sensei

Your Everyday Workout Buddy

Process Book by

Yashasvi Chaurasia

yashasvi20159@iiitd.ac.in

2020159, CSE

Table of Contents

Introduction

Group Formation

The Project

Measuring Progress

Current Scenario and Stakeholders

Research Process

Developement

My Work Process

The Journey of Design

Conclusions

Introduction

I am Yashasvi, an Undergrad CSE student who had no prior Design Experience before taking this course, the only reason I selected this course was my interest in Design and Development.

I had an introductory course in my first Semester which was also under Dr. Grace Eden, the method of teaching seemed quite exciting to me as the entire course is filled with Presentation weeks and Breakout Sessions where teams sit together to discuss their ongoing project.

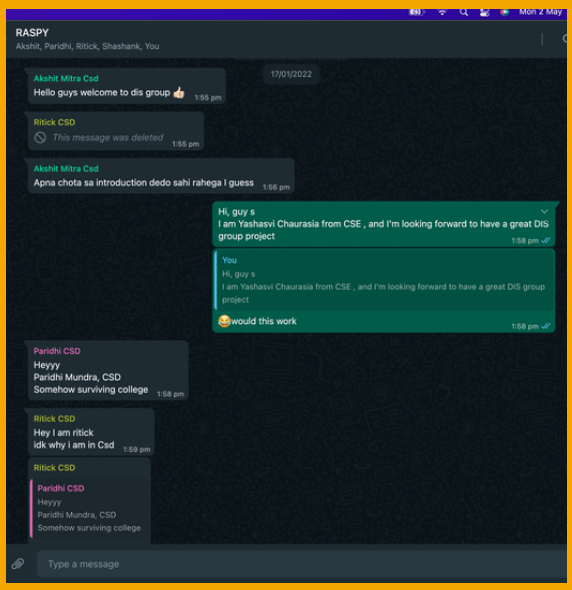
At the start, it was a bit difficult to find a team but eventually, a friend of mine invited me to his team where we discussed how the usual design course progressed. These CSD guys really helped me get comfortable with the Design Course and with time we were able to interact and communicate our ideas with each other properly.

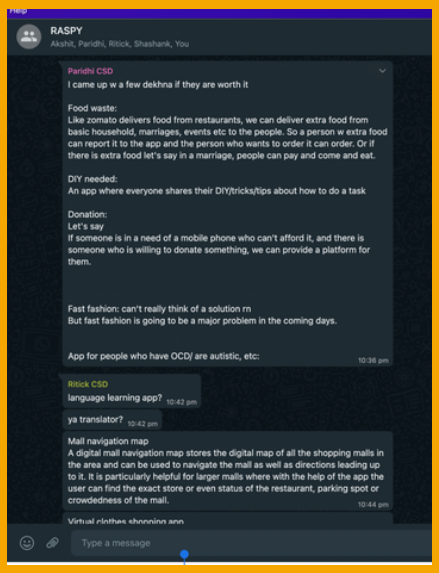
During the Semester our Team had to decide upon an idea and create a working demo for that idea by the end of the semester.
In the initial weeks, we started out with many ideas discussed over our whatsapp groups, and initially, we ended up choosing Abilify, an video chat app for the disabled which we had to change due to some issues in the idea.

Due to this switch in ideas, we then ideated a new project from the origins of our previous project where we would use computer vision to correct Users' body posture so that we can avoid Injuries.
The Ideas had some Design related issues which were addressed by Dr. Grace so we modified our idea of creating a web app instead of a mobile app.

The next few weeks were spent learning computer vision from tutorials and how to integrate it into our project while all of us completed our deadlines from other courses.

The end result was really exciting when we finally were able to create our web app from scratch even when I had no prior design experience.





Group Formation

Group formation was one of the most important tasks in the initial few weeks of this course as all I knew was that I am in a new Course that I know nothing about. The initial panic was real for me as not finding a good team but at the end of this project I really ended up making good friends.

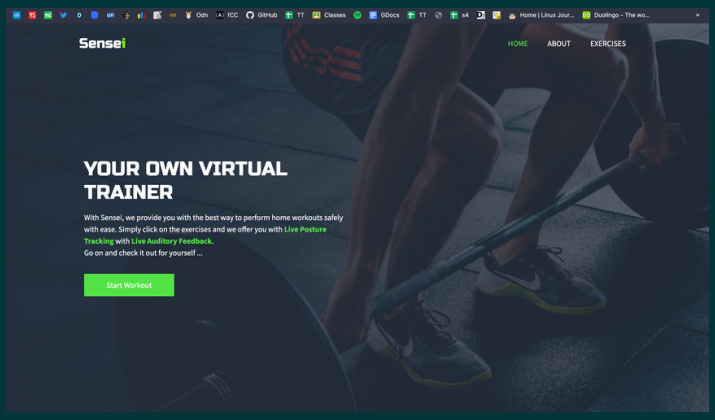
After I had found my team, we had a WhatsApp group where we would discuss all the work and project-related stuff.

In our Project group, we had 3 CSD students and 2 CSE students including me. Initially, we introduced ourselves in the group via text messages and later with time we slowly moved on to google meets for discussions and casual talks about the courses in our College.

With the processing course, we decided on our roles in the team where I was one of the developers and was also given project management duties.

"A great project starts with a great team"
-Yashasvi

The Project



Virtual Workout Trainer

Our project is a virtual workout trainer which would monitor our User's posture and give feedback to help them correct it.

Our project was a tough one as we had to actually integrate a lot of components into it. As the Course progressed our tech stack also slowly and steadily started to grow as our team intended to provide a good user experience to our users.

Problem Statement

Physical Gyms are highly Expensive and require travel time.
Homw workouts can be done easily saving both time and money but they can cause severe injuries if done with incorrect postures

With Sensei

We provide Live Posture Tracking ability to our users so that they can perform home workouts safely in the houses and also save both money and time

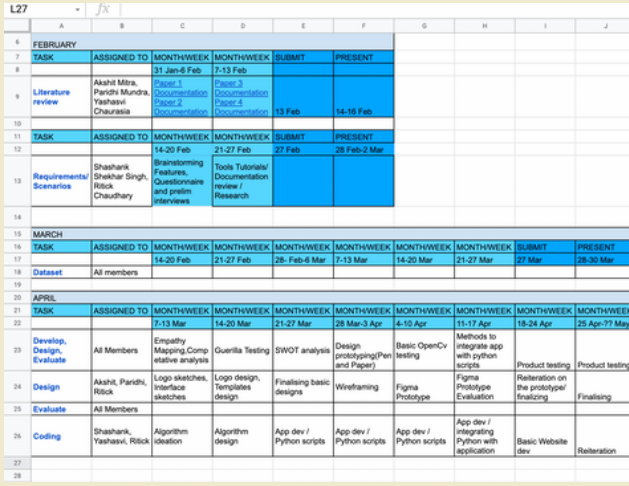
Problems

The idea although seems exciting but would requires Computer Vision and intensive coding to provide a visual feedback to the user.
Integrating Modules with an App or a webapp takes knowledge and loads of time for debugging and finding bugs and errors.

Why we progressed

All of our 5 team members agreed that the stated problem really existed and hence we could finally solve a real world problem using this project.
The field of Computer Vision seemed really exciting as now we would finally learn something Cool and futuristic.

Measuring Progress



FEBRUARY					
TASK	ASSIGNED TO	MONTH/WEEK	MONTH/WEEK	SUBMIT	PRESENT
		31 Jan-6 Feb	7-13 Feb		
Literature review	Akshit Mitra, Paridhi Mundra, Yashasvi Chaurasia	Paper 1 Documentation Paper 2 Documentation	Paper 3 Documentation Paper 4 Documentation	13 Feb	14-16 Feb
TASK	ASSIGNED TO	MONTH/WEEK	MONTH/WEEK	SUBMIT	PRESENT
		14-20 Feb	21-27 Feb	27 Feb	28 Feb-2 Mar
Requirements/ Scenarios	Shashank Shekhar Singh, Ritick Chaudhary	Brainstorming Features, Questionnaire and prelim interviews	Tools Tutorials/ Documentation review / Research		

MARCH									
TASK	ASSIGNED TO	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	SUBMIT	PRESENT
		14-20 Feb	21-27 Feb	28- Feb-6 Mar	7-13 Mar	14-20 Mar	21-27 Mar	27 Mar	28-30 Mar
Dataset	All members								

APRIL									
TASK	ASSIGNED TO	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK	MONTH/WEEK
		7-13 Mar	14-20 Mar	21-27 Mar	28 Mar-3 Apr	4-10 Apr	11-17 Apr	18-24 Apr	25 Apr-?? May
Develop, Design, Evaluate	All Members	Empathy Mapping,Comp etative analysis	Guerilla Testing	SWOT analysis	Design prototyping(Pen and Paper)	Basic OpenCv testing	Methods to integrate app with python scripts	Product testing	Product testing
Design	Akshit, Paridhi, Ritick	Logo sketches, Interface sketches	Logo design, Templates design	Finalising basic designs	Wireframing	Figma Prototype	Figma Prototype Evaluation	Reiteration on the prototype/ finalizing	Finalising
Evaluate	All Members								
Coding	Shashank, Yashasvi, Ritick	Algorithm ideation	Algorithm design	App dev / Python scripts	App dev / Python scripts	App dev / Python scripts	App dev / integrating Python with application	Basic Website dev	Reiteration

Performance goals are a good way to monitor and measure progress. Just having a mere Idea for the project would not have helped us create it so we organized our Project and started to break it into small deadlines.
We created a Gannt Chart to measure and track progress while I personally reminded our group members of our self imposed project deadlines.

Method	Activity / Project	Data / Outcome
Organising files in Google Drive	Created a shared Drive with all the teammates.	• Resource sharing became easier • We never had to use multiple repeted links
Group Meetings on Sundays	Once in a week we used google meet to discuss individual progress	• All us knew how much each of us had progressed • Easy Project management
Gannt Chart	We created a Gannt chart which was used to plan futuristic deadlines	• Helped to self impose deadlines and monitor progess

Research

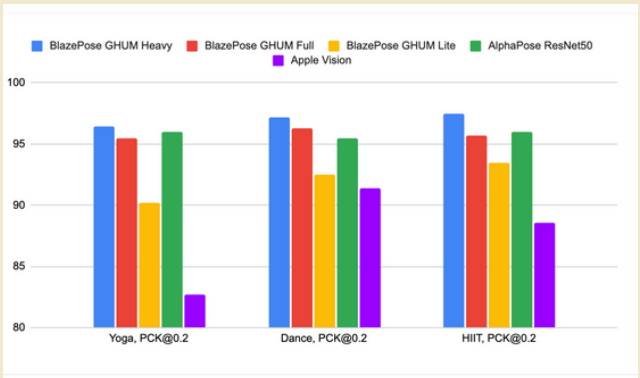
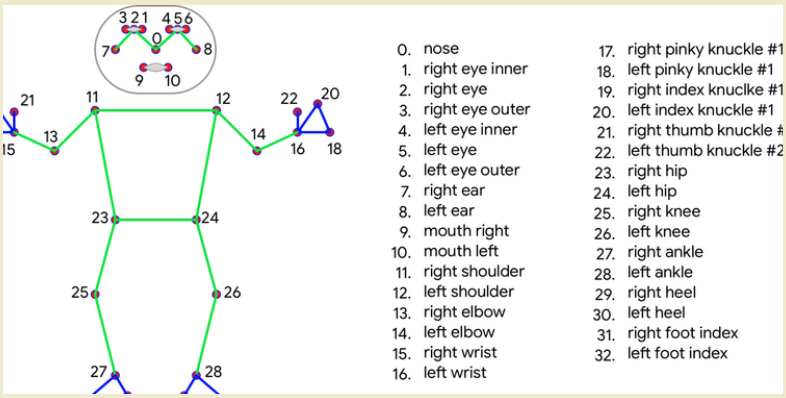
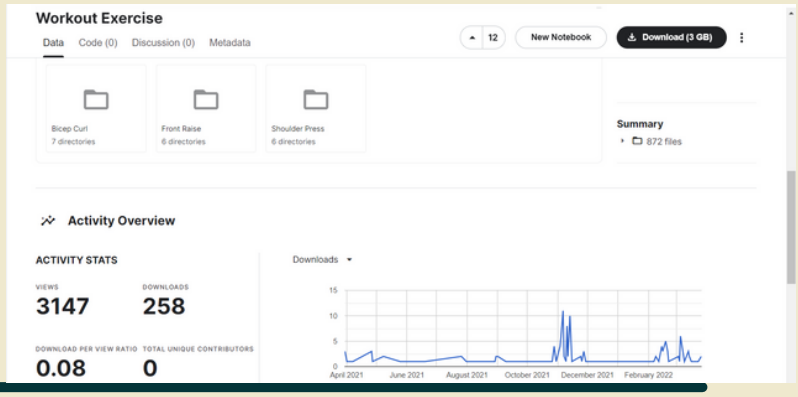


Fig 2. Quality evaluation in PCK@0.2.

designed our models specifically for live perception use cases, so all of them work in real-time or majority of modern devices.

Method	Latency Pixel 3 TFLite GPU	Latency MacBook Pro (15-inch 2017)
azePose GHUM Heavy	53 ms	38 ms
azePose GHUM Full	25 ms	27 ms
azePose GHUM Lite	20 ms	25 ms





To improve and better understand our domain our group read a total of 10 research papers out of which we found 8 research papers that actually helped us in understanding our users and our domain.
After reading and analyzing our Research papers we found our stakeholders to be beginners and intermediate gym-going people.

Our group then performed 5 interviews to better understand our stakeholders on the ground level.
We then divided our work where each member took consent from the interviewee before conducting our interviews to better understand our stakeholders.

We came out to the conclusion that most of our stakeholders were of the age between 17 to 25. With our basic survey it comes to be 60%

Development

"The Actual grind of the Code is when you debug it"

We started off with organizing ideas and ideating processes but soon after midterms all we had left to do was develop the project.
initially, we had used a python script for our project which was working perfectly and seamlessly but when we searched on how to integrate the script into a web application, we were stuck !
we had to ask for help from our TA Kyzyl sir who helped us modify our tech stack and suggested us to switch our script from python to javascript which we eventually did.

01. Python Script

I along with shashank created a python script using Opencv and mediapipe.

02. Switching Languages

We had to completely rewrite our Python code in a completely new language to reduce project complexity.

03. Developing Frontend

The frontend part seems easy but it requires multiple iterations and we had to reiterate our designs 3 times.

04. Audio Module

We had to Research for what audio library to use for active audio feedback.

05. Django Integration

We integrated all of our files with Django framework to easily host our website

06. Hosting Our Website

We requested iiitd server access so that we could host our websites onto the server.

HTML CSS python JS OpenCV MediaPipe

My Work Process

The development process is really cool and awesome business, once you are in it you would just hate it and love it at the same time.
I personally liked this course due to its practical nature where we learn how to actually create things that work and can be used by people.
The development process was a really tough ride as we had to learn and unlearn lots of stuff.
Our team had divided the front and the backend part of the project among ourselves where I was supposed to handle the Computer Vision and Backend part of the Project.

It was very frustrating at times when I was not able to debug the code and had to work the entire night to fix a small part of the code but I also felt like a genius when I was actually able to debug an error in our code.

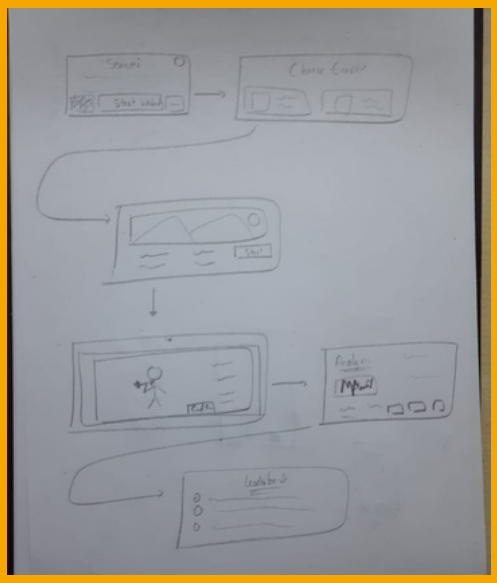
The journey begins with small unit testing of the code I have written and slowly integrating it into a bigger piece of code.
The debugging sessions were long and tiresome and I often had to take breaks, where I usually took a 15 minutes stroll on the campus capturing beautiful images during the walk.

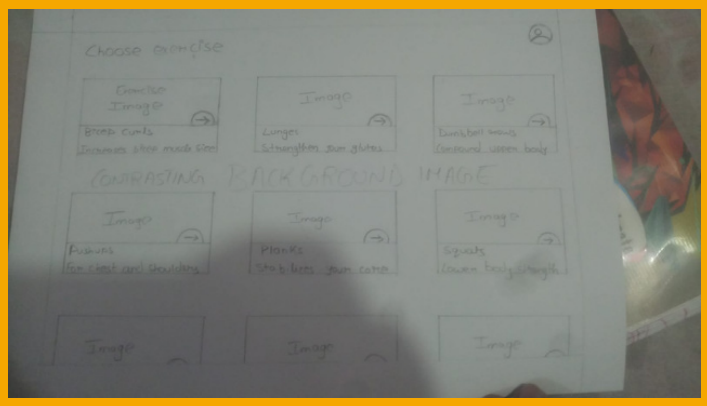
Initially, our website looked plain and stale but by the end, it is the project I am proud to have worked on.

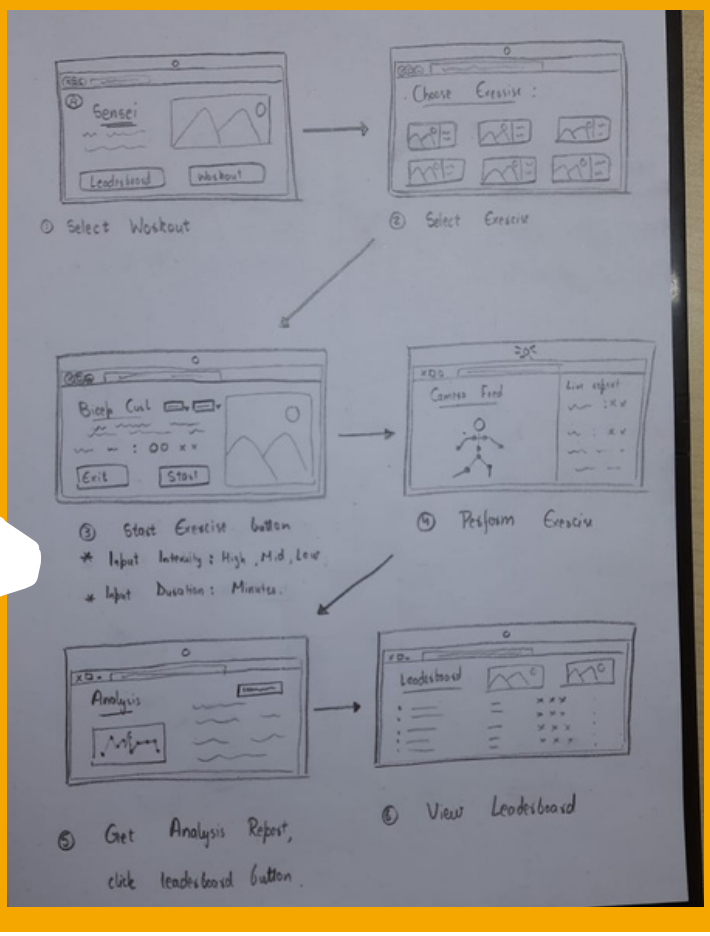
Pictures from the Campus Stroll, during debugging breaks

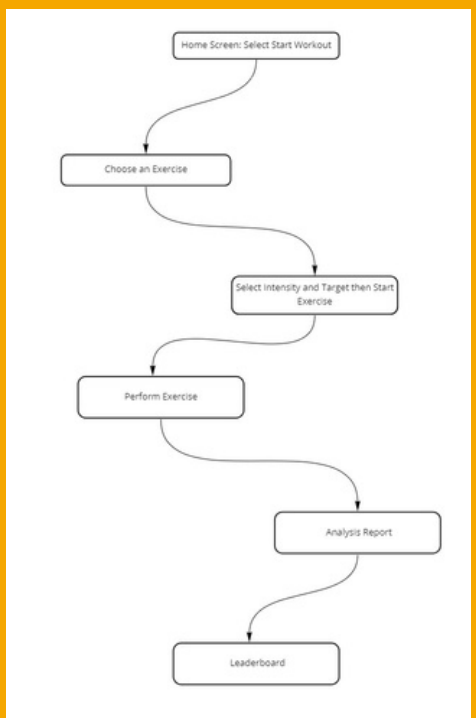
My Shadow

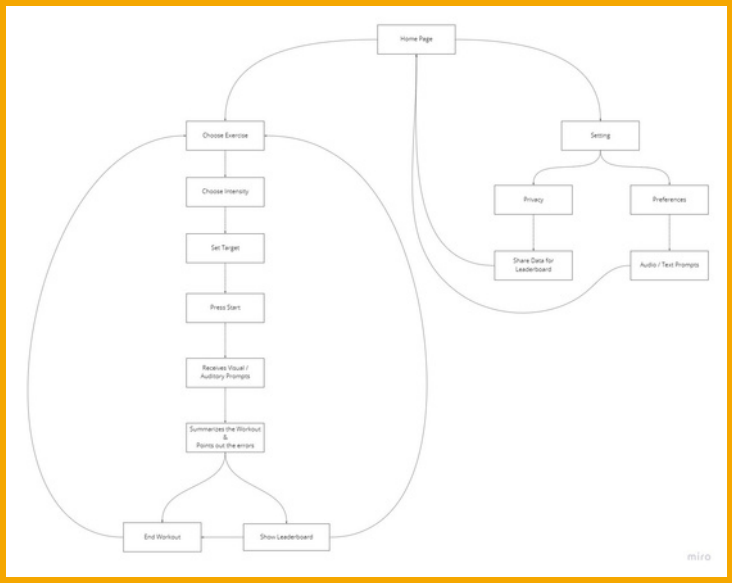
Our Designs





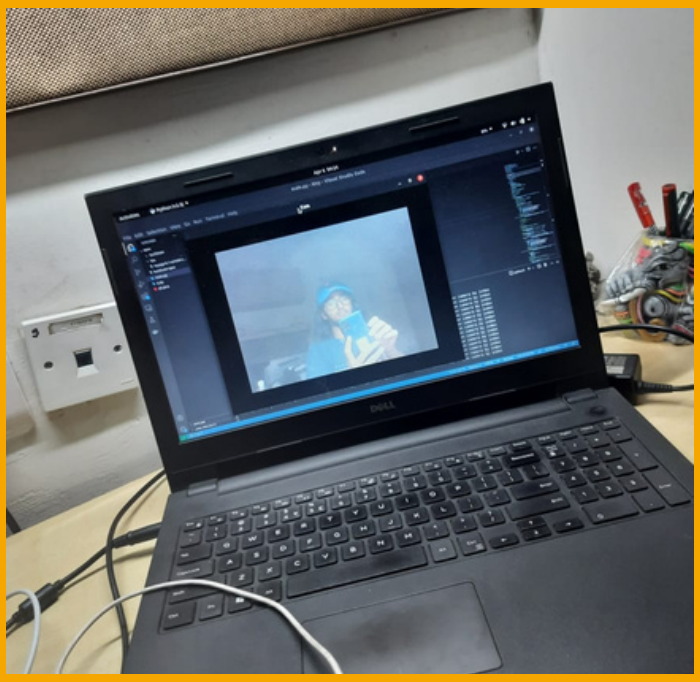


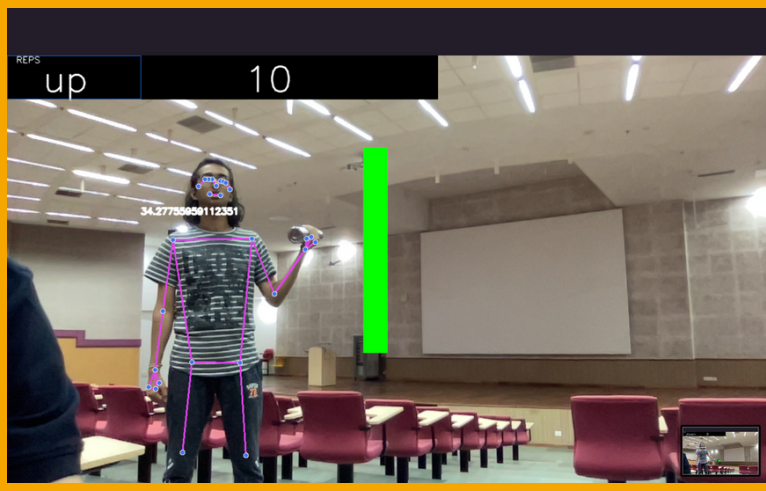




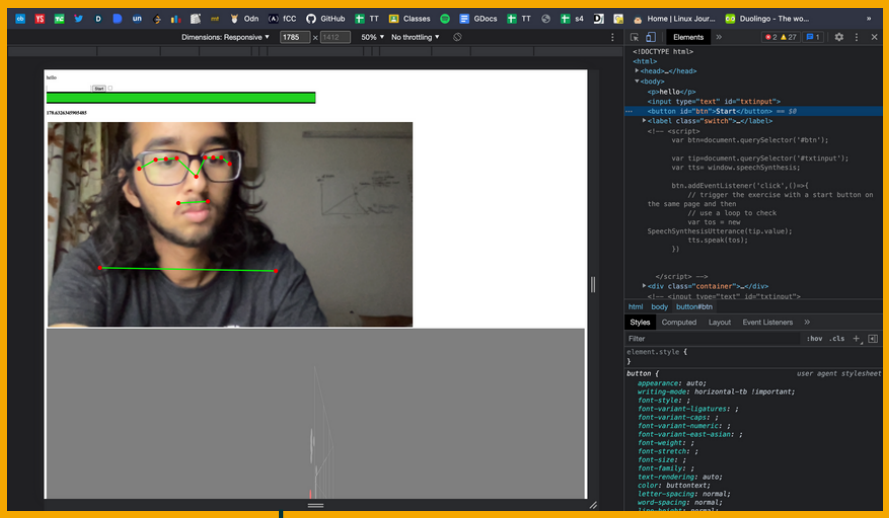
Low Fi designs and Diagrams

The Journey

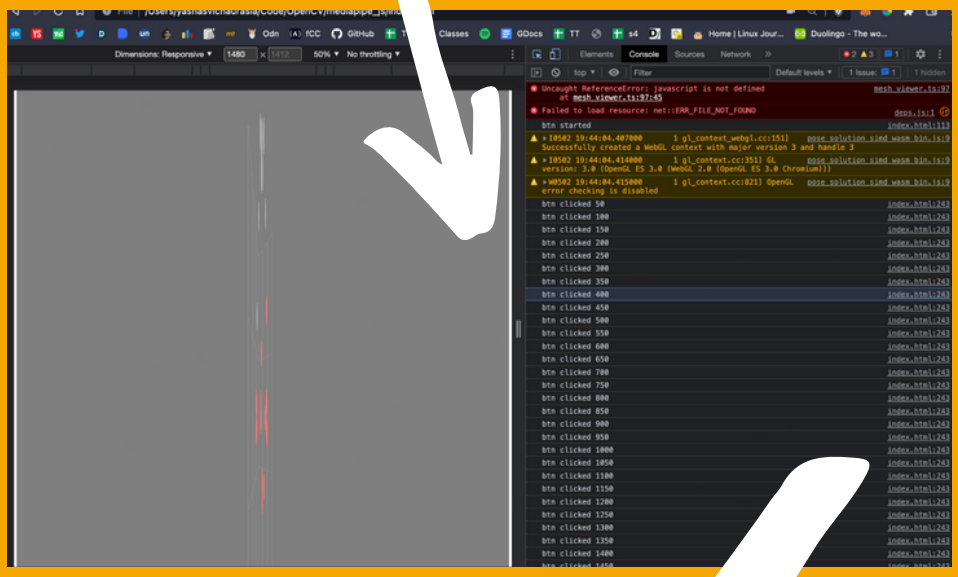




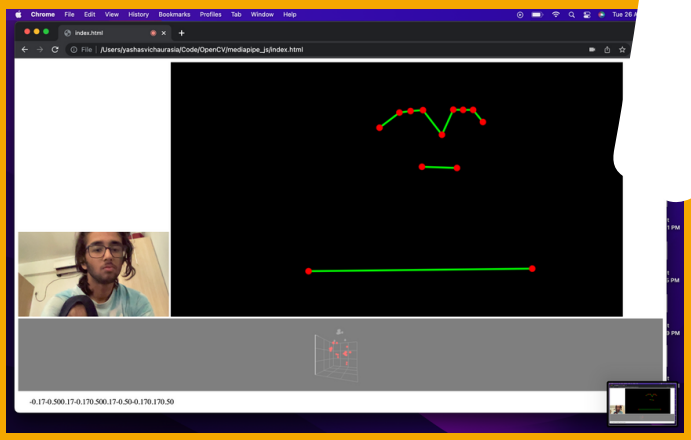
From Using Camera in app to Making a perfect Python Script

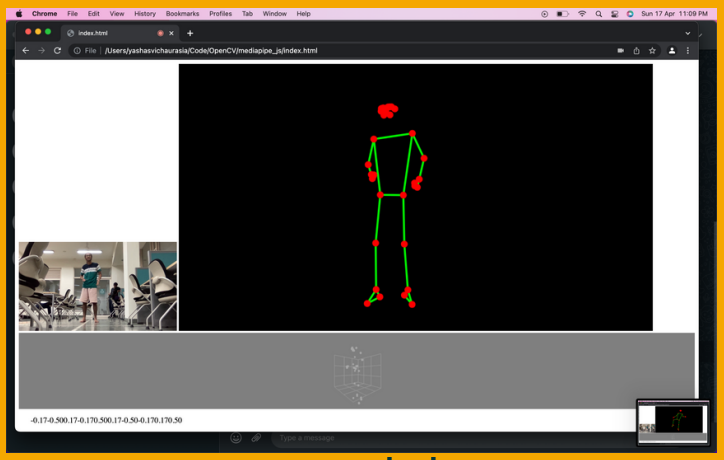


Writting the script in Javascript to Crashing it again

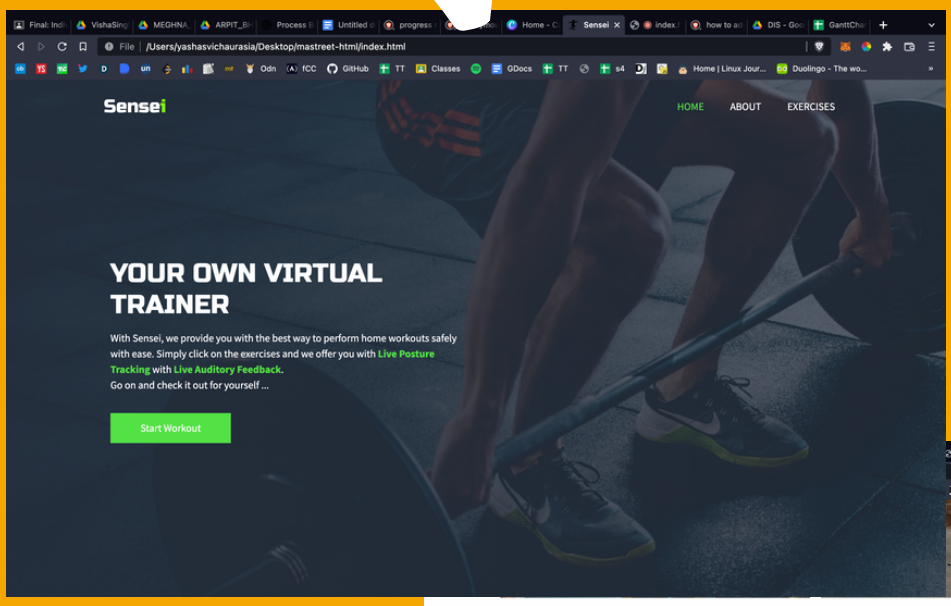


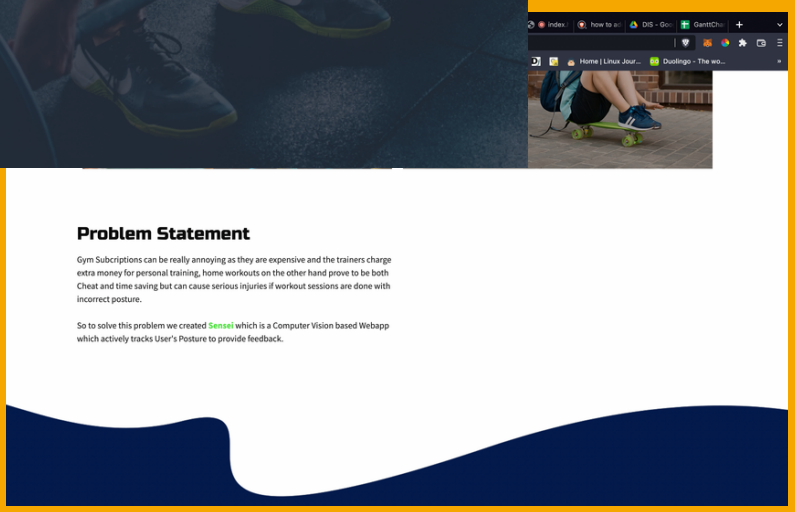
The Journey





Fixing the Code and Integrating Voice module





To creating My best Project

Conclusion

This project was one of my best projects as finally, I was able to work with new people and also create a wonderful product I really poured my soul into.
Also, the project would look really cool on my resume.

Highlight 1

Computer Vision can be used to solve Real-life problems and hence it is a really useful field to work in

Highlight 2

This project helped me to work with people of diverse backgrounds and fields.

Highlight 3

Now i can actually relate to the importance of Design in a product

Highlight 4

Late Night Grind Works

With the help of my teammates and the constant support of Dr Grace Eden and TA Sushmita Maam, we were able to complete our project ,debug it and finally host our project as a proper website.

"There is happiness on the other side of Debugging"

-some developer