Isokinetic Dynamometer Ironman

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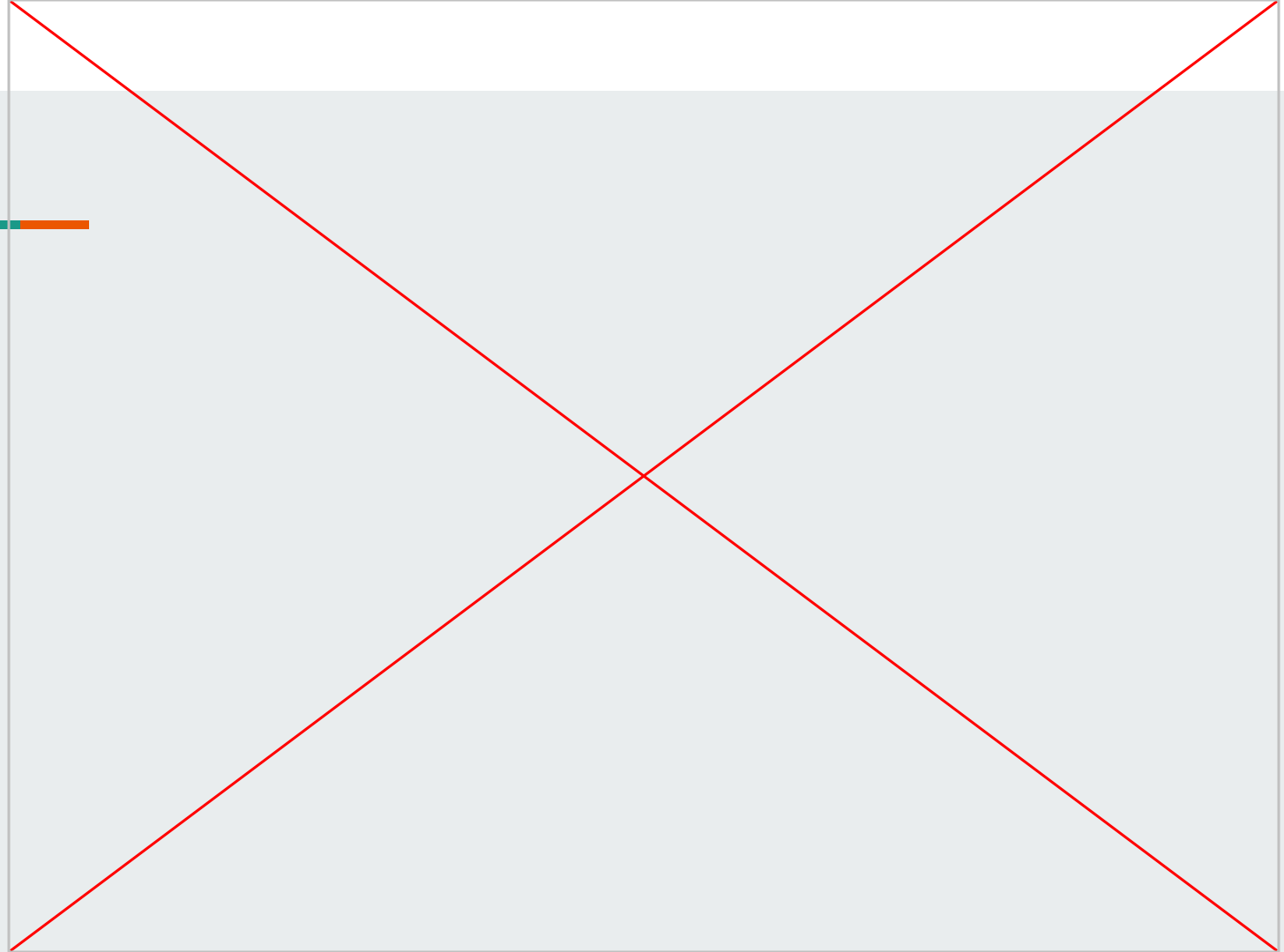

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Introduction

- A small prototype
- Is the data somewhat relevant and practical
- Measure muscle strength for a continuous extension
- The goal with this project
- The intended user are hospitals and clinics

Problem Statement

- Large and expensive
- Targeted area limitations
- Decreased Accessibility
- Limited Research
- Sub-Optimal Rehabilitation Outcomes

Technical Approach

Sensors, Components and Software:

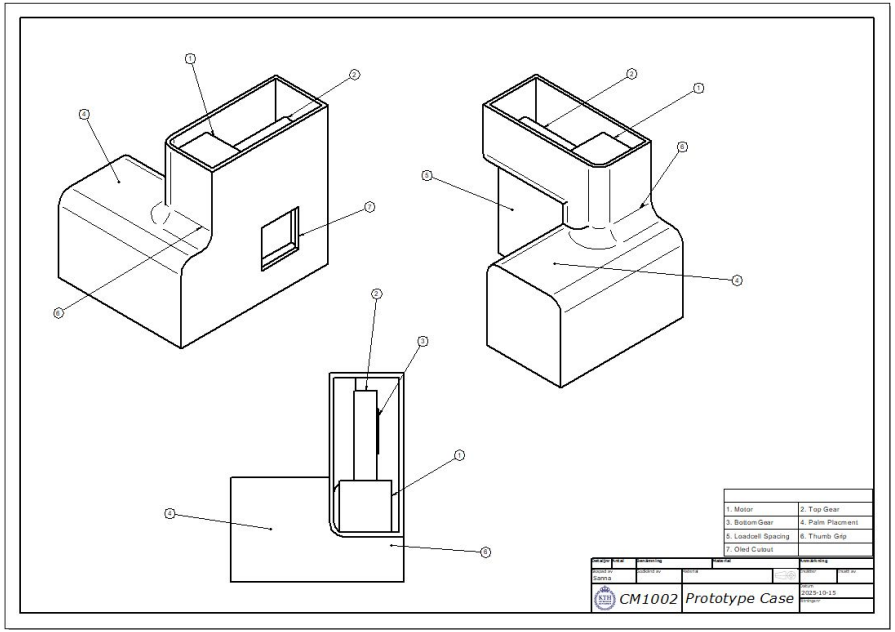
- Arduino microcontroller
  - Open source
  - Load cell (+Amplifier), Stepper motor (+driver), Magnetic Encoder, SD-card module
  - Encoder is commonly used and accurate
- Coded in C
  - Takes values from Load Cell and Encoder and saves data to SD-card
- 3D designed gear-driven system
  - Mounted with a Load Cell
- OLED-display
  - Displaying angles and force in real-time

Key features to achieving Isokinetic Control:

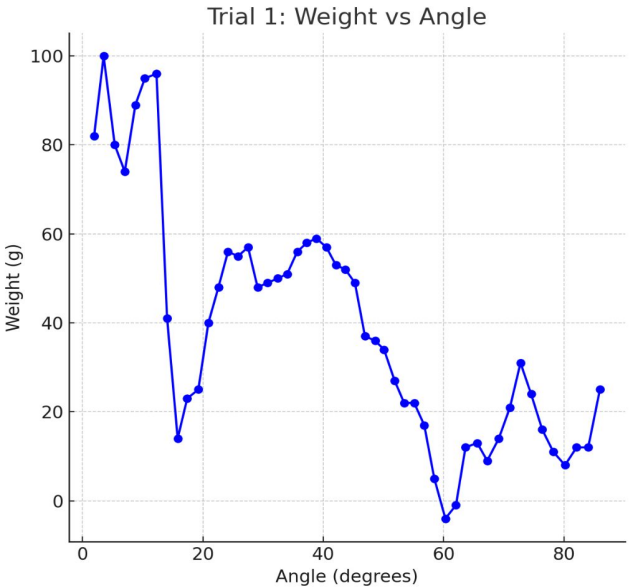
- Encoder Measurement
  - Continuous measurement of angular position
- Software Implementation
  - Tracks total rotation
  - Updating measurements in real-time
- Data Collection
  - Load Cell measuring applied force

User Interaction

- Users finger is placed along the load cell
- Physical interaction with resistive motion
- Data is collected during process
- Straightforward user experience
  - Easy setup
  - Clear feedback
  - No complexity
  - More accessible in use and cost
- Rounded edges for ergonomic comfort



Results


Trial 1: Weight vs Angle
Weight (g)
Angle (degrees)
0
20
40
60
80
100


Trial 2: Weight vs Angle
Weight (g)
Angle (degrees)
0
25
50
75
100
125
150
0
20
40
60
80

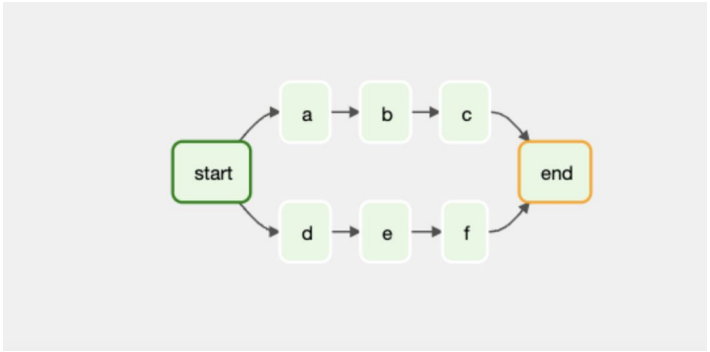
Project Methodology

Parallel and Modular design methodology(GitHub Projects)

- Mechanical structure
- Electronic control
- Software design

To Improve

- Structured and detailed planning approach
- Deeper preliminary research
- time-efficient solution



Thank you for listening!