



# Sensor-Enabled Push-Up Progress Tracking

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Presented by:

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# Overview



Today, we'll explore how sensors and acceleration data can revolutionize push-up tracking using the matlab app sensors on our phones

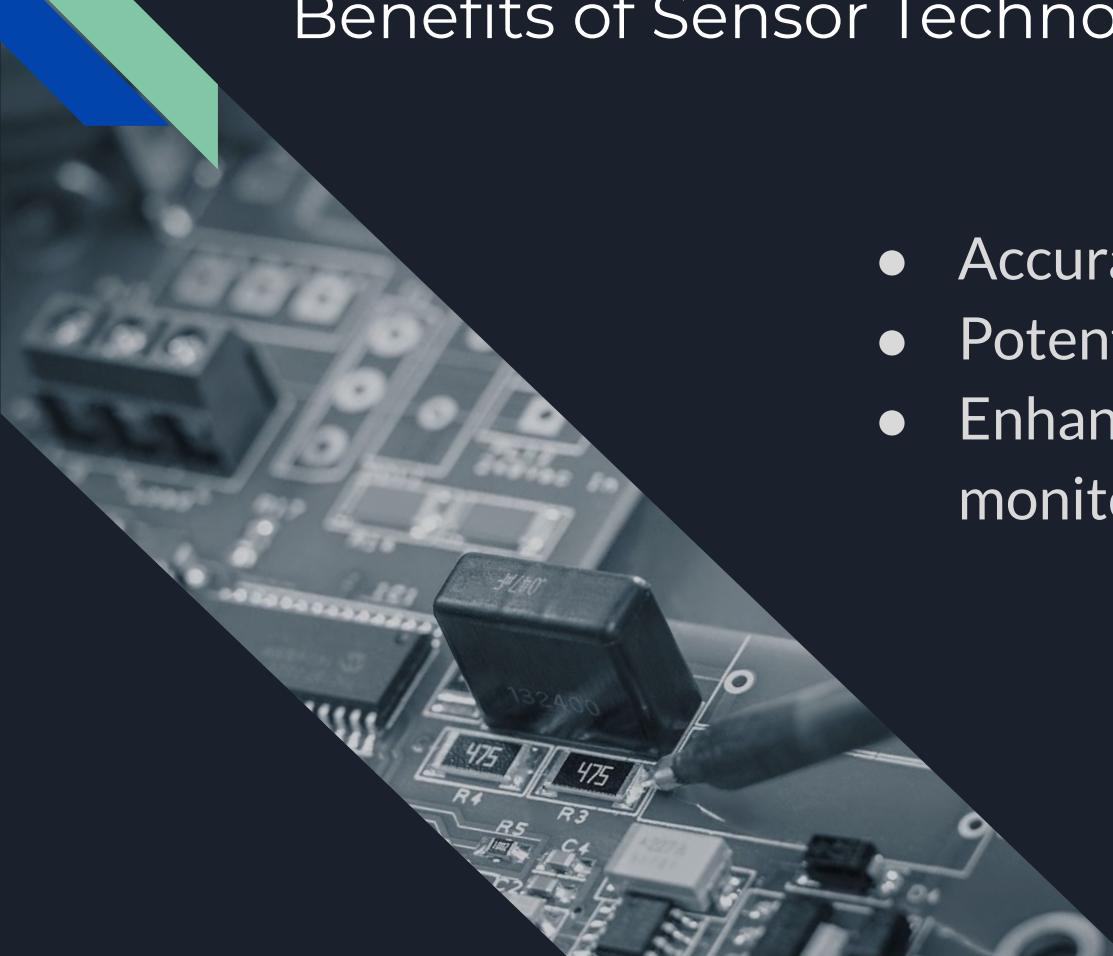


# Team Members

Xuan: Coder

Anthony: Markerter/Assistant coder

Kenneth: Athlete



# Benefits of Sensor Technology

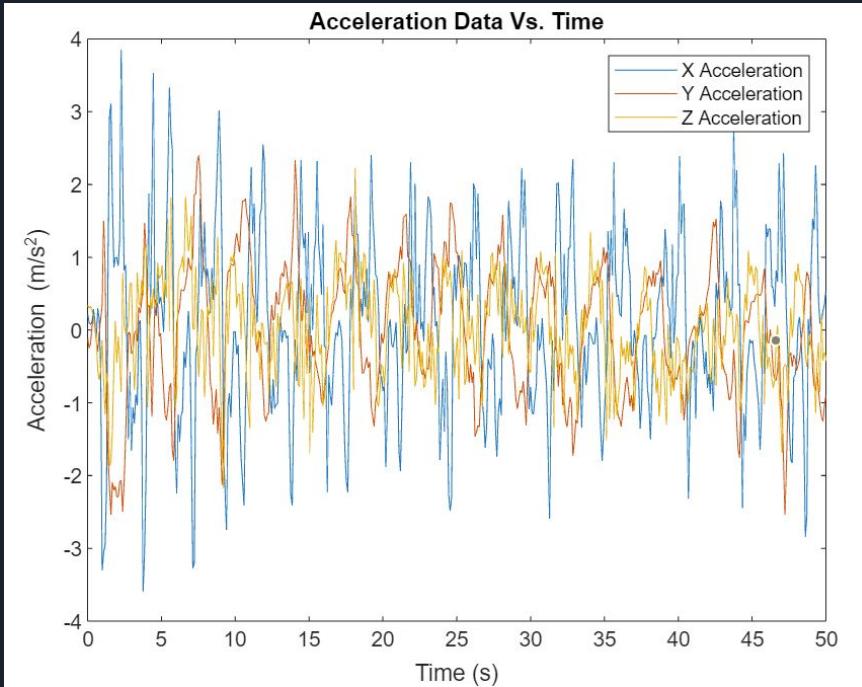
- Accurate data
- Potential Real-time feedback
- Enhanced performance monitoring.



# How Sensors Work

- Athlete Kenneth's Push-Up Procedure:
- Assume push-up start position.
- Log acceleration using MatLab App on phone.
- Data Collection:
- Capture X, Y, Z positions and Timestamp.
- Data Upload and Visualization:
- Transfer data to Matlab Live Editor database.
- Plot values to generate a graph for analysis.

# Making Sense of Graphs

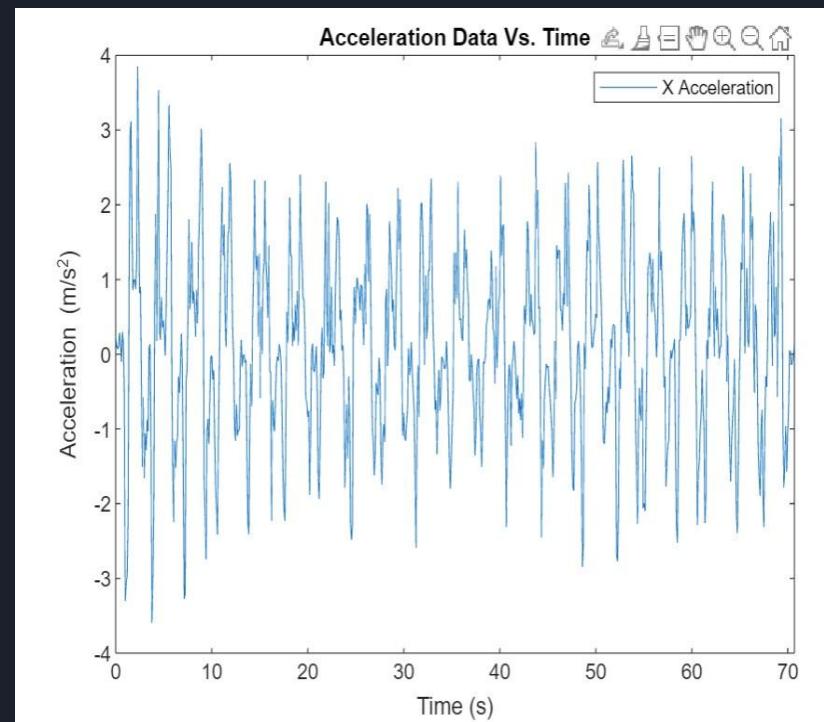
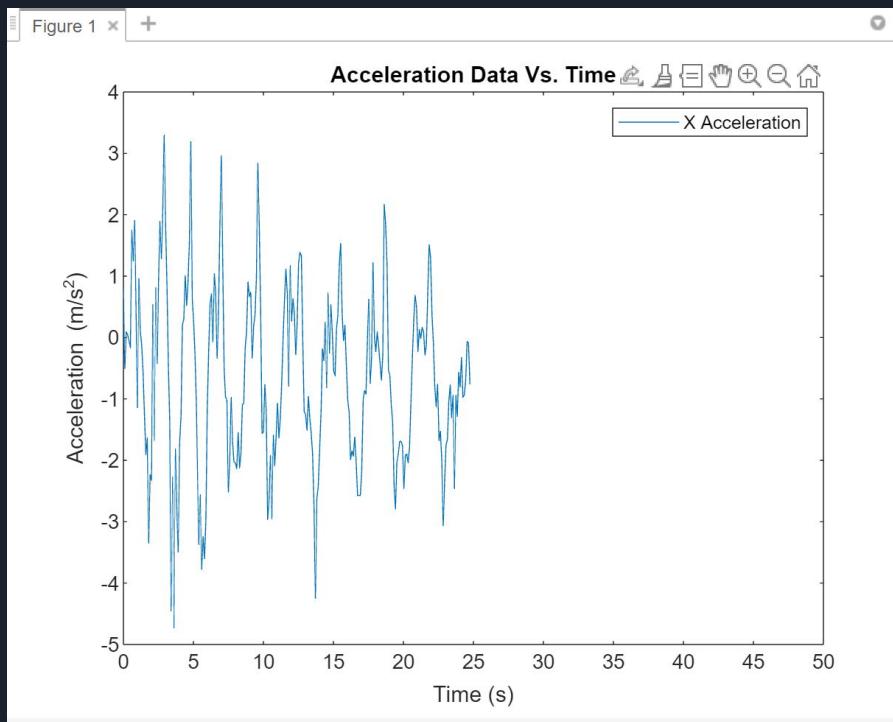


Initially we had plotted X,Y,Z against Time, and started to determine what data was relevant to counting pushups.

The current graph is too noisy and determined we only needed to plot our Z-axis to measure our athlete going up and down

# Using Z-axis to view our PushUps

Steady reps Vs. Max Reps





# What Actually Happened

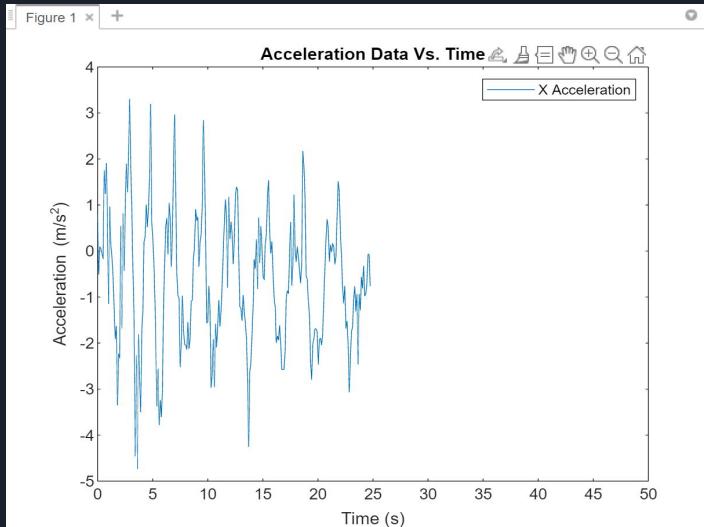
- Code Challenges:
  - Identifying push-up count in trials.
  - Accounting for sensor accuracy (10Hz sampling rate).
- Guidance from Superiors:
  - Acknowledged zero acceleration limitation.
  - Developed threshold to handle deceleration.
- Accurate Push-Up Count:
  - Utilized thresholds for proper rep determination.
  - Counted each pair of stops as one complete push-up.

# Thought Process behind the Code

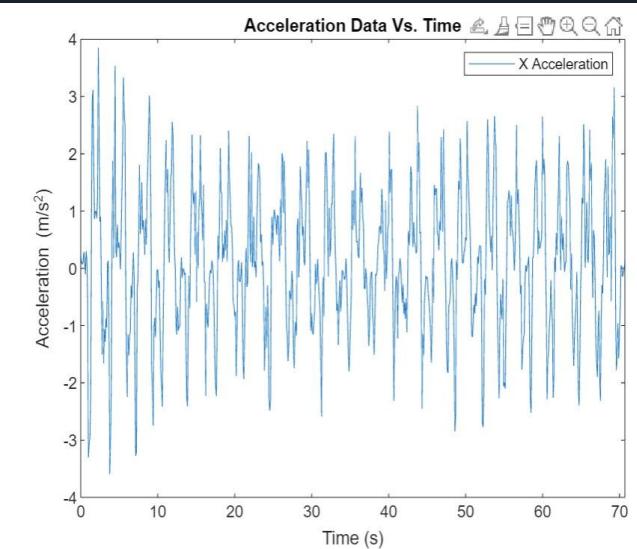
- Account for gravity 9.81 to remove the effect of gravity, makes our slides look cleaner
- When our acceleration reaches a set point (coming to a stop) we count that as one of the stops, which in push ups its 2 stops, one at the height of the rep and one at the bottom
- We determine that our best threshold to count a pushup was 0.125;
- We never truly reach a zero which is the reason behind the threshold



# Results



Pushup done:  
9.5000



>> test  
37.5000



Any questions?

