ME, ECE, BE Capstone Design Programs

Team #26: LibraBoard - Mixed Board for Balance Rehabilitation

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GLABO ULB

Overview

- Collaboration with Université Libre de Bruxelles in Belgium
- Concept developed by Dr. Serge Van Sint Jan

Objectives

- Assist physical therapists in assessing a patient's level of balance
- Collect data to track the patient's progress over the course of their rehabilitation
- Develop prototype for patients with locomotor disabilities
- Produce prototypes ready for medical testing in Belgium.

Functional Requirements

- Collect raw data to allow user to control the video game and for the physical therapists to track progress throughout rehabilitation
- Components must be easily attached and rotated
- Must be sturdy and reliable for medical applications
- Bluetooth compatible and battery powered
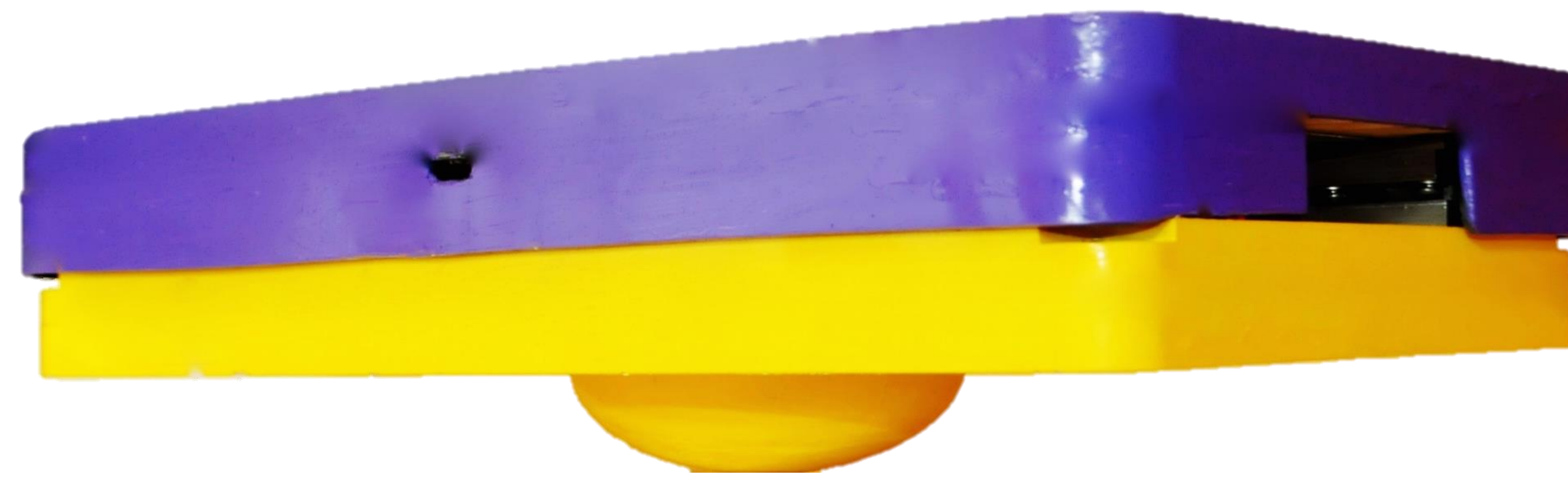
Testing Method

- Actual physical therapy patients
- Randomized position test
- Test positions include: standing with both feet, standing with left foot, standing with right foot, sitting on the board
- Tests done both with eyes open and eyes closed

Technical Specifications

- Working Weight Range: 50-300 lbs.
- Weight of device: 26 lbs.
- Bluetooth range: 30 ft. recommended, 80 ft. maximum
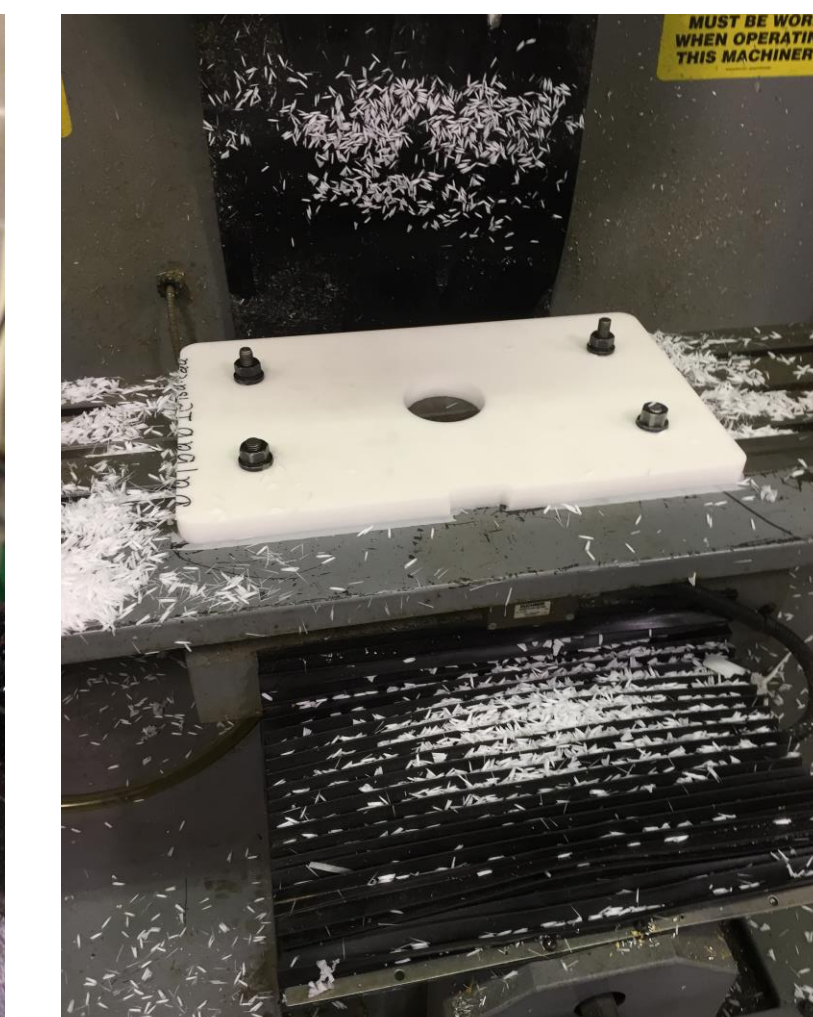
Safety

- To be used in conjunction with physical therapist
- Non-slip tape to increase grip on the top plate
- Warning labels posted to the board
- Safety manual included

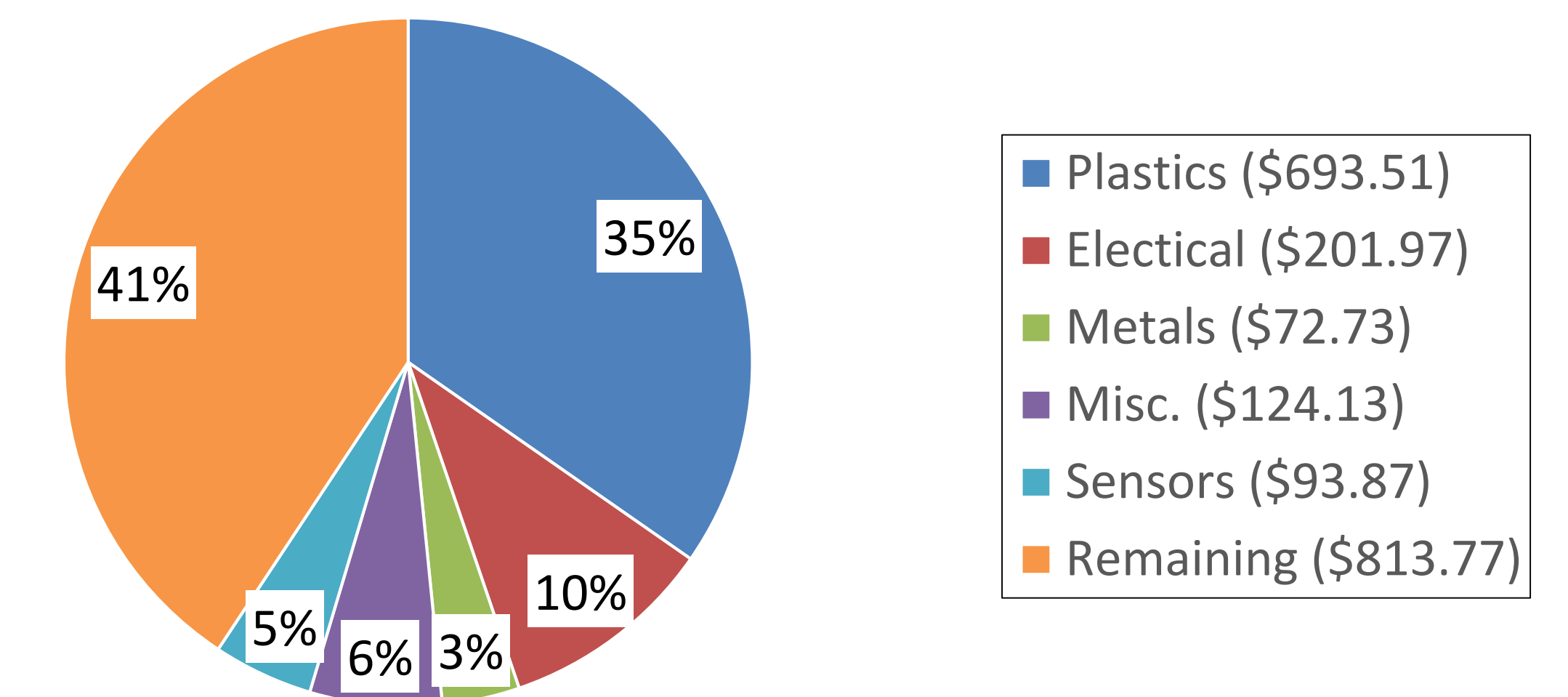## Manufacturing and Assembly

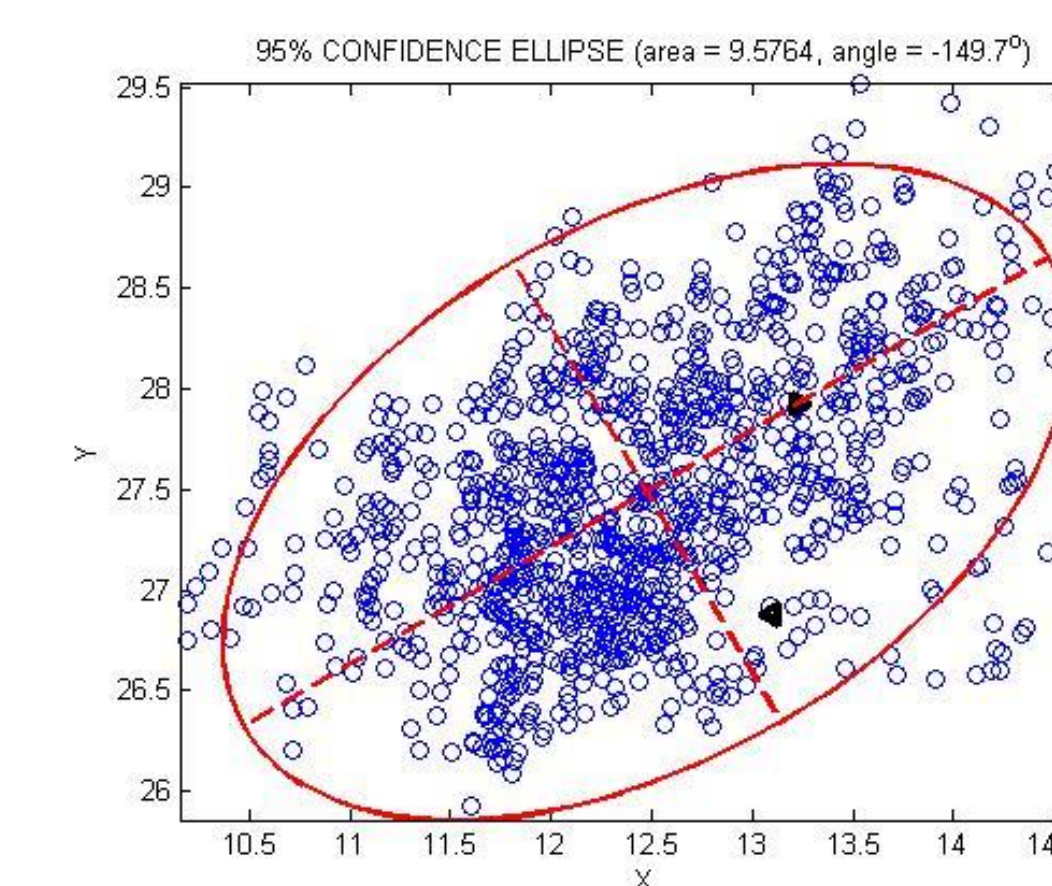Milling of Components   CNC of plastic   3D printing of plastics

Budget

- Plastics ($693.51) — 35%
- Electical ($201.97) — 10%
- Metals ($72.73) — 3%
- Misc. ($124.13) — 6%
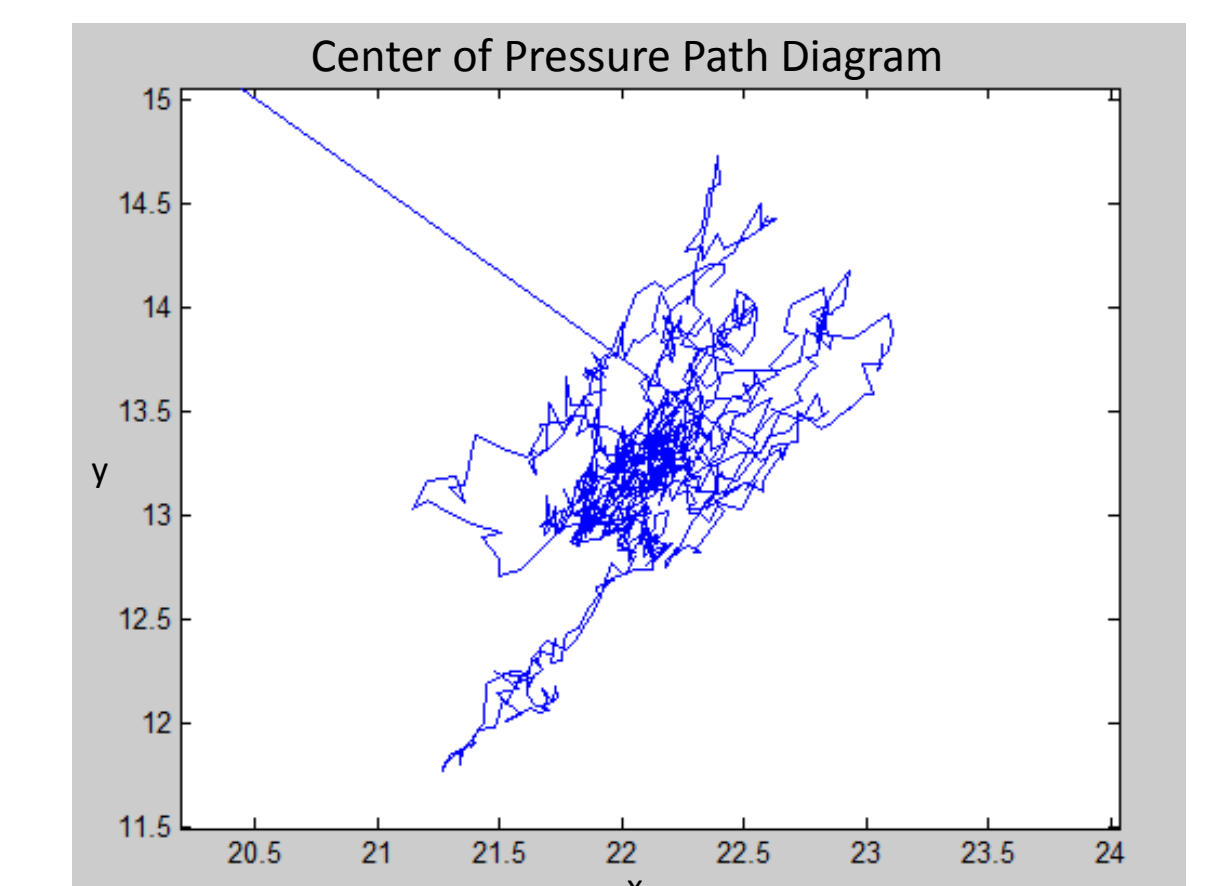- Sensors ($93.87) — 5%
- Remaining ($813.77) — 41%

Results and Conclusions

- Center of Pressure 95% ellipse
- Center of Pressure path diagram
- Daily calibration

Right Foot Eyes Open-Healthy User-95% Ellipse   Path Diagram

Sponsors: Université Libre de Bruxelles, Dr. Serge Van Sint Jan

Advisor: Dr. Daniel Hayes