

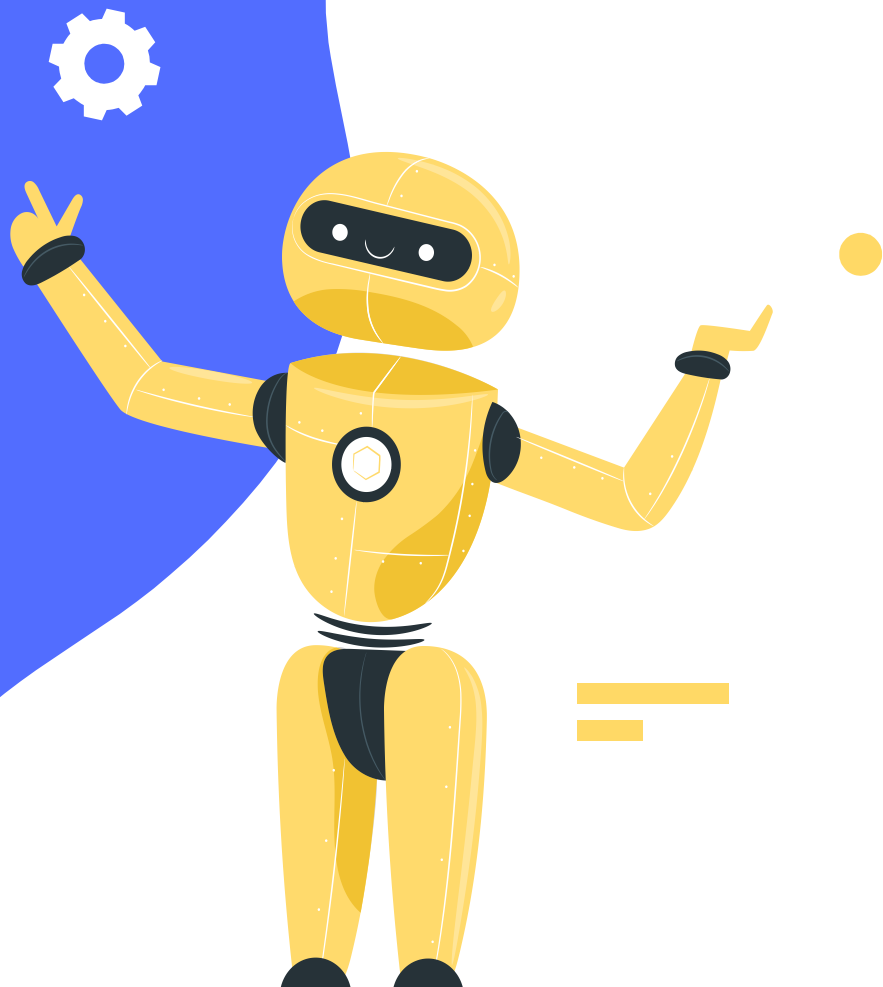


Hands On!

A Physio Game

PITCH DECK

LIEB Project Presentation



OUR TEAM

Diogo Valente



The Game Dev
Master

Inês Barros



The Eletronics
Wizard

Isabela Marques



The Signal Processing
Hero



Hand therapy



- Due to its exposure and important functionality, hands can be affected by many injuries from fractures of the hand or arm, to lacerations and amputations, burns, surgical repairs of tendons and nerves, birth defects or arthritis and osteoarthritis
- Hand therapy typically addresses the biomechanical issues underlying upper-extremity conditions but it's always important to have a client-centered approach, since therapy has paces and effects that can vary from person to person
- Children have high risks of hand injuries since they are more careless, therefore it's important to have in mind some adaptations for their rehabilitation such as stimulus, concentration and motivation



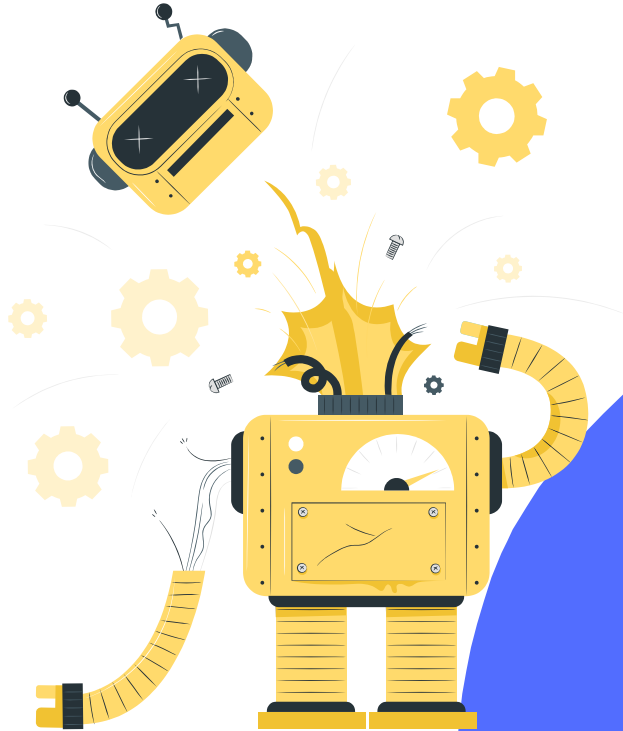


PROBLEM vs SOLUTION

The idealization of *Hands On*



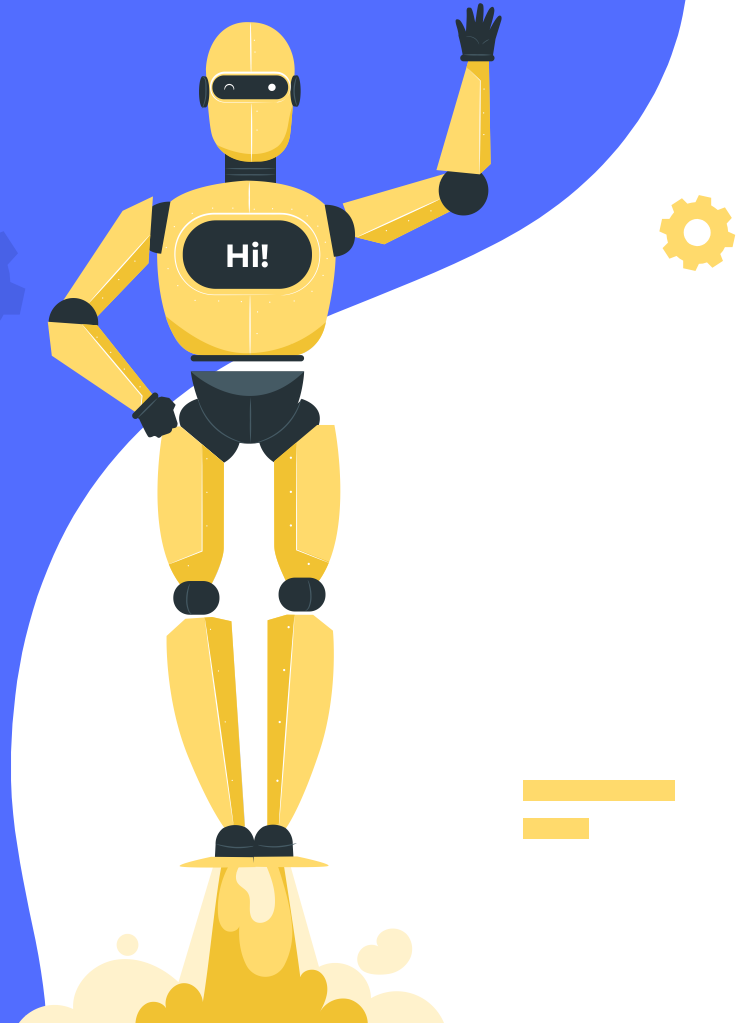
Physical therapy with COVID-19



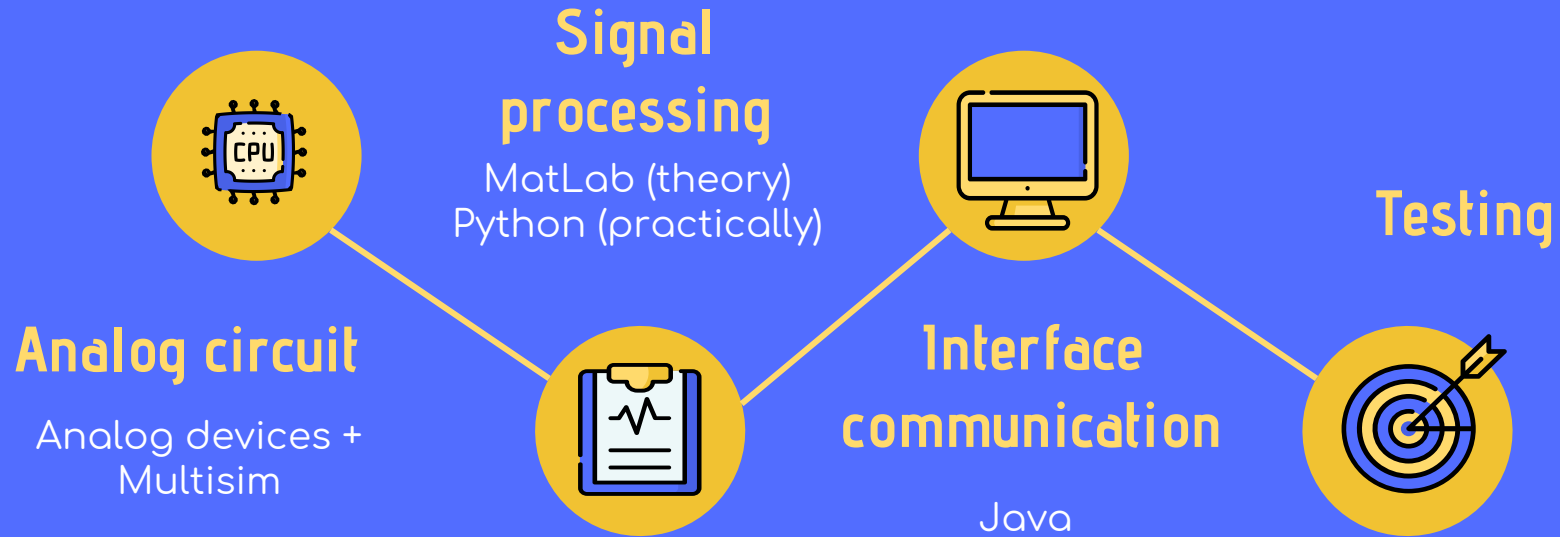
- The pandemic state COVID-19 brought has posed a big challenge to physical therapy practice, especially regarding the level of contact with patients
- A possible solution for this difficulty is telerehabilitation which consists on the use of technology to link practitioners to patients
- However, there are still doubts and studies to be made in order to access its effectiveness and outcomes

What is *Hands on?*

- Game which purpose is to promote hand movements in order to better address physical therapy for motor rehabilitation
- Developed to improve and facilitate children's physical therapy so that they are more stimulated and interested



IMPLEMENTATION

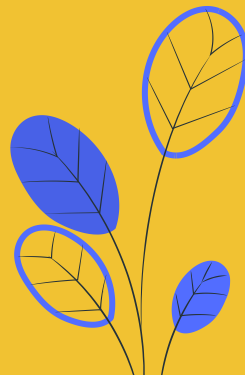




01

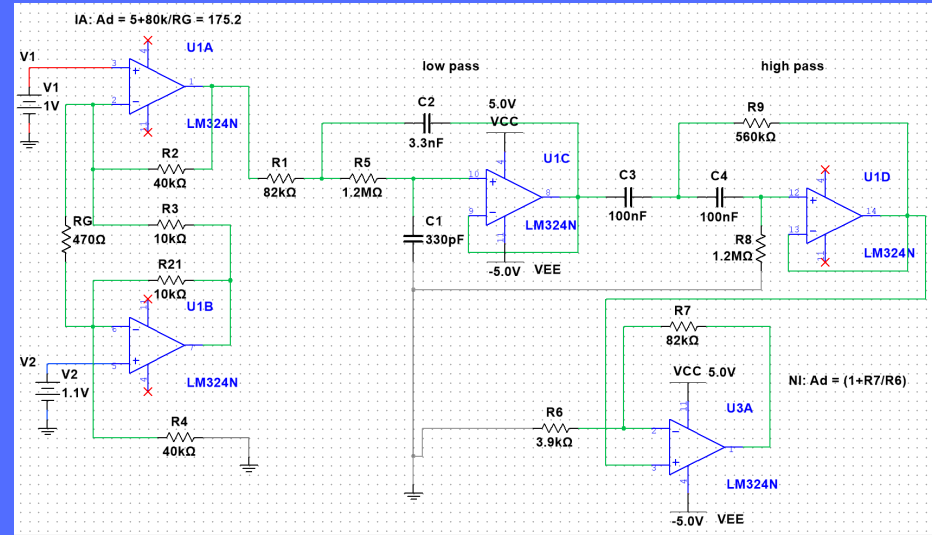
SIGNAL ACQUISITION

And circuit design



ANALOG CIRCUIT

- 3 electrodes: one for reference and two for differential voltage
- Instrumentation amplifier - gain of 175.2
- Low pass filter - 500Hz cutoff frequency
- High pass filter - 2Hz cutoff frequency
- Non-inverting amplifier - gain of 22

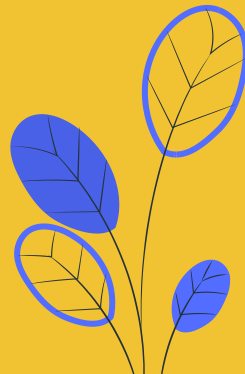




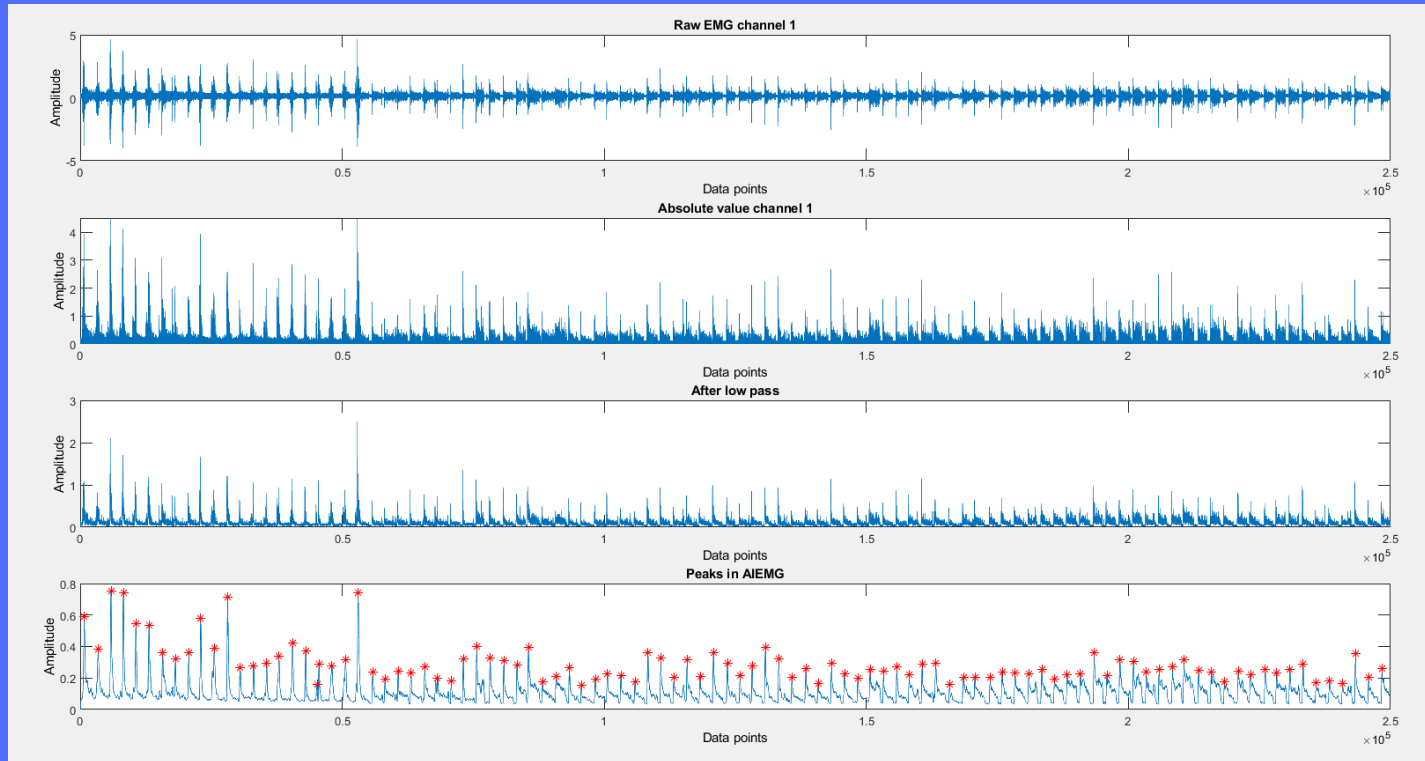
02

SIGNAL PROCESSING

Theoretical done in MatLab



SIGNAL ANALYSIS

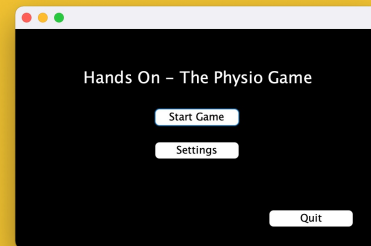




03

GAME DEVELOPMENT

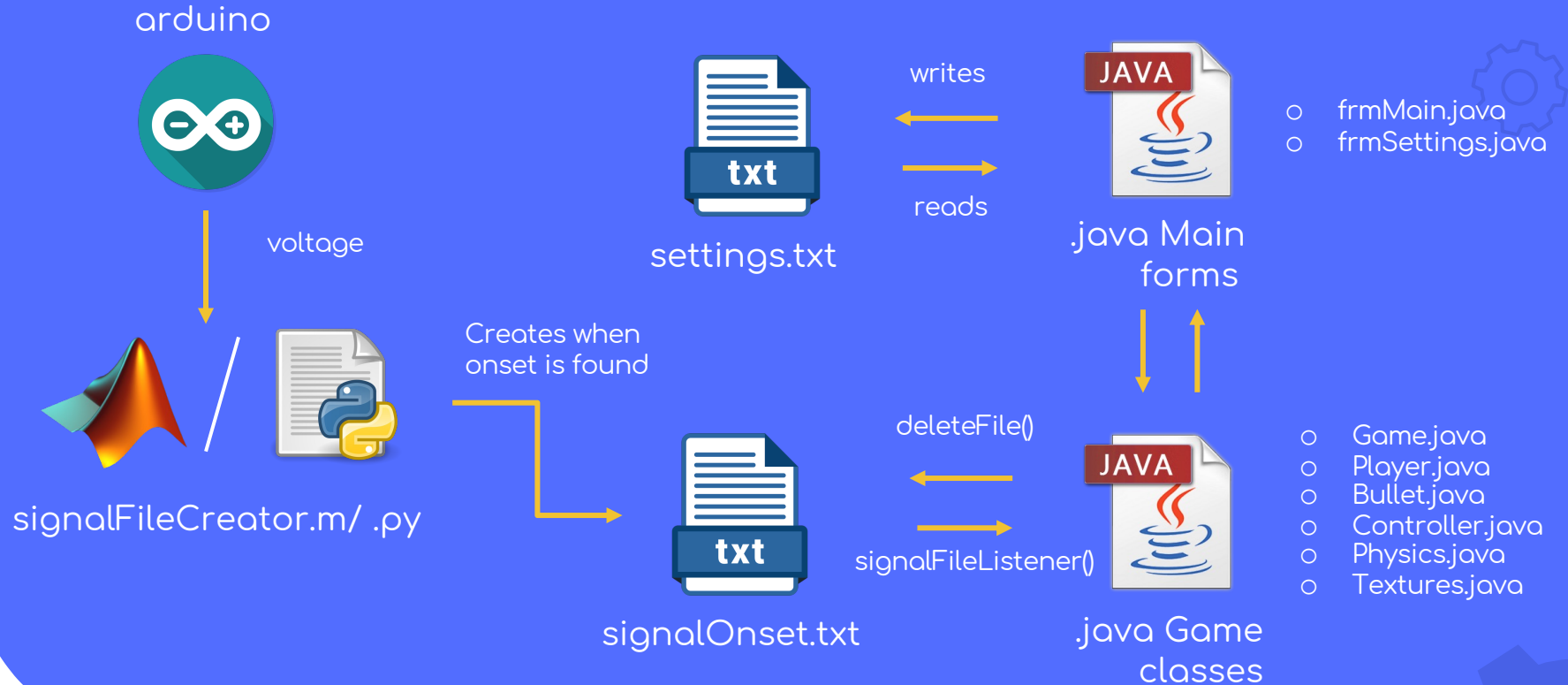
Getting the hands on!



PRODUCT DEMO



THE COMPONENTS



GAME LOGIC & MECHANICS



Game Loop

A constant loop inside a java thread



Tick()

Calls all control functions
60 ticks per second



Render()

Renders all images
and textures



Collision Detection

Square-based
collision



Buffer Strategy

Ensures smooth
graphics

There is no time
constraint for rendering.
This game renders at
300 fps



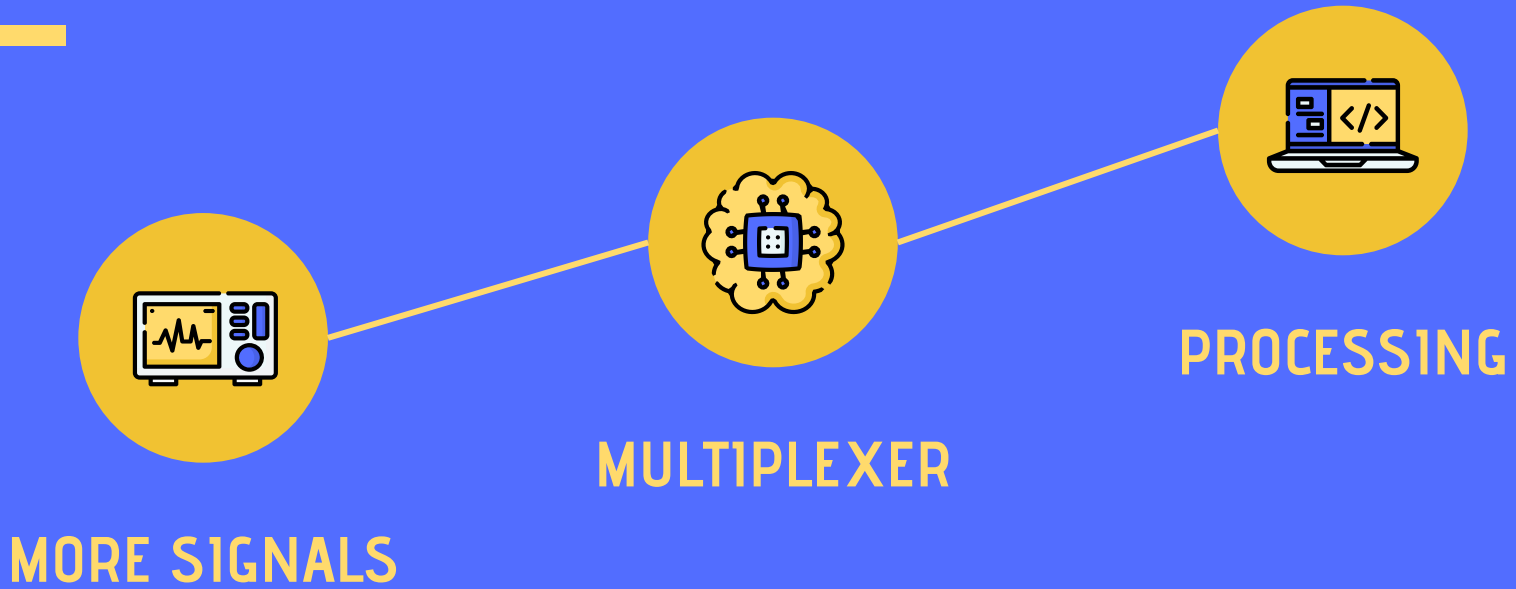
04

FUTURE IMPROVEMENTS

There's always space to grow



IMPROVEMENTS - SIGNAL



IMPROVEMENTS - GAME



SWOT ANALYSIS

STRENGTHS

Easy to use; fully integrated;
niche market; fun

WEAKNESSES

Signal identification can fail;
hardware needs to be sold

OPPORTUNITIES

Partnerships with armband
companies to facilitate
distribution

THREATS

Market difficult to penetrate;
in-person rehab might be
preferred



The background is a solid yellow color. There are several gear icons: a large yellow gear on the left, a large yellow gear on the right, a small blue-outlined gear in the top right, a small blue-outlined gear in the bottom left, and a large yellow gear at the bottom center.

Thank You!

Go ahead with any questions!