Cervical amplitudes recording with a virtual reality device Oculus Rift for a therapeutic purpose

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Cervical Amplitudes Recording

- Introduction
- Project Management
- Technical Implementation
- Conclusion

Introduction

Project Overview

Presentation of the project

Subject

Means :

Access to an Oculus Rift

Stakes :

Analyze cervical amplitudes in order to detect illnesses

Compare data before and after treatment

Stakeholders

Clients :

Denis Ducommun, ITO

Jérôme Ermont, IRIT

Supervisor :

Patricia Fuilla-Weishaupt, Apsys

Team

Project Executive Order

Implementation Responsible

Configuration Master

Test Supervisor

Quality Manager

Project Overview

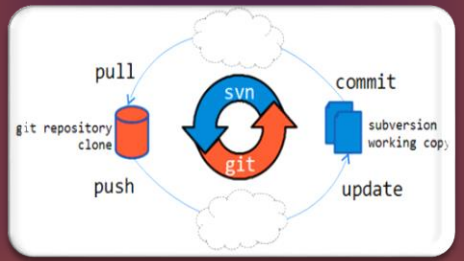
Presentation of the main tools

Visual Studio 2015

- C++ IDE for developers
- Debug tool
- Git Plugin

GitLab ENSEEIHT

- For us to modify the same code on different workspaces



Oculus Runtime

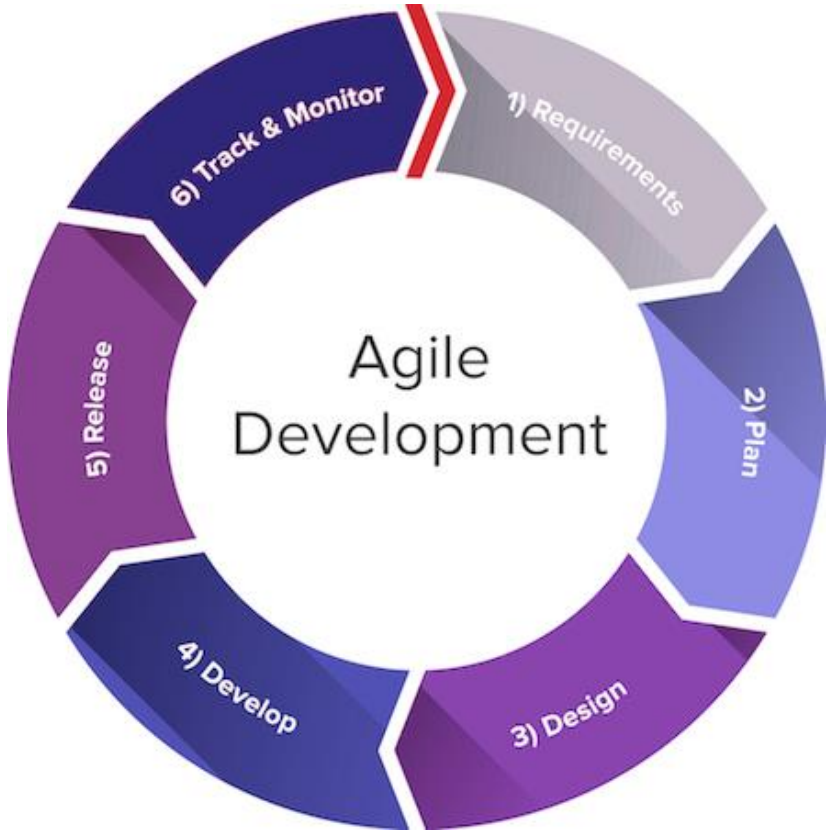
- Allows the simulation of HMD
- Necessary to run the Oculus Rift
- Compatibility issues with the latest SDK

Google Drive

- Sharing documents like specifications, risk table…

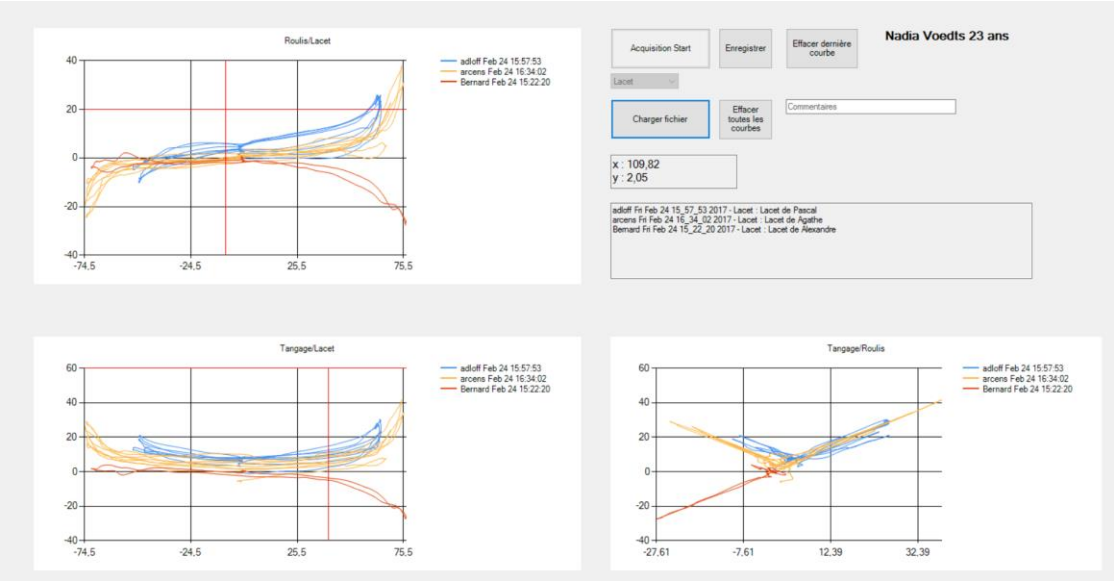
Project Management

Development Process

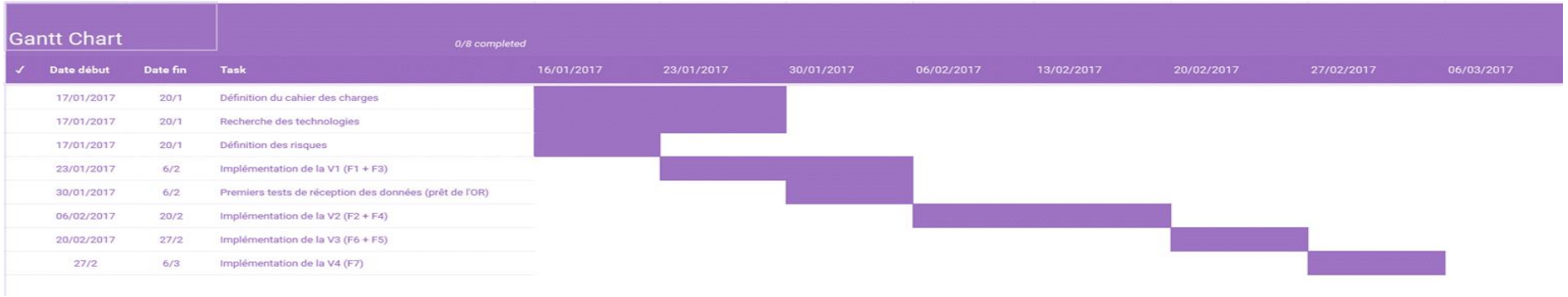


Deliverables

- Windows Application



- Specifications :
  - Human computer interface
  - Data record and storage
  - Comparison between patients at different dates
  - Launchable when vestibulus is running
  - May be plugged in another data recorder
- User guide
- Developer guide
- Sources of the application



	16/01	23/01	30/01	06/02	13/02	20/02	27/02	06/03
Beber	Specifications	Implementation	Implementation	HMI	HMI	HMI	Implementation	Report
Jim	Technologic researches	Test Prep	Test Prep	Data studies	Stats	Stats	Implementation	Report
Nadia	Specifications	Implementation	Implementation	HMI	HMI	HMI	Implementation	Report
Lucile	Specifications	Test Prep	Tests	Tests	Tests	Tests	Tests	Report
Victor	Technologic researches	Implementation	Implementation	Implementation	Implementation	Implementation	Implementation	Report

Planning

Gantt Chart and Overall Planning

27/01 => Acquisition in the console
30/01 => First window, display of the acquisition
Retour_t type for the intermediate variable of storing
02/02 => Array dynamisation and text file storing
Function which create a text file from a Retour_t
03/02 => Function which plots curves from a text file
04/02 => Plot is no longer in the acquisition function
File charging now converts text file in Retour_t and then plots
06/02 => Add of cursors on curves
07/02 => Truncature of decimales on the curves and in the display of coordinates
08/02 => File explorer for saving and loading files
09/02 => Cursor improvement, window size increased, add of « clear last curve » button
15/02 => Add of profiles, automated saving
16/02 => AcqForm now launches from Home
18/02 => Profile loading
21/02 => Acquisition blocked if not movement selected, AcqForm not available if no profile is loaded
23/02 => Add a dialog so we don't lose acquisition without meaning to
28/02 => Add of curves commentary

Actual versioning

Historic of pushes

Meetings

With the supervisor and the client

- Meetings with supervisor :
  - Weekly meetings
  - Project Management
  - Methodology
  - Advices on how to satisfy the Client
- Meetings with the client :
  - Weekly meetings
  - Show our progress
  - Ensure we are on the right way
  - Specify expectations

Risk	Probability	Seriousness	How to avoid the risk/react if it happens
Bad relationships in the group	2	3	Cohesion Burger King Monday's ChocoMorning
Lack of resources or difficulties to get them	4	4	Be ready when we get the OR
Bad understanding of client's expectations	2	4	Keeping in touch with the client Review of the cahier des charges
Weak planification	1	3	Do a Gantt Chart
Incompatibility with other pieces of software	4	2	Show what the client needs
We don't succeed the development in C++	1	5	Learn C++, ask for help from our teachers

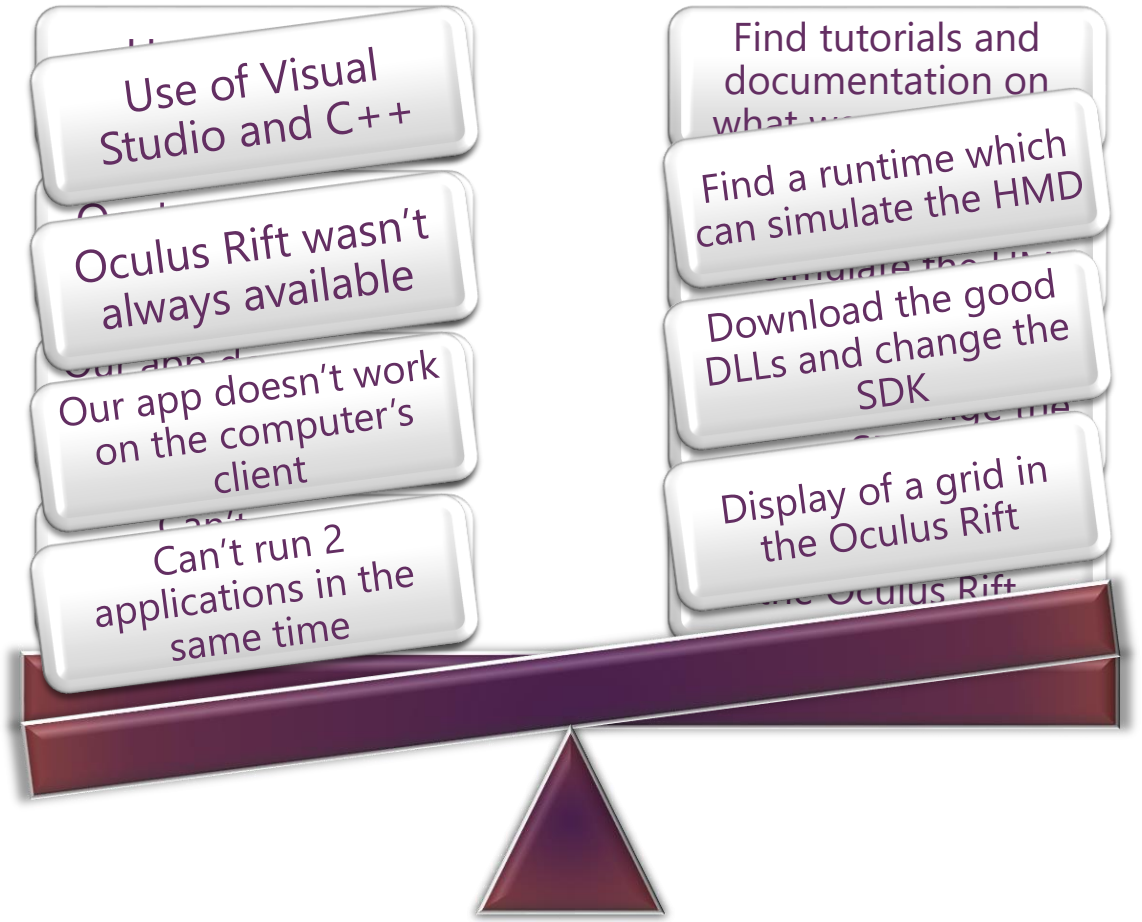
Risks Analysis

Risks and solution found

Problems encountered

And solutions found

Problems

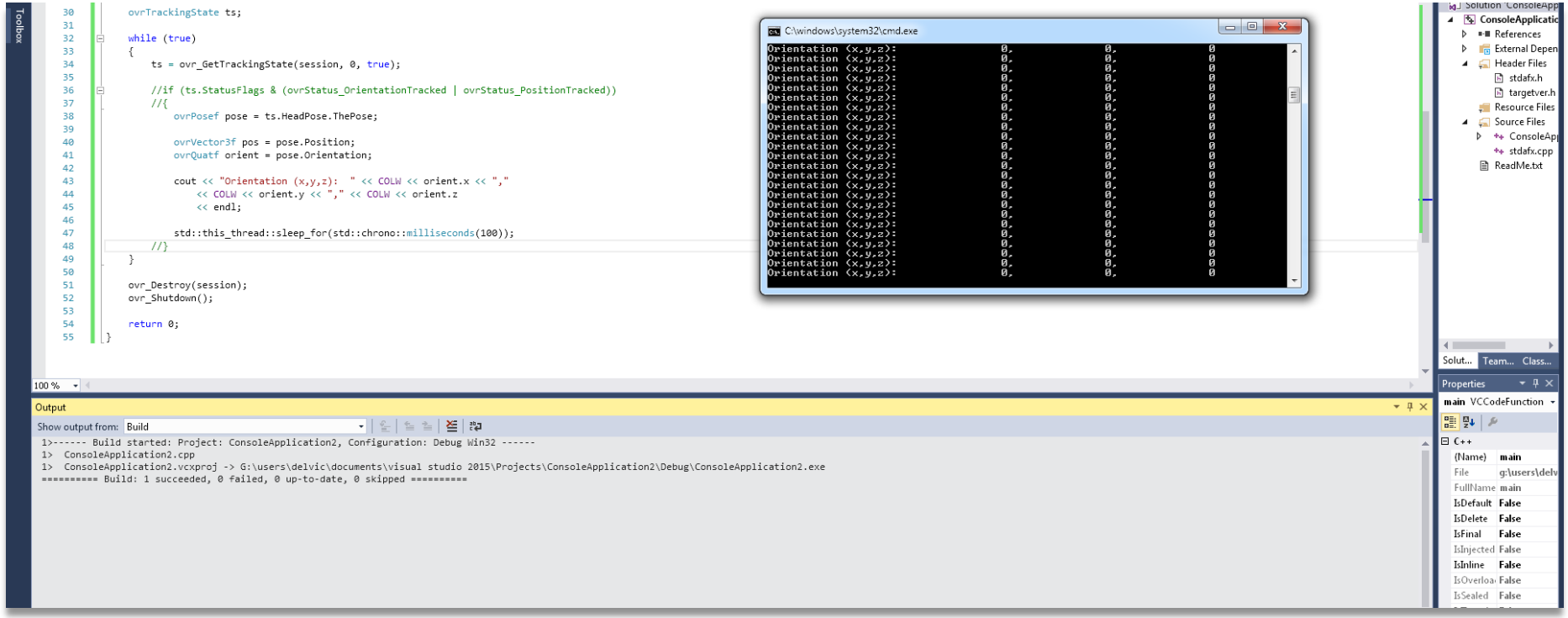


Solutions

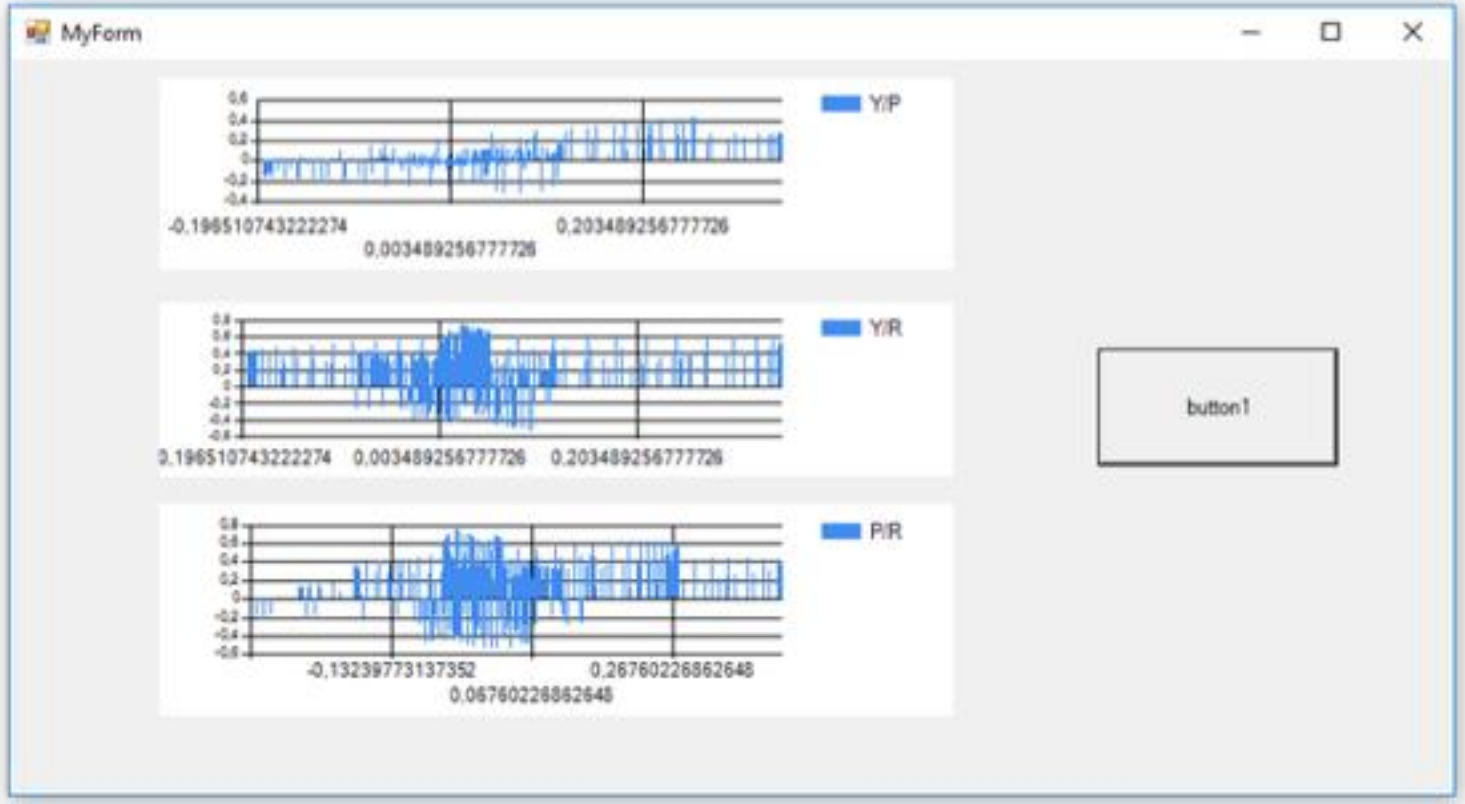
Technical Overview

Historic of application

- Data capture
- First human machine interface
- Data saving
- Data loading
- Profile management



Data capture

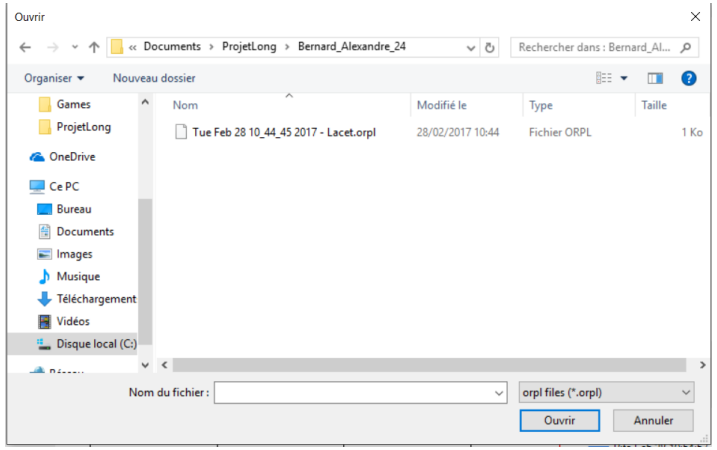

MyForm
Y/P
-0,196510743222274
0,203489256777726
0,003489256777726
Y/R
0,196510743222274
0,003489256777726
0,203489256777726
P/R
-0,13239773137352
0,26760226862648
0,06760226862648
button1

First HMI

Data loading and saving

Data loading

- Windows explorer
- Can only open files *.orpl



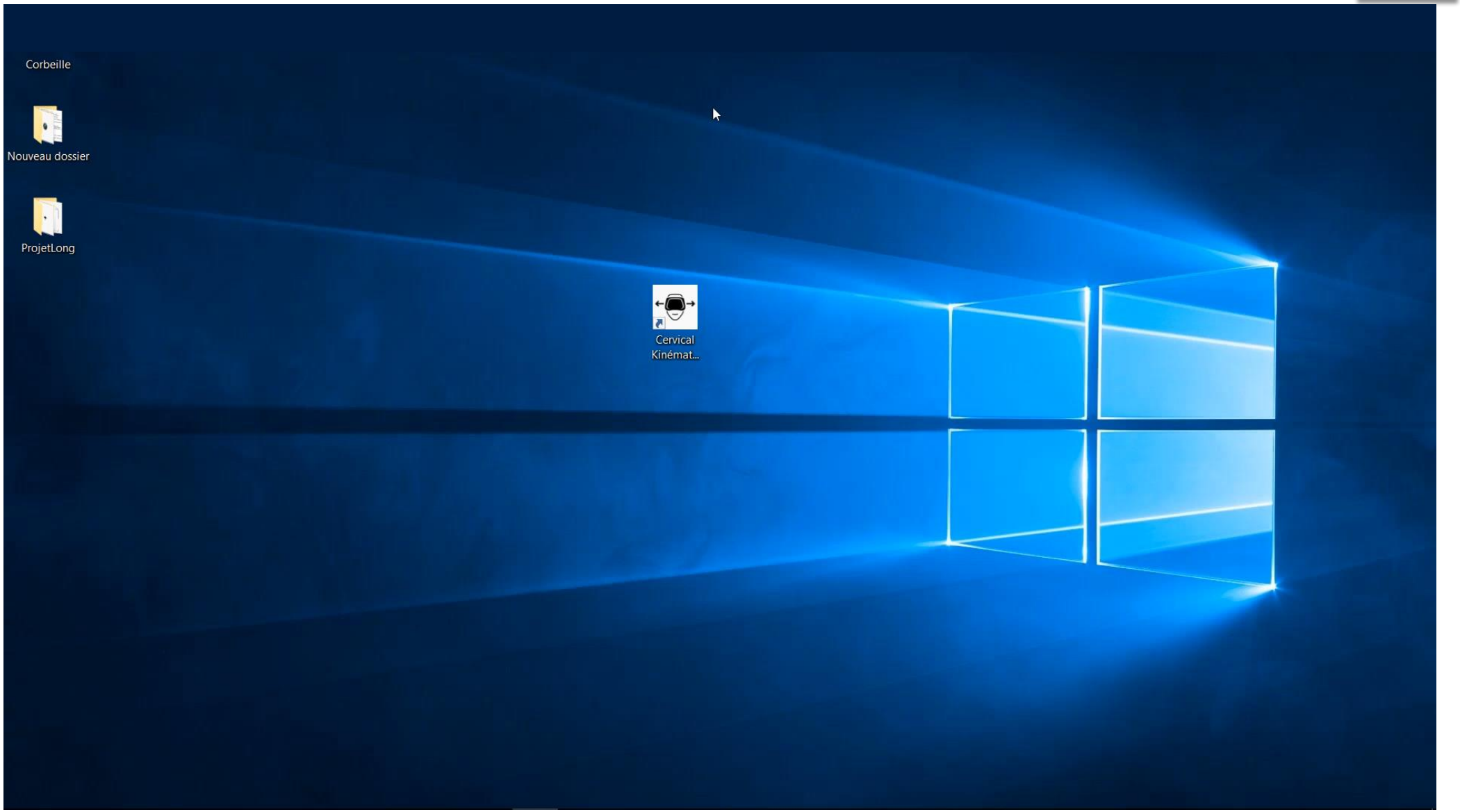
Data saving

- First the same explorer as the loading
- Then automatic recording
  - Date
  - Movement type
  - Subject name folder

Profile management

- Creation of a folder with first name, last name and age of subject
- Possibility to load a pre-existing subject
- Creation of a comments file where you can find all comments related to the records

Presentation of the final product



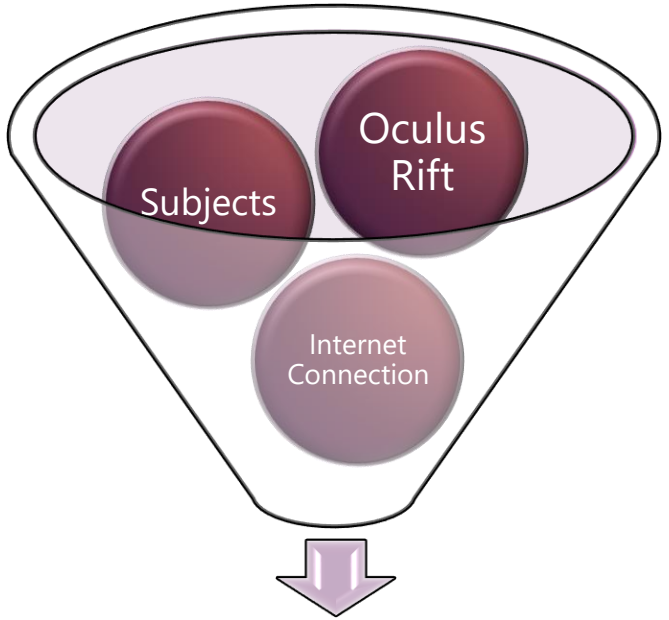
Last meetings with the client

- Presented our application to him and his coworkers
- Detected anomalies in Alexandre's yawing
- Tried some infructuous therapy
- Left some testing advices

Some issues the client found

- While he was testing, he recorded a lot of patient data
- He asked to add the age of the subject
- He wanted to add comments on curves
- He found some bugs occurring when the application wasn’t use properly

- Anyone with an oculus can download and use the application
- Any osteopath can analyze data sets and detect issues in head movements
- Everyone can send their measures to Denis (30 records weight 500 Ko)



How it can be used

By any osteopath in the world

Axis of amelioration

For the future developers

Thank you for your attention