

**ECE Capstone program
Spring 2018
Project Abstract & Info**

Please provide the following information to be shared with on capstone information exchange platform:

1. Project number: S18-48

2. Project title (as will appear on the poster): Workout Form Classifier

3. Team members:

Alexander Tang

Harry Li

Philip Mak

Samuel Cheung

4. Adviser(s) name(s):

Professor Roy Yates

5. Up to 5 keywords that will help to classify the project scope:

Motion-sensing, weightlifting, machine learning

6. Project abstract (up to 250 words) to be shared with judges:

Lifting in a gym can be challenging because of the technique required for some workouts. Inexperienced lifters can easily hurt themselves with improper form; squatting and deadlifting especially can easily lead to back injuries. Improper form can only be corrected through proper training, which can be expensive through a personal trainer. Our goal is to create a system that can detect a weightlifter's form, classify whether the form is good or bad, and offer suggestions for improvement. Our proof of concept focuses only on deadlifting.

We used Microsoft Kinects to detect form by inferring the skeleton based on the weightlifter's outline. Using this skeleton, we can plot the points of major points such as head, shoulders, lower back, hip, and knees.

After collecting samples of good and bad form from the Rutgers Powerlifting Club, we used machine learning to create a model that can classify deadlifting form.

We created an app that can read the data from the Kinect, check with the form classifier, and offer feedback to the weightlifter with tips for improvement.