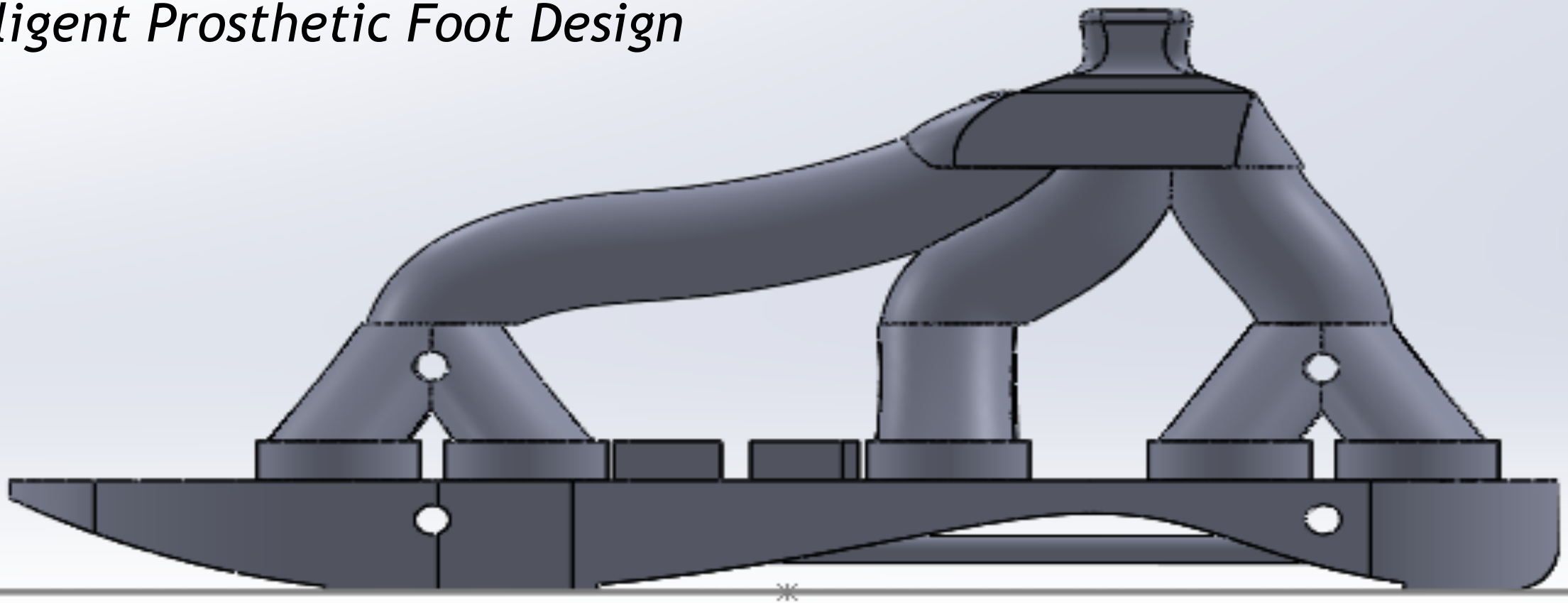
BIOKNEEK

Intelligent Prosthetic Foot Design



Anthony Harshil James Tomás

Inspiration

Hearing the problems Francisco faced with athletics we wanted to find a solution to enhance his mobility

After brainstorming with Francisco , we realized that maintaining weight distribution was a problem for him

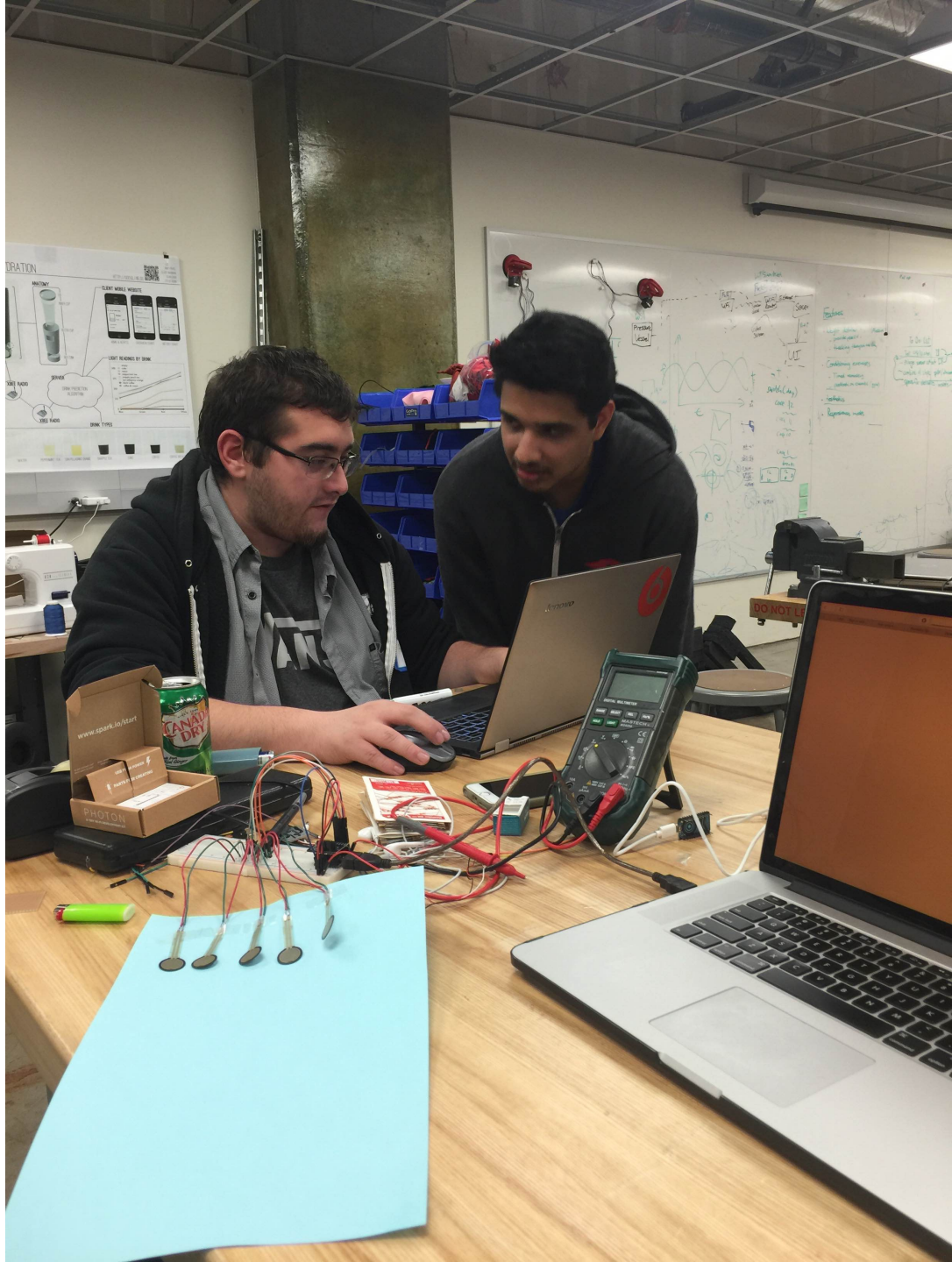
We also discovered there was plenty of room to innovate, augment his prosthetic leg

Medical Consequences

Francisco identified some of the problems with incorrect weight distribution

Difficulty walking, Back pain, Muscle atrophy, Poor posture

Previous methods to overcome this difficulty: Physical therapy, Habitual correction



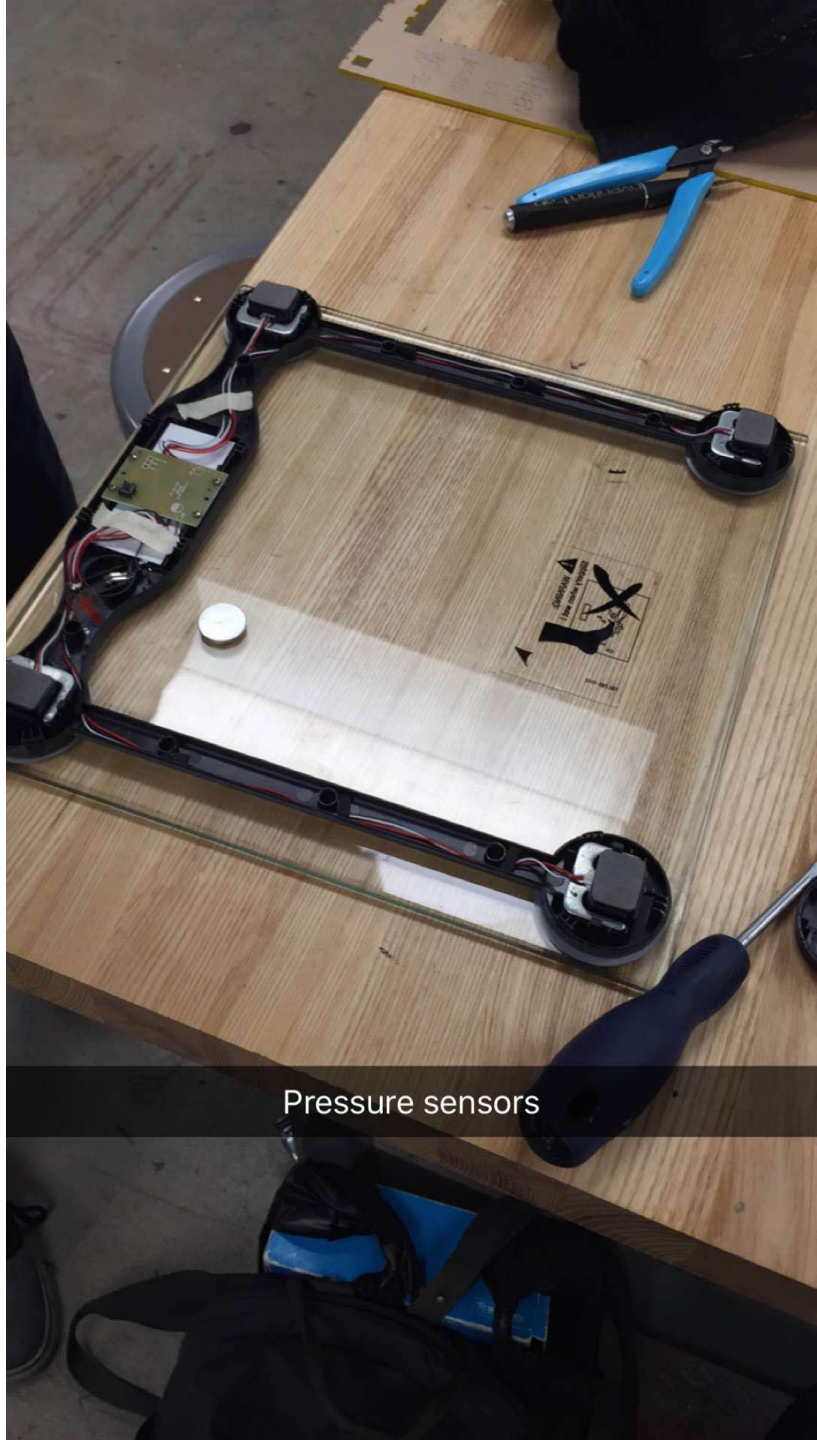
Solution

Augmented prosthetic foot that gives haptic feedback

We collaborated with Francisco for iterative design by using his foot as a base model

First design we tried to use 4 load sensors hacked from a bathroom scale

Given space constraints we decided to use thin Force-Sensitive Resistor (FSR)



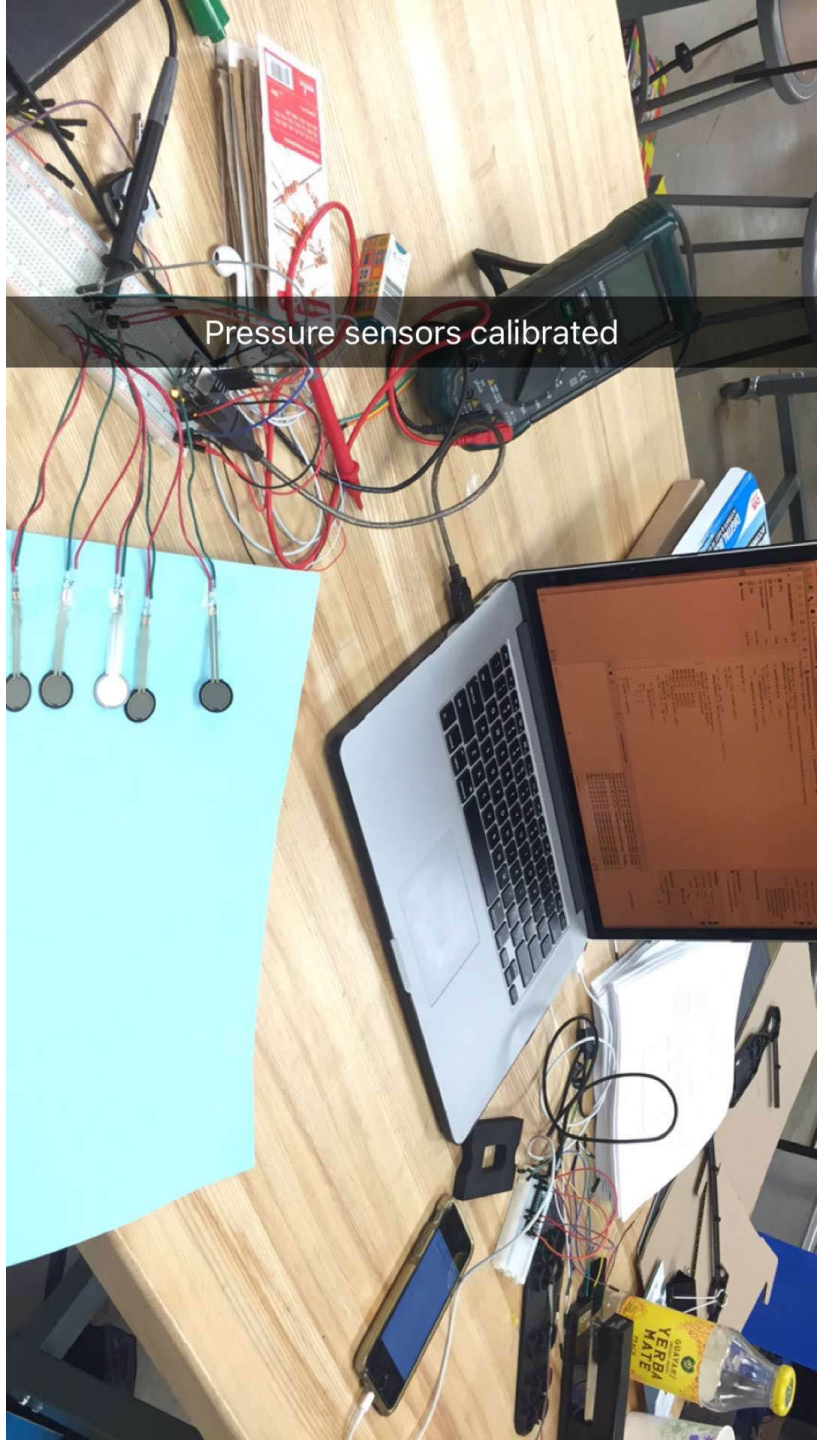
We first modeled Francisco’s prosthetic to in order to tailor a solution for his needs

We 3D modeled an arch that distributed the weight from his leg to 10 sensor locations in a sole modeled from Francisco’s foot

The 10 sensor’s were calibrated to Francisco’s weight distribution

Sensors detect incorrect weight distribution, and trigger a Bluetooth-enabled Arduino

An iOS app interfaces, and causes a subtle vibration




3D Solutech Printer Filament
3D Solutech Printer Filament
PLA ONLY PLA ONLY PLA ONLY
Here is a sign
I can
ABS ONLY ABS ONLY ABS ONLY
Royston 306
ULINE


CRYSTAL GEYSER