Smartbell

Movement Characterization for Strength Athletes

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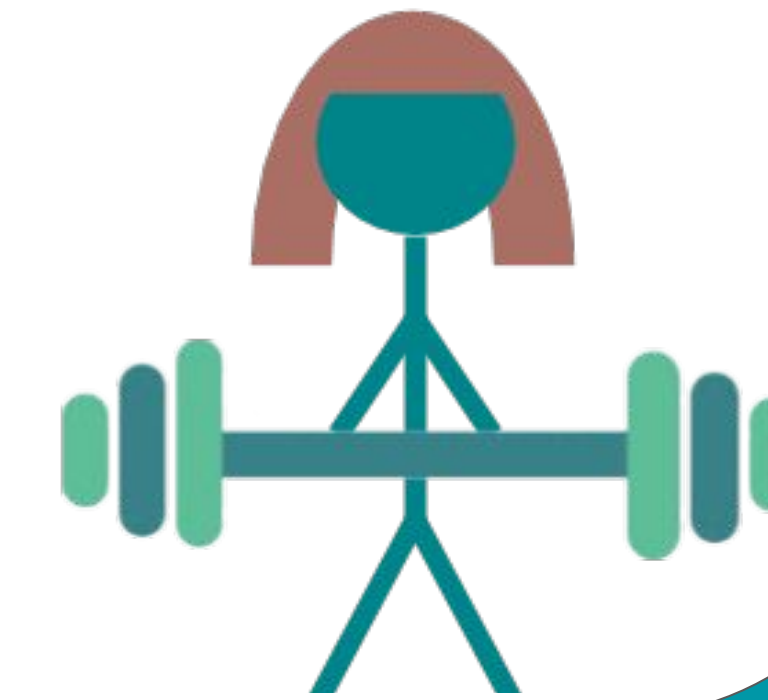
Smartbell

Introduction

The goal of Smartbell is to measure an athlete's barbell metrics, tracking their movements and number of reps over time in an iOS application that helps them track progress.
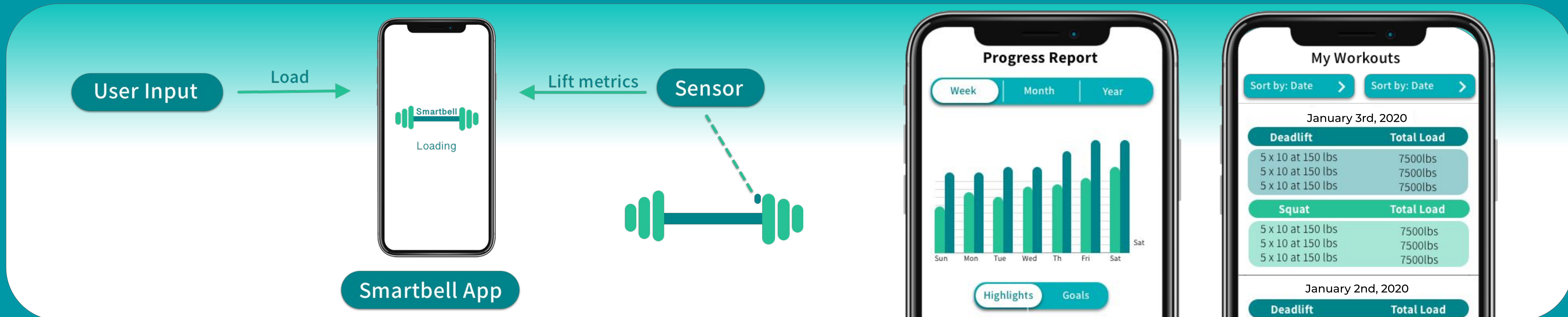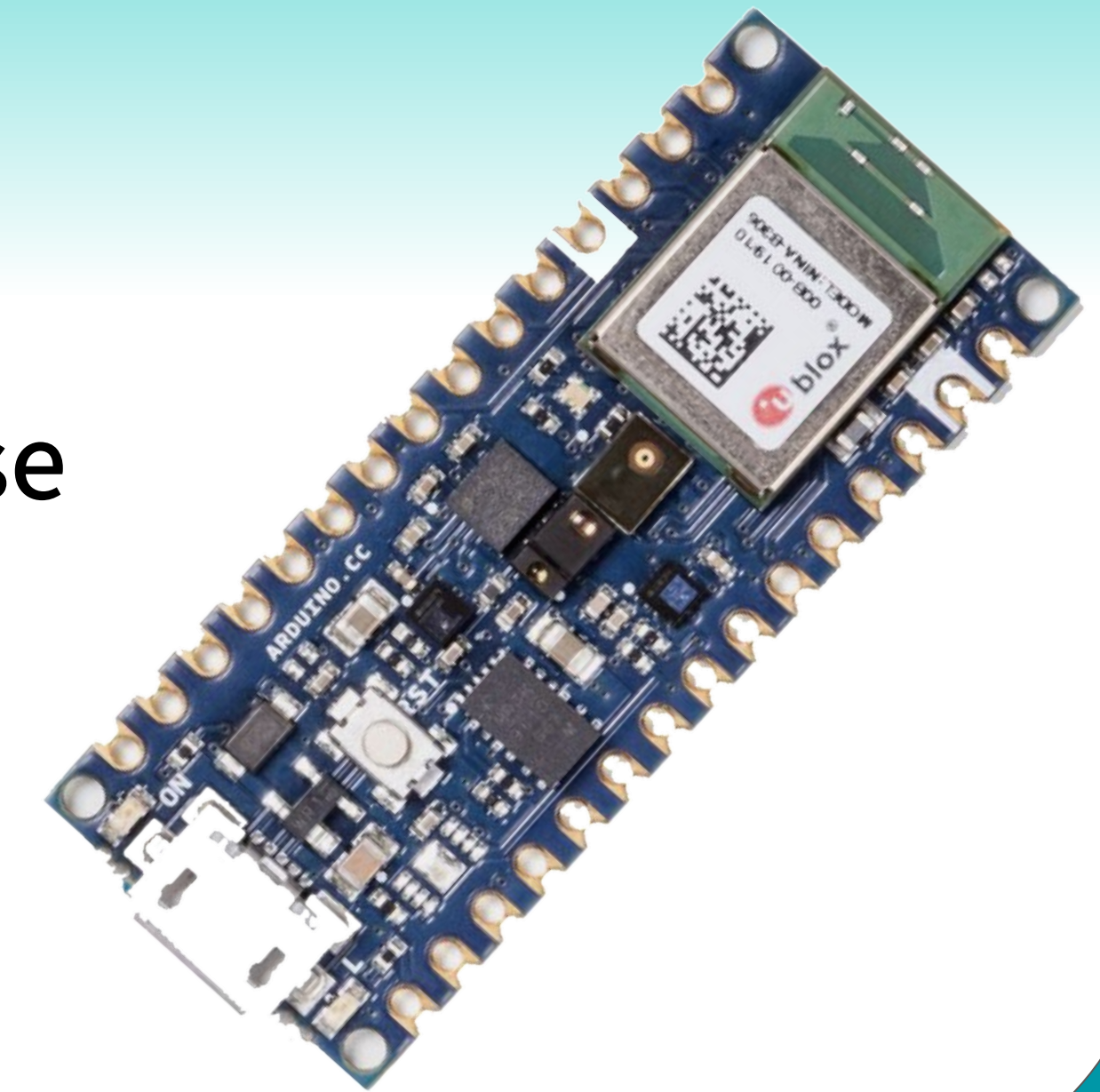
Goals

- Characterize squat/deadlift barbell movements
- User interacts for data acquisition
- Repetition/movement data sent over BLE
- App UI displays sensor readings

Challenges

- Machine learning → Swift
- Train ML algorithm
- Arduino Nano 33 BLE Sense
- Working remotely
- Real-life integration

User Input — Load → Smartbell — Loading ← Lift metrics — Sensor

Smartbell App

Progress Report

| Week | Month | Year |

Sun Mon Tue Wed Th Fri Sat

Highlights | Goals

My Workouts

Sort by: Date > | Sort by: Date >

January 3rd, 2020

Deadlift	Total Load
5 x 10 at 150 lbs	7500lbs
5 x 10 at 150 lbs	7500lbs
5 x 10 at 150 lbs	7500lbs

Squat	Total Load
5 x 10 at 150 lbs	7500lbs
5 x 10 at 150 lbs	7500lbs
5 x 10 at 150 lbs	7500lbs

January 2nd, 2020

Deadlift	Total Load

Accomplishments

- Filter real-time accelerometer data
- Train Keras ML algorithm
- Keras (Python) → CoreML (Swift)
- BLE data transfer
- iOS/Swift app

Future Directions

- ML model for all barbell movements
- Database implementation
- Custom Smartbell sensor
- Automatic sensing of user workouts

Acknowledgements