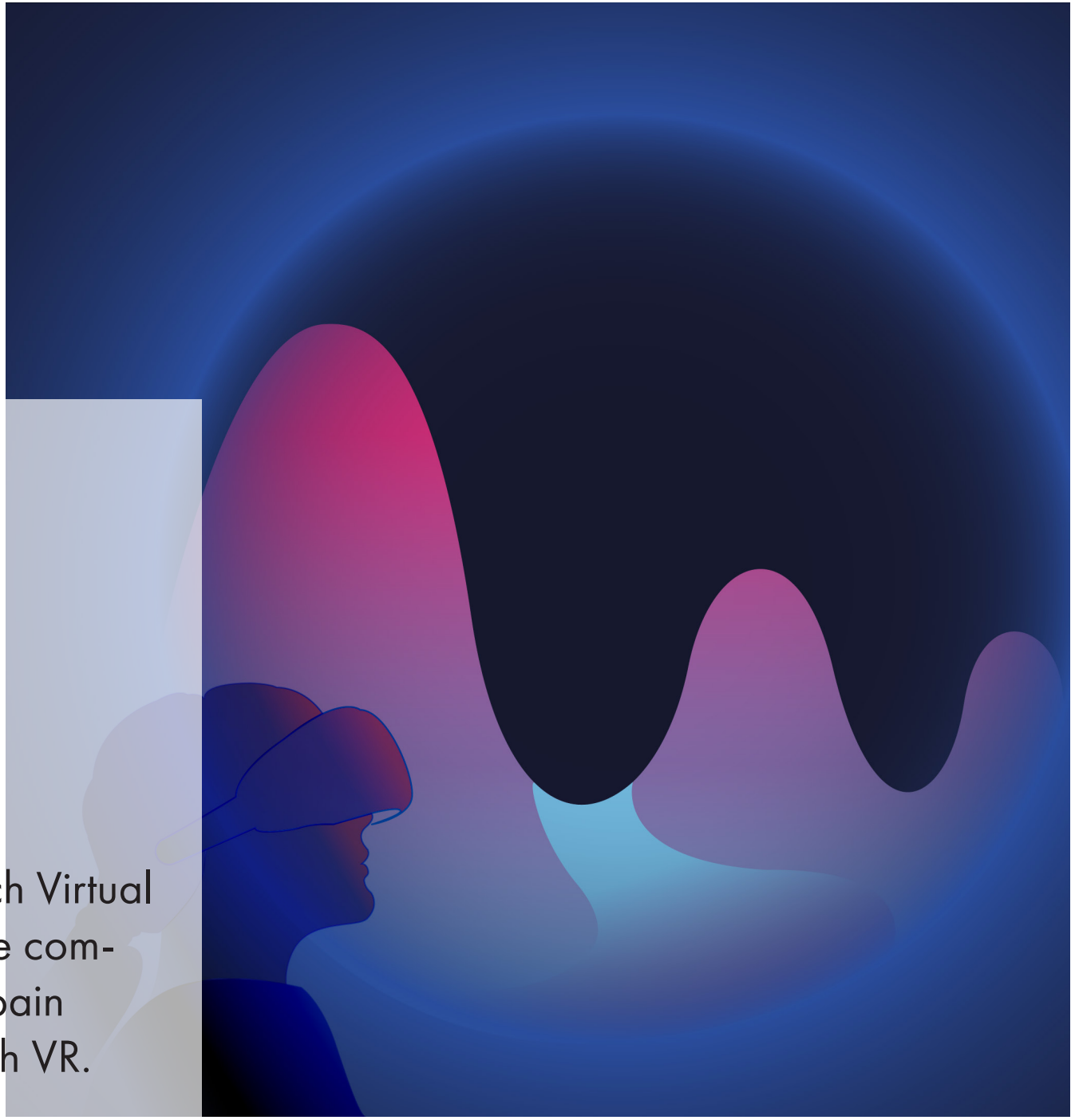
A very polyvalent work

During this project, my role was rather diverse. It went from sketching, 3D modeling and rendering to coding, testing electronic components, etc... Once our concept and shape was decided we tried to split the work to be as efficient as possible. While we both worked on every part, my main responsability was making the Video Game features, ensuring its compatibility with the hand tracking sensor, working on its UI and interaction through hand tracking and our device.

2.

PainkillAR

Internship
2019



2 months internship in a French Virtual Reality startup. The goal of the company is to provide non-drug pain management solutions through VR.

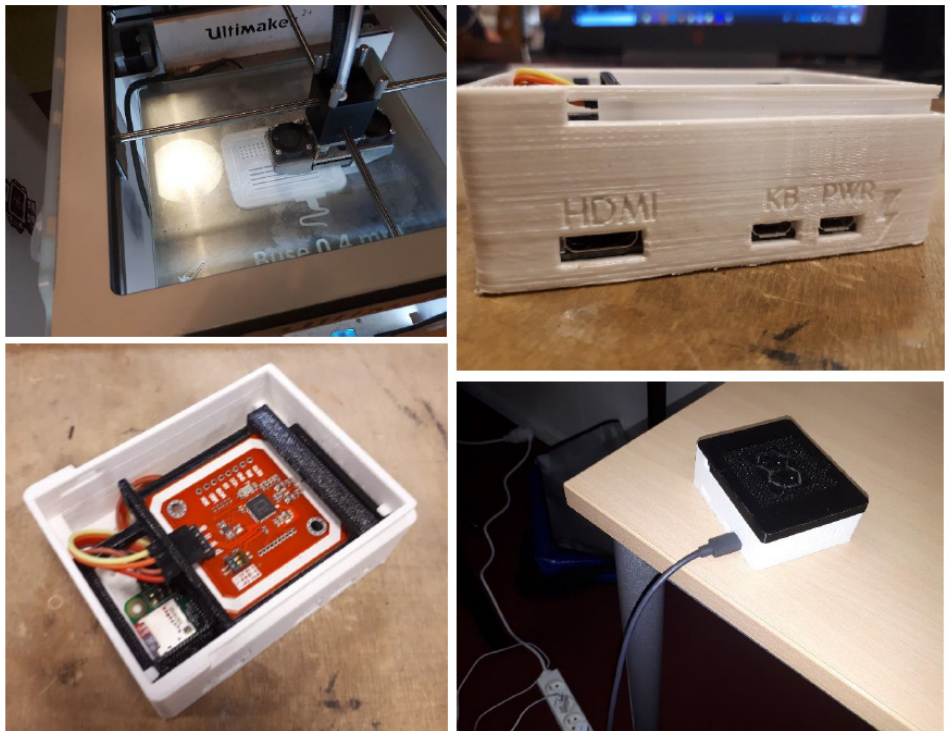
Role

Design and Programming

Due to the small size of the company and my proficiency both in design and engineering, there was a lot of variety in the nature of the tasks I had to work on. It went from coding in C# using Unity for VR apps, 3D printing protective boxes for Raspberry Pi electronic montages, Design a Website (React) and making illustrations such as the one on the cover as well as UX Design for the concept of PainkillAR's products. It was really intense , stimulating and allowed me to learn a lot

Thanks to the CEO, I got the opportunity to learn a lot about the way startups work, in complete immersion and it really changed my perspective on things.

Results



3D Printed Box
I designed a 3D printed Box using only snap fits and playing with tolerances to protect and keep in place a Raspberry Pi montage.

Lindra, meditative walk app
I made the logo for PainkillAR's main product lindra which is an app that helps the user to get some relief from his pain through a meditative walk.

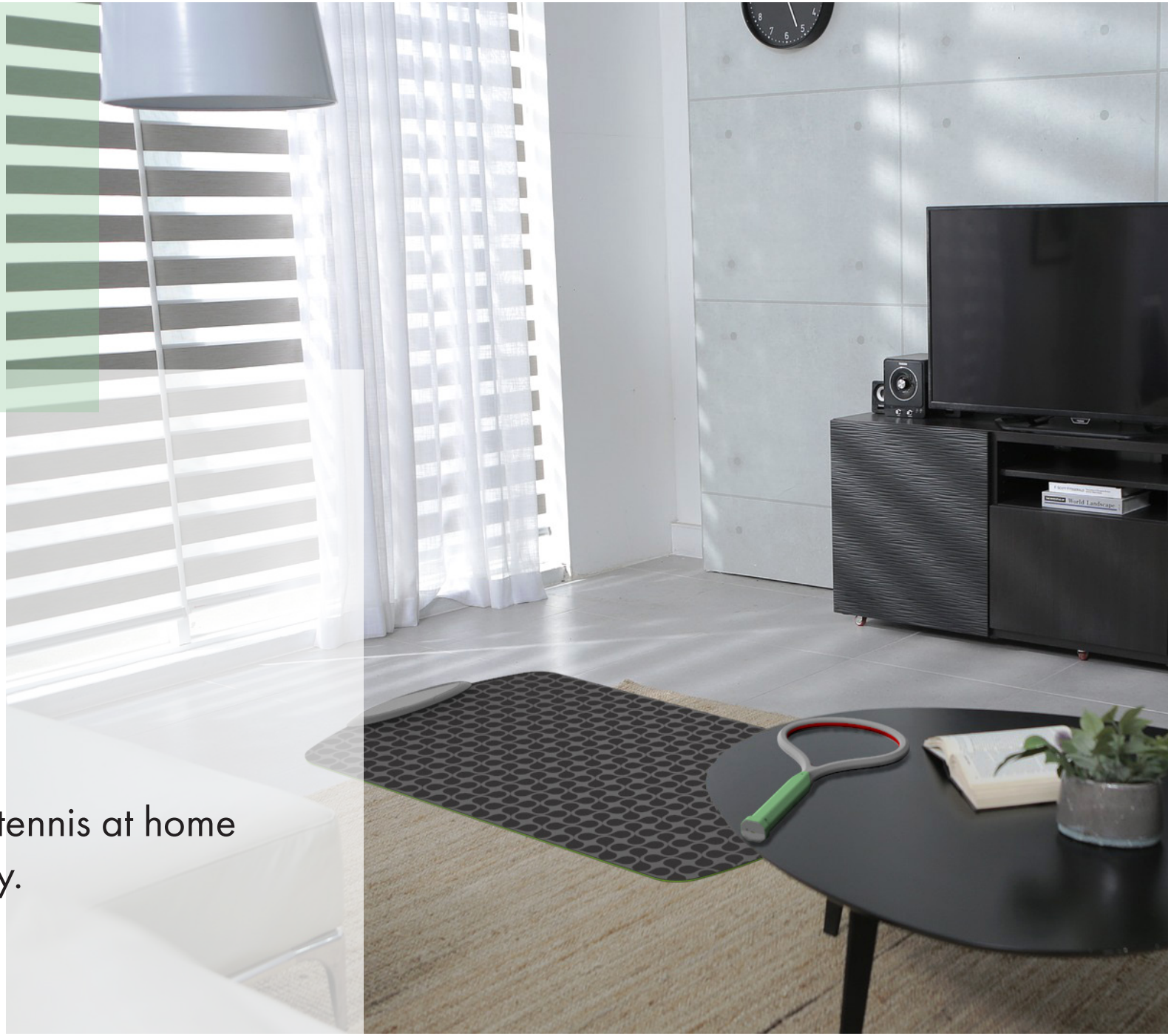
Lindra port to Google Cardboard
The Lindra app was originally made for Oculus Go. My role was to make an Android version Google Cardboard compatible. I also had to deal with the lack of a controller normally available with the Oculus headet. To solve this problem I implemented the use of Gaze Control and the use of the only button on the cardboard headset that simulates a click on the screen of the telephone inside the Google Cardboard. We then published it as an alpha on the Play Store.
The app can still be found but has improved a lot since I worked on it.

3.

REHO-T

Group Project
2018

Learn how to play tennis at home using Mixed Reality.



Brief

Design a product that will help an intermediate tennis player practice at home.
The main point is to help him practice trajectory reading and positioning, getting feedback about his progress in real time.

Ideation

Interviewing tennis specialists
First of all we needed to know how to approach the problem. Interviewing tennis professionals such as highly skilled players and teachers allowed us to know which points to address in our solution. It led us to understand that players first need to focus on improving their ball trajectory reading and improving their footwork/positioning accordingly. We then decided to focus on that.

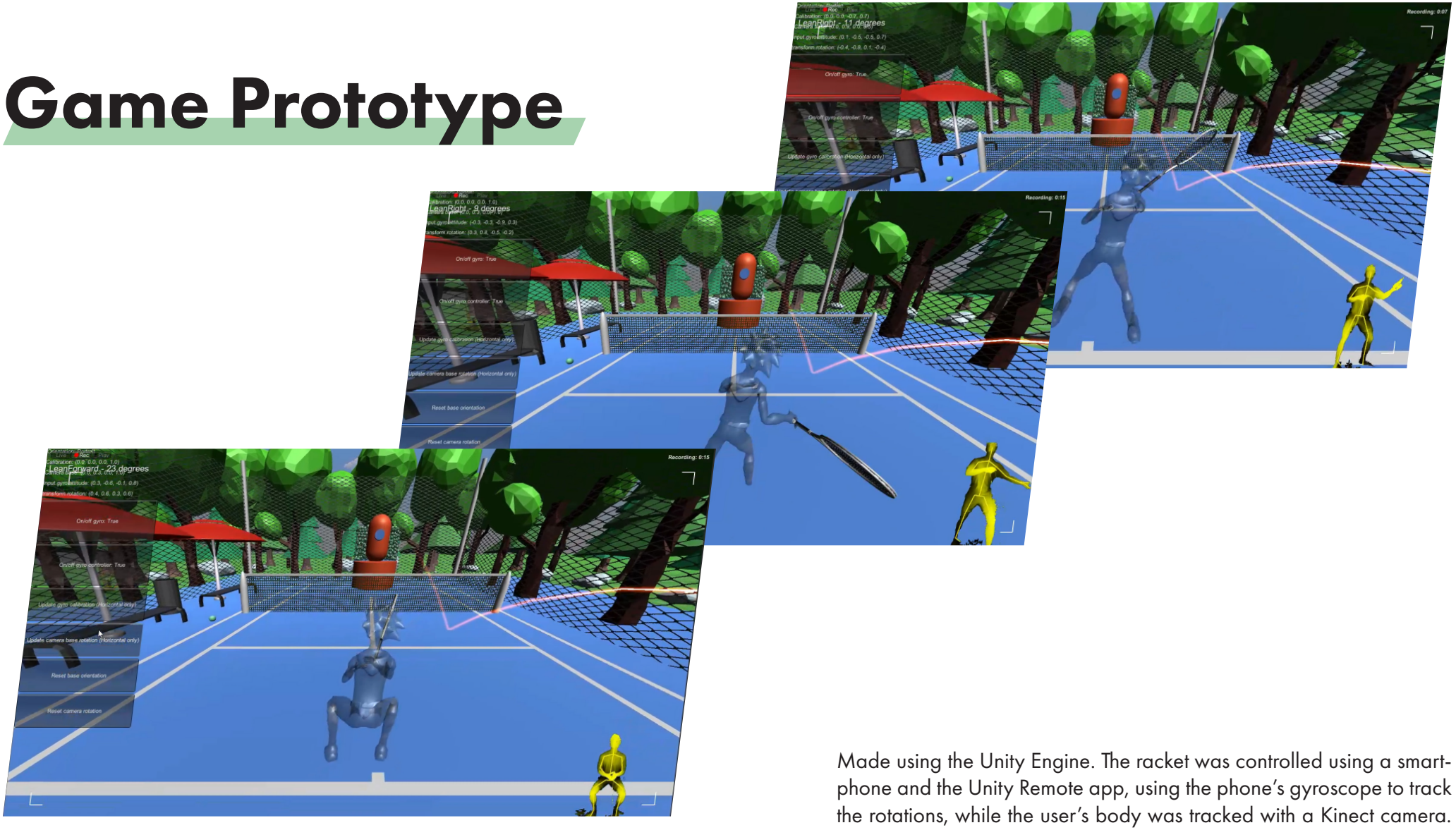
Question forms
We used question forms such as Google forms to learn more about what people would want from our product and learnt that:

- Most of them stopped playing due to lack of time
- They were interested in VR
- Had enough space to practice at home

Concept

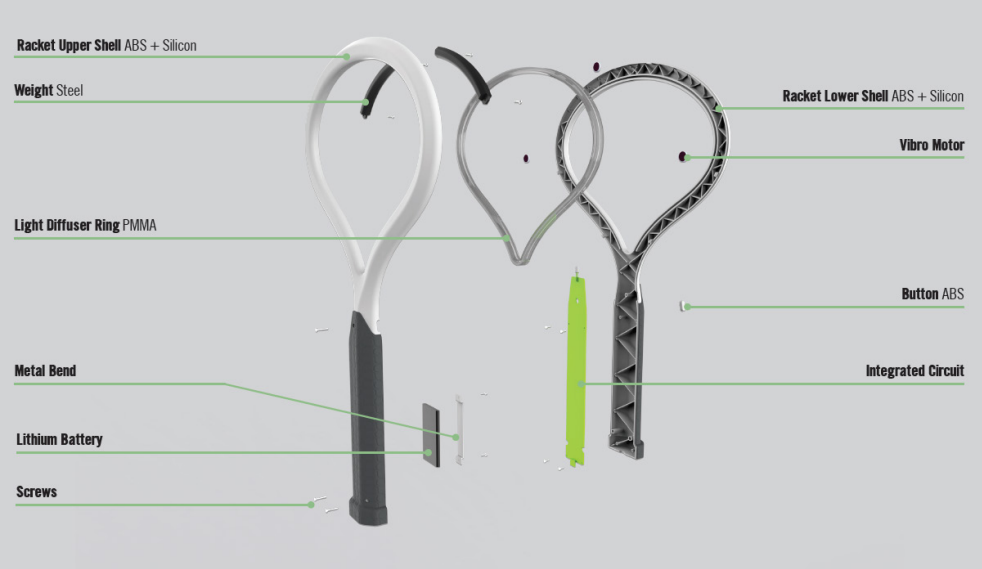
Our final concept is an at home solution. The user uses a racket controller connected via Bluetooth to a computer/console for the racket movements. His body movements are tracked by a Microsoft Kinect Camera, while his foot positioning is monitored by a pressure sensitive mat also wirelessly connected. He uses those to interact with a video game where a machine throws balls at him, announcing the trajectory or not according to the chosen parameters.

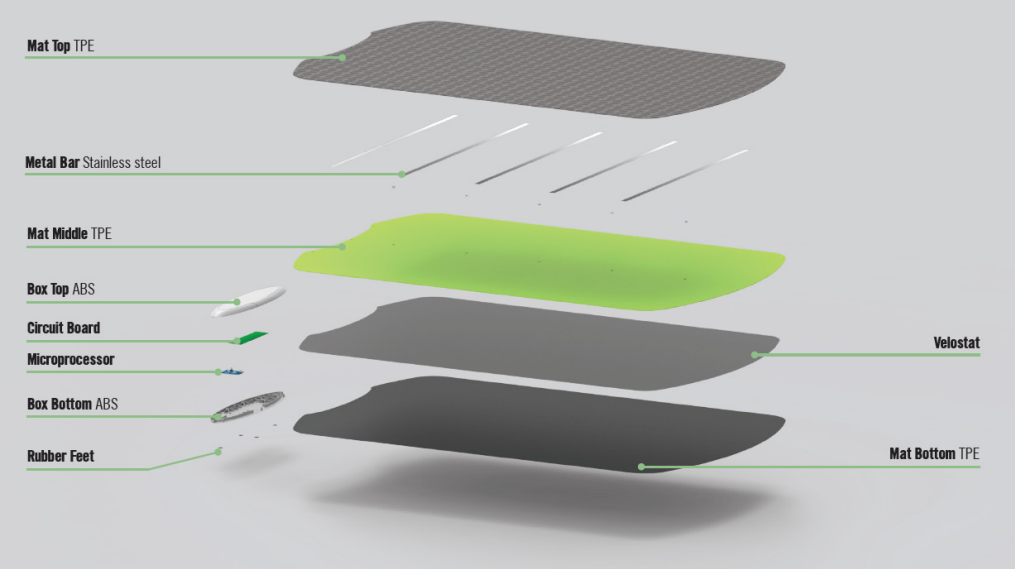
Game Prototype



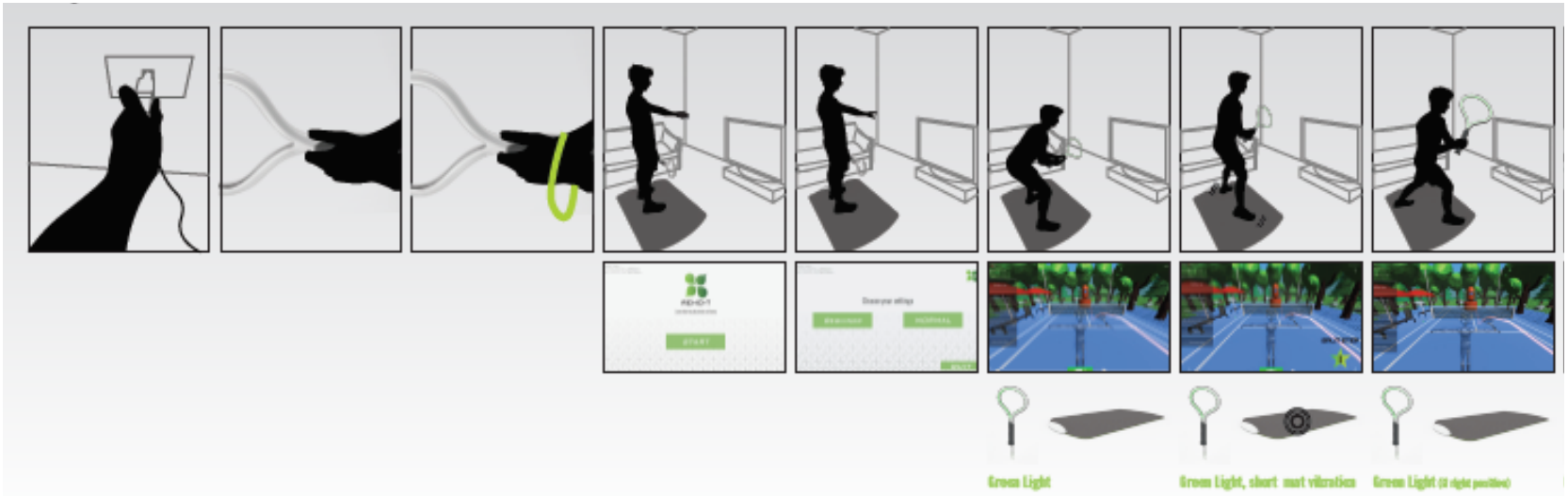
Made using the Unity Engine. The racket was controlled using a smartphone and the Unity Remote app, using the phone's gyroscope to track the rotations, while the user's body was tracked with a Kinect camera. We implemented gesture control to navigate through the menus. Serial connection with an arduino board for the mat.

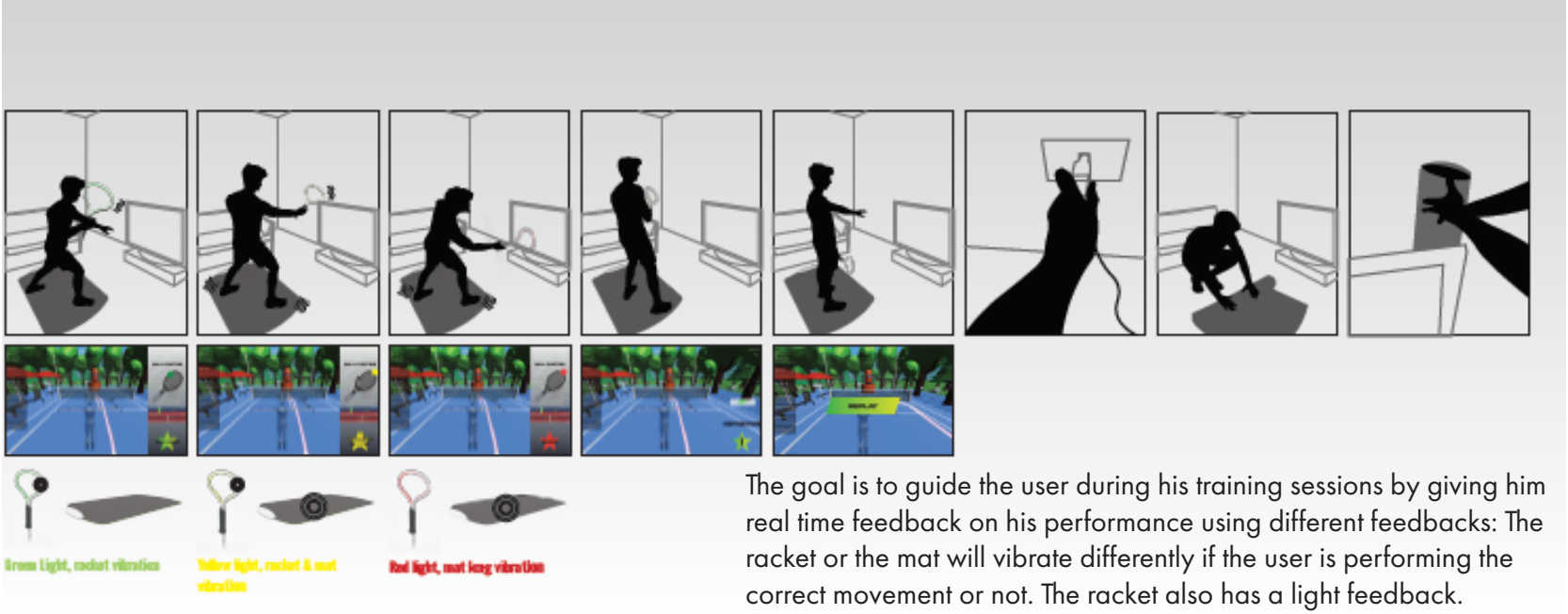
Exploded views





Storyboard





The goal is to guide the user during his training sessions by giving him real time feedback on his performance using different feedbacks: The racket or the mat will vibrate differently if the user is performing the correct movement or not. The racket also has a light feedback.

Role

Involved all along

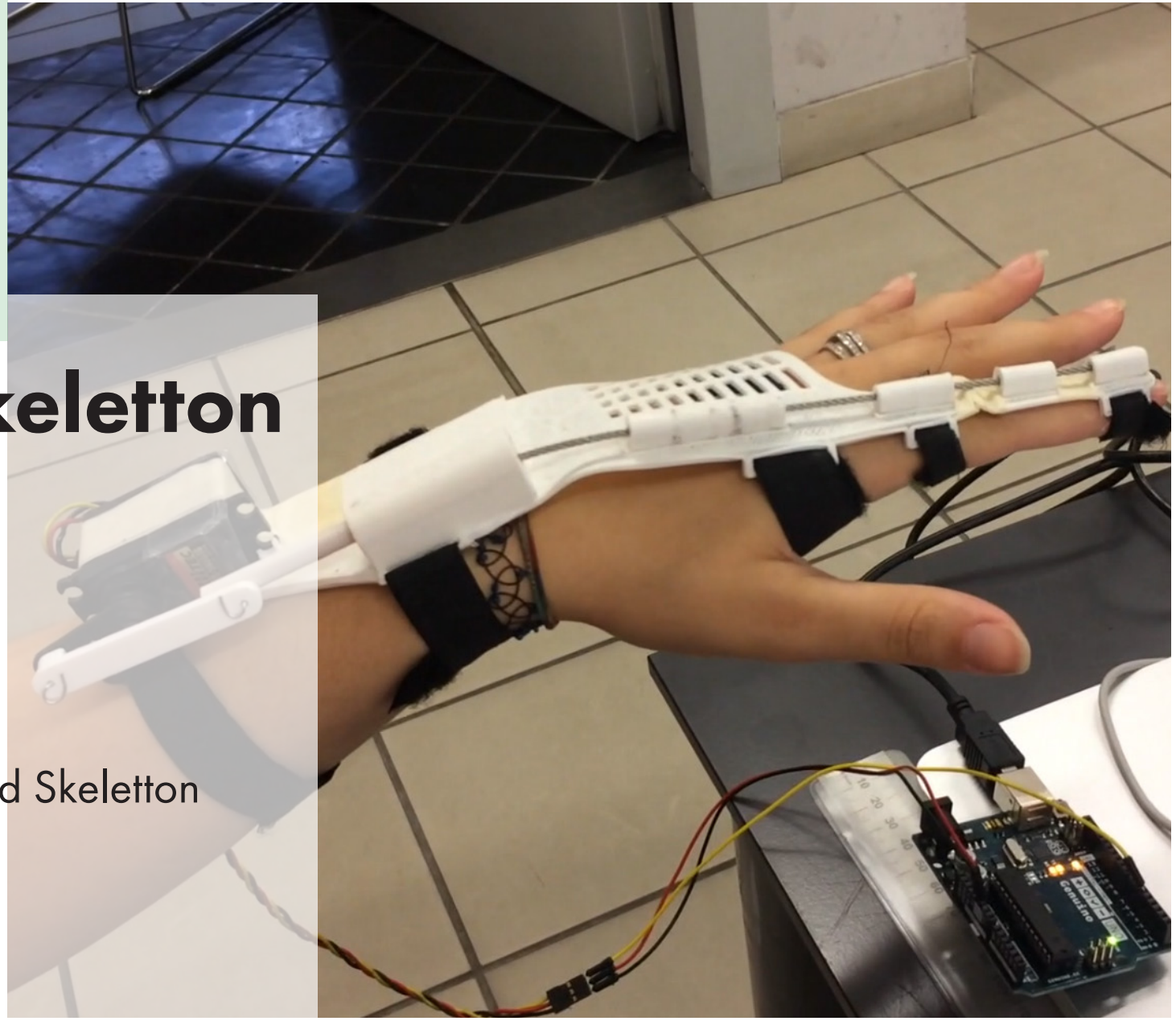
I was responsible for the research part. Participated in the modeling of the Racket Controller. I was then responsible for the Virtual Prototyping part, building the whole game, the interaction with the kinect, the phone, the arduino card, etc...

4.

VR Hand Skeletton

Group Project
2018

Make a 3D-Printed Hand Skeletton
paired with a VR game.



Brief

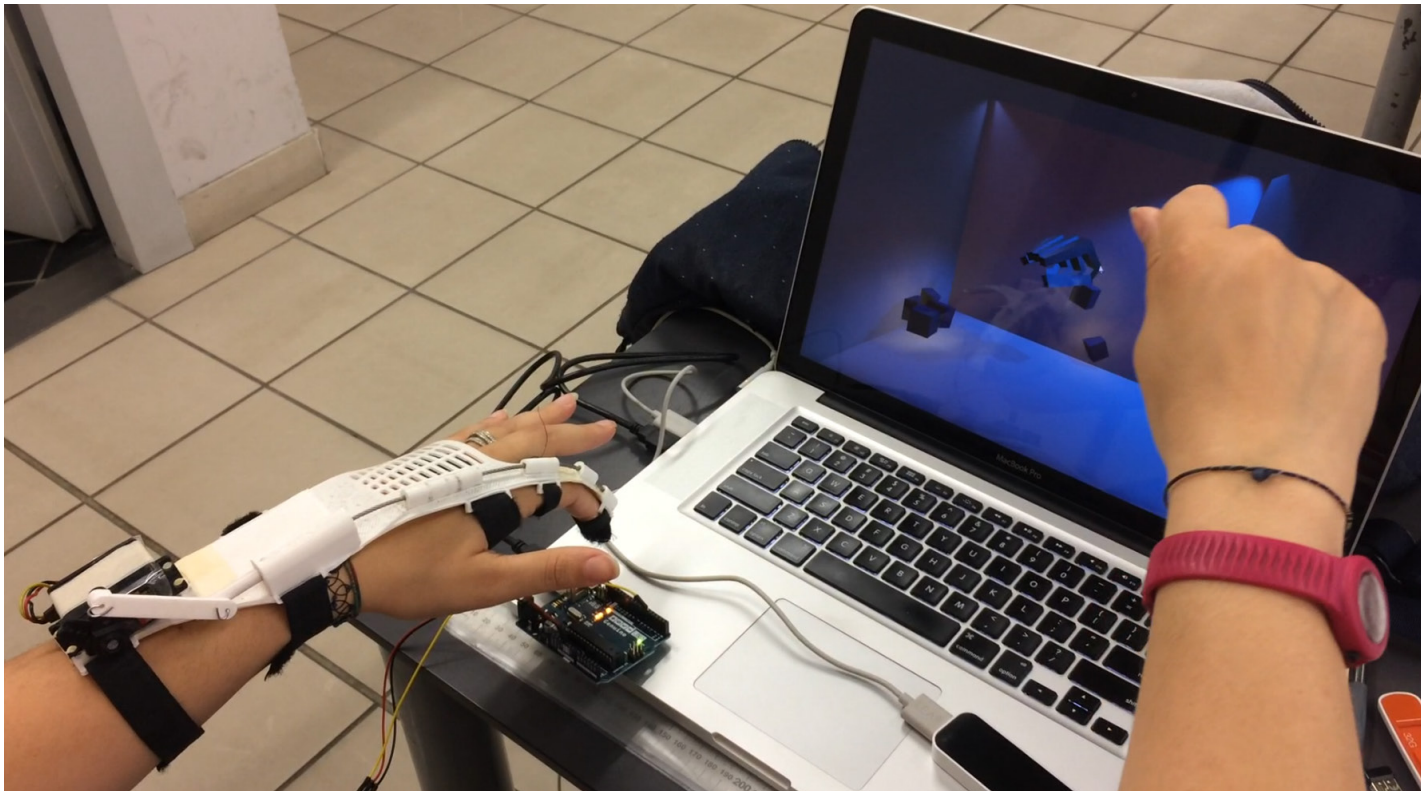
Design a hand skeletton paired with a VR game
for post-stroke hand rehabilitation.

Ideation

Inspired from mirror therapy
Taking inspiration from mirror therapy relying on mirror neurons by tricking the brain in making it see something that is not real. In our case it would be showing the right hand moving to the patient while his right hand is impaired and it's in fact the left one that he sees reflected in a mirror. We wanted to create something similar using Virtual Reality.

Passive exercising
Our Exo-Skeletton would assist the user in his movements, thus making the exercising passive, or assisted if the user applies force too.

Result



Using an arduino board, a leap motion device for hand tracking and a servomotor plus a cable to move the finger. The user moves his sane hand above the leap motion and the exo-skeletton replicates the movement. The hand movements are translated inside the game and the hand model is reversed compared to the sane hand to mimic mirror therapy.

Role

I was responsible for the research part. I helped on the modeling part but had to focus on the game prototype part due to time limitations. I was in charge of being able to retrieve the fingers angles by studying the leap motion SDK, and use this information to make the exo-skeletton move accordingly using an Arduino program.

5.

Museum Interface

Group Project
2018

Design a game for touchscreens to be used inside a Museum, bringing together different users and generations.

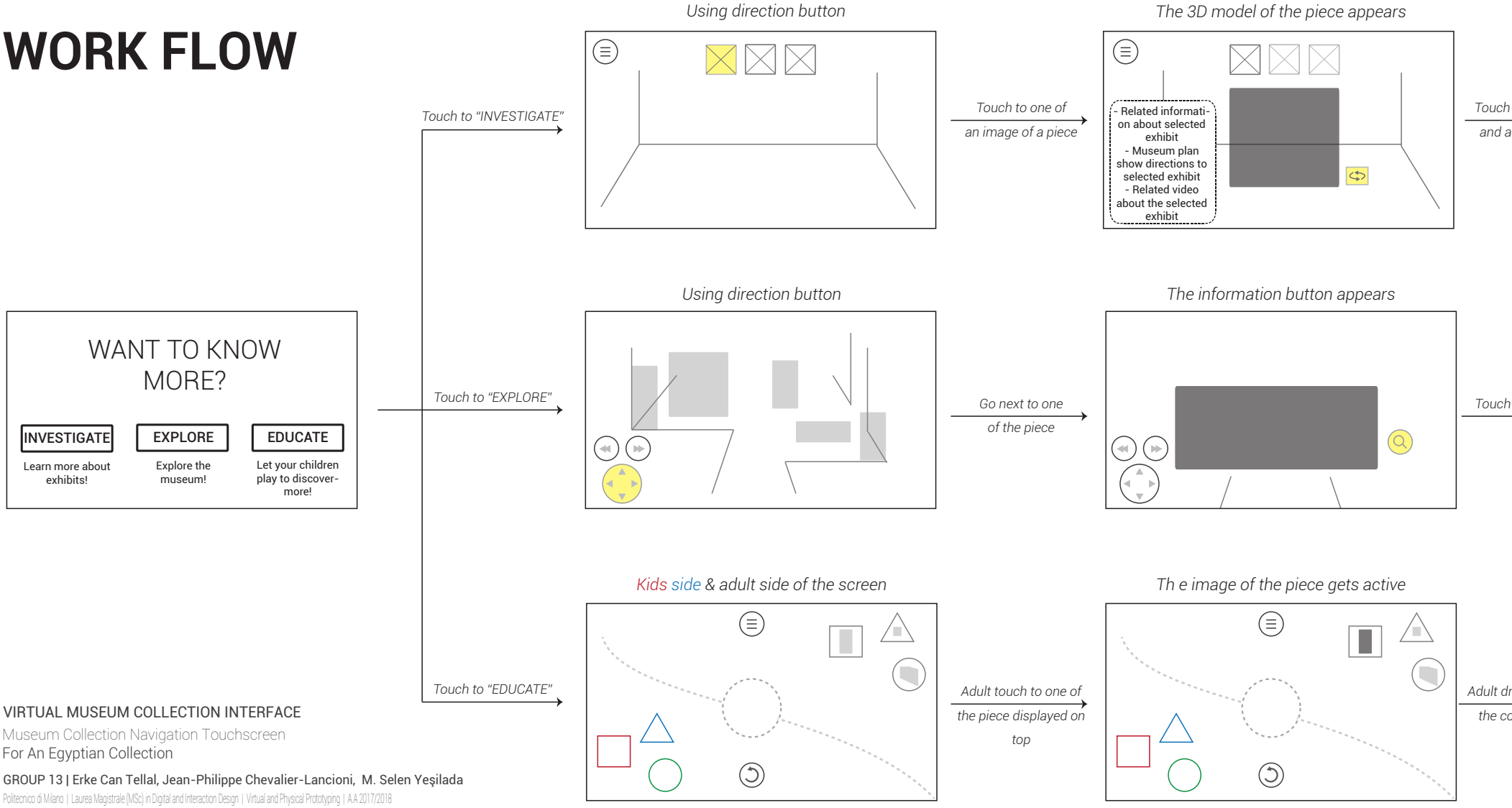
Brief

Design an app for a touchscreen device in a Museum for different types of users (experts, families, kids) regarding an Egyptian Collection.

Research

Concept

WORK FLOW



VIRTUAL MUSEUM COLLECTION INTERFACE

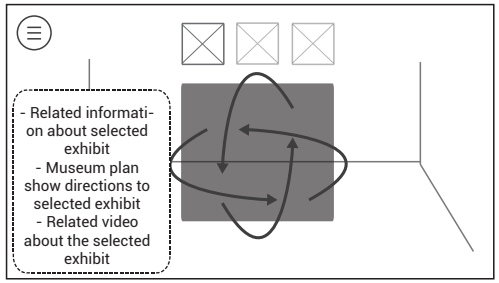
Museum Collection Navigation Touchscreen
For An Egyptian Collection

GROUP 13 | Erke Can Tellal, Jean-Philippe Chevalier-Lancioni, M. Selen Yeşilada

Politecnico di Milano | Laurea Magistrale (MSc) in Digital and Interaction Design | Virtual and Physical Prototyping | A.A 2017/2018

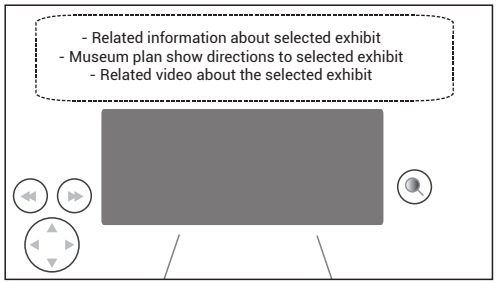
Rotating the 3D model 360 degrees

to rotate button
ctivate rotation



The information bar appears

to information
button



Menu Button, *Back to main screen*

Rotation Button, *Activates rotation of 3D model*

Previous Button, *Back to main screen*

Next Button, *Goes to next exhibit*

Direction Button, *Navigates the user*

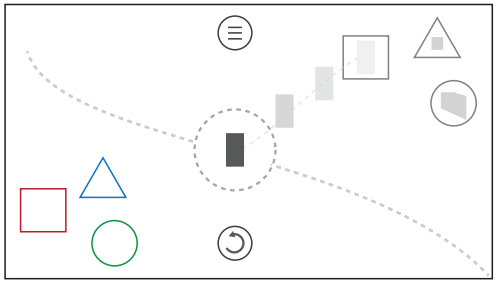
Information Button, *Opens the information bar*

Reset Button, *Refreshes the screen*

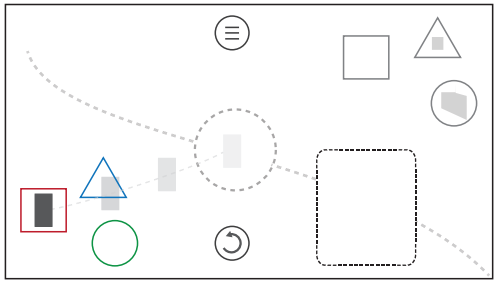
Shows taken actions

The piece is ready to be taken by the child

ag the piece to
mmon place

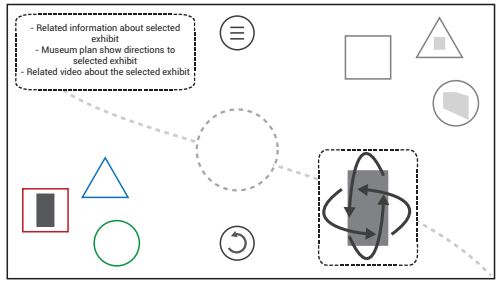


The child drags the piece into the correct shape

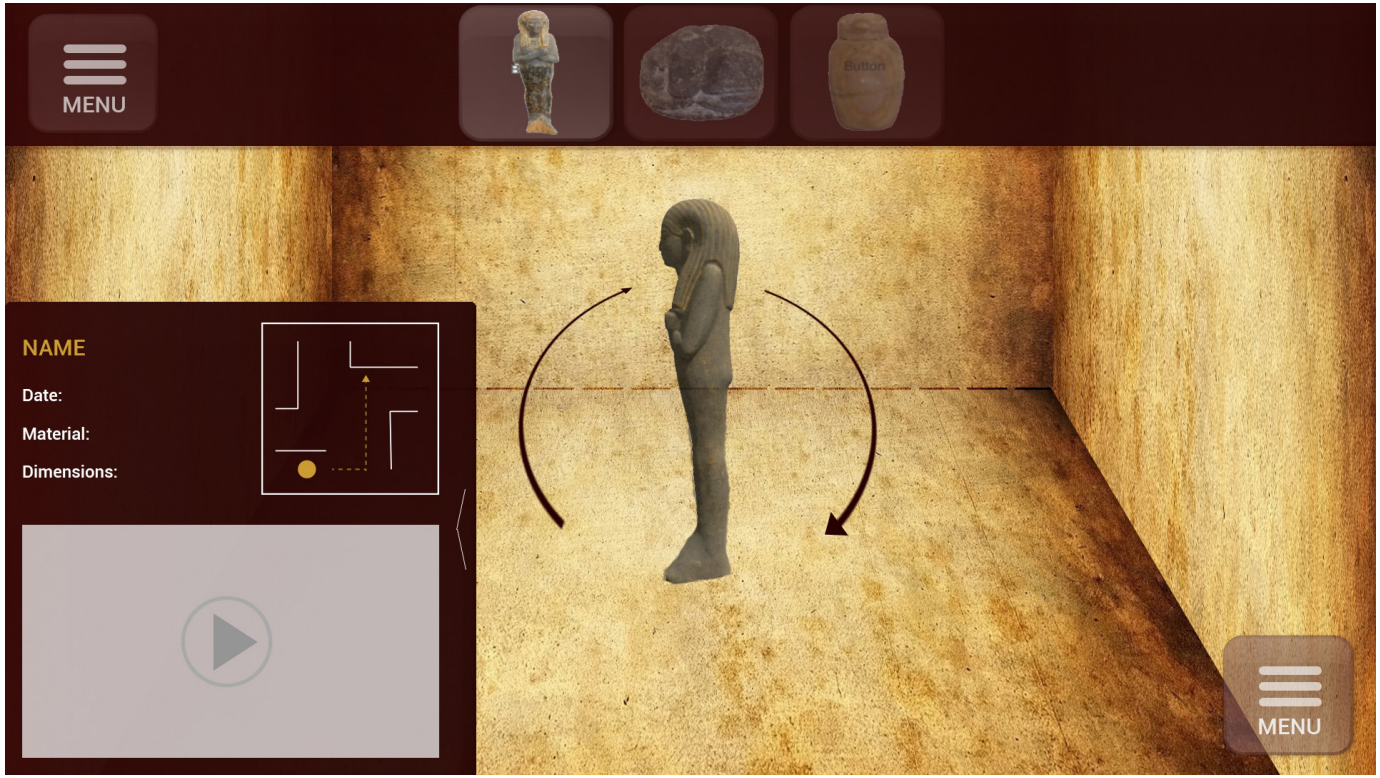


The child puts the piece into the correct shape

The 3D model of the piece and the information bar appears

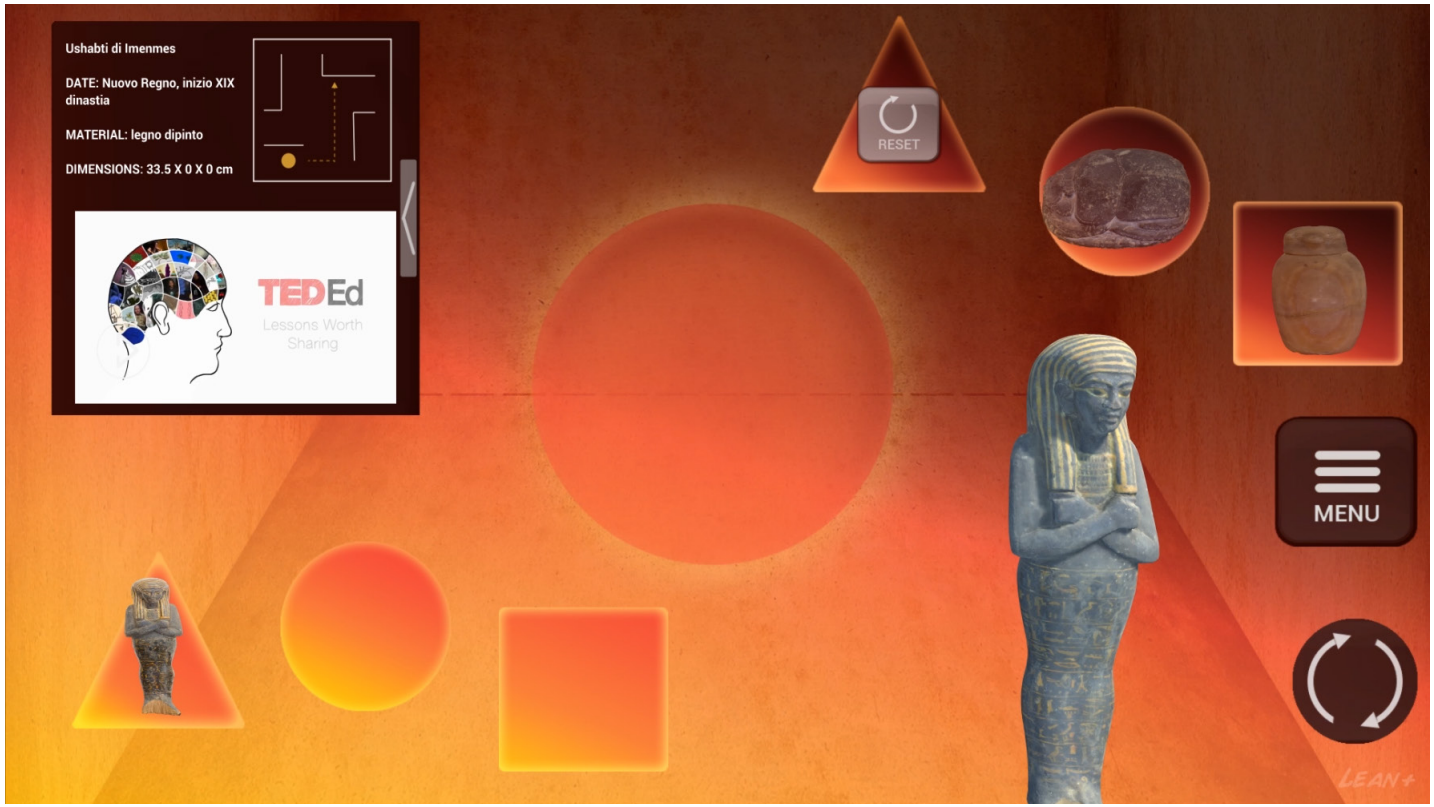


Visuals



Expert mode
The user can choose one of the exhibited items, rotate, zoom, learn more about it through a video and know its position inside the exhibition.

Fun mode
The user is transported inside an ancient Egyptian temple, where the exhibited items are disposed. He can move around using an FPS point of view and learn more from the items when getting close to them.



Family mode
The top right-hand side is for the parents, and the bottom left-hand side for the children. The parents pass to the middle one of the items. The child needs to put it in the geometric corresponding part. From there, the parent can play the video, and the child move the item around.

Role

Ideation and Coding
We developed the concept as a team of 3. 2 of us then worked on the coding part, including myself.

6.

Website

Personal Project
2017

My personal website where I share everything that I'm passionate about.

Goal

Make a website to share my passions about technology and music.

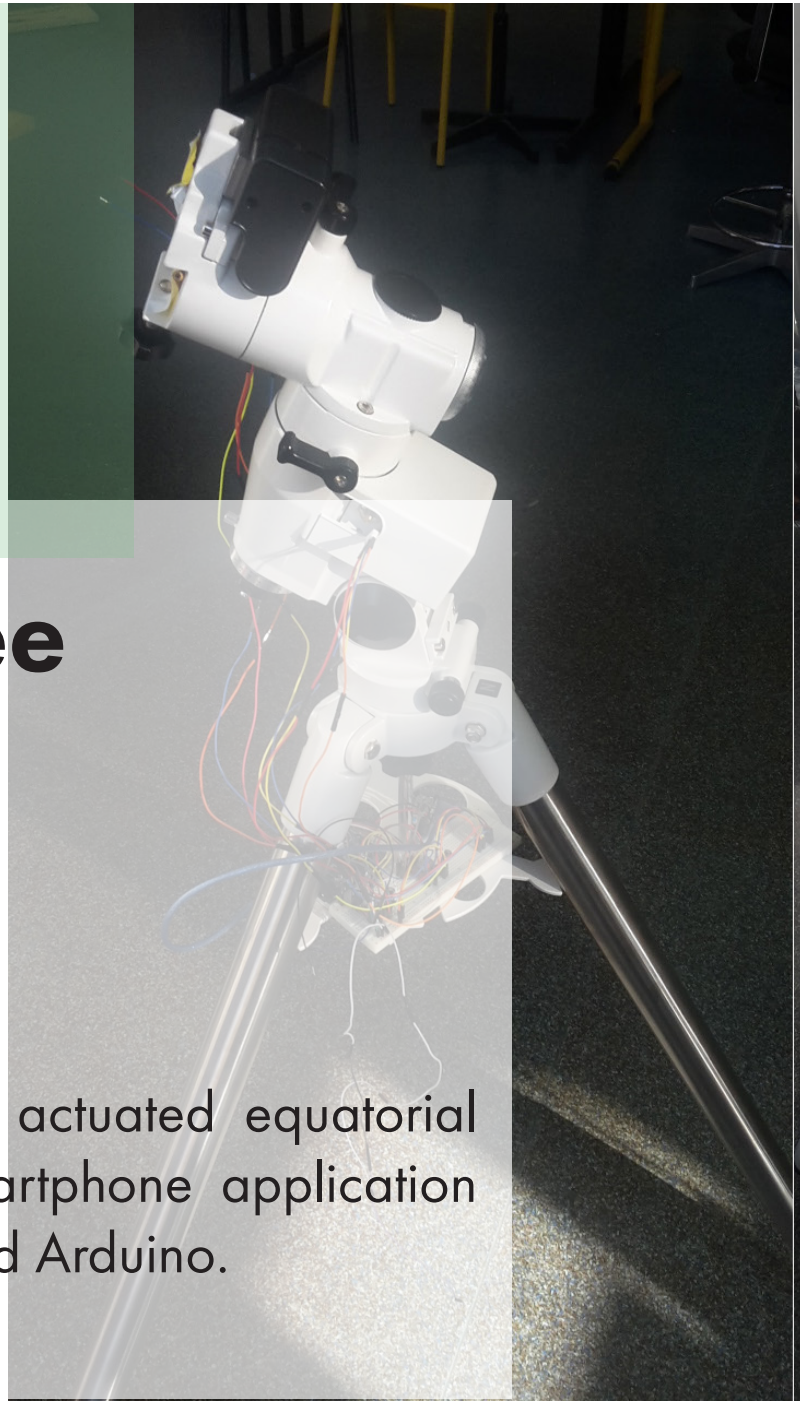
Web development

Technologies
Modified Bootstrap template using HTML 5, CSS 3, JavaScript.

7.

Cassiopée

Group Project
2016 - 2017



Make a remotely actuated equatorial mount from a smartphone application using Bluetooth and Arduino.

Goal

It is very difficult for beginners to get started with astronomy. One of the first barriers being setting the telescope in the right direction. The idea was to make it easy for them to observe the star/planet they wished by choosing through a 3D sky map on their phone and then automatically adjust the telescope position from the chosen direction.

Research

Already existing 3D sky maps
By searching for those kind of apps, we realized there are already very good and functional ones out there, so we figured we would only focus on a side implementation that would go with those already existing ones. We only had to focus on where the user was pointing at and position the mount accordingly.

Chosen technologies
Being early in our studies we had little technical knowledge. I personally got the opportunity to go through an Arduino course at my school's fablab. We also learnt that we could code Android apps with Java which was a language that had learnt the previous year. We then chose to go with an Arduino board connected to an Android phone through Bluetooth.

Concept

The user would point at the sky using his smartphone, choosing a star to point at looking at the screen. Then the phone would send to the arduino board the rotation to perform in order to point to the correct direction. It would then actuate the servo-motors on the 2 axis of the mount. The user would then only have to adjust the lenses accordingly.

Role

Ideation and Coding
I mainly worked on the concept, the choice of the technology, and then arduino/ android code.

Contact

Website
jeanphilippe.chevalierlancioni.perso.centrale-marseille.fr

Email
chevalier.lancioni.jp@gmail.com

Phone
+33 6 65 53 58 91