Center-of-Balance Digital Swing Trainer Project

Sponsor: Byron Williams, Fairways and Greens

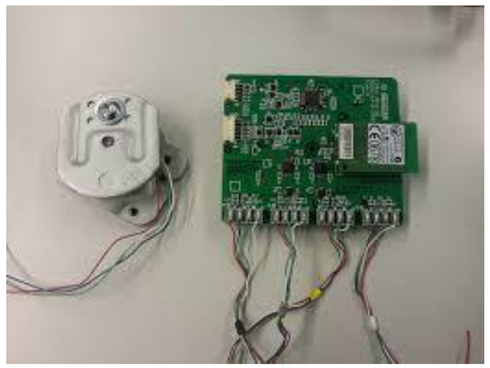
Background

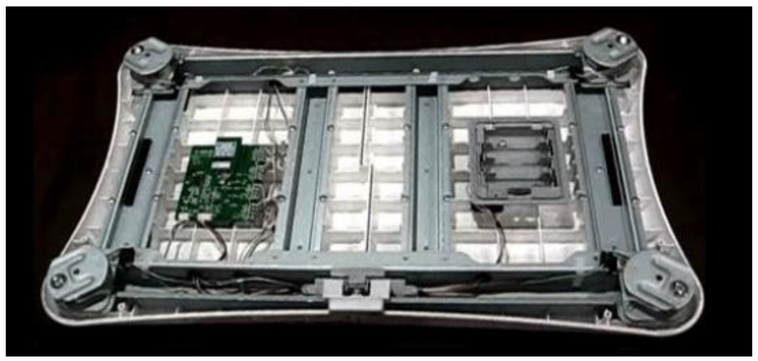
Golf is an incredibly difficult game, and a swing that is even slightly off-balance can be detrimental to the shot's success.

To find the solution to the inconsistent contact many golfers face, we set out to create a device that tracks the user's center of mass throughout their swing and displays the results in an intuitive format.

Research

To begin, we need to find an accurate and cost-effective method to measure the pressure applied by the user when swinging. We found the balance boards used with the Nintendo Wii to fit this criteria.





Development

The Wii board was rewired into a Raspberry Pi where the voltage across each load cell can be recorded.

We then added different known amounts of weight to each load cell and recorded the voltage to calibrate the device.

With the calibration complete, the center of mass can easily be calculated and represented in a graph

Engineering Standards

Load Cell Standard
ASTM E4, ISO 7500-1

Implementation and Presentation

With the center-of-mass calculated for the user's swing, a graph is created showing the transition of the center-of-mass throughout the entire swing. A color gradient is used for the line to represent the passage of time.

While this is useful to see the basic transfer of weight, a more comprehensive analysis is needed to see the weight distribution at specific points in a swing.

We utilized a high-speed camera to show frames at different points in the swing alongside the center-of-mass at that specific moment.

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