

## **An Experimental Comparison of Object Tracking Data using Microsoft Kinect™ and Pixy CMUCam5**

Undergraduate engineering students need more exposure to visual, “real world” examples within the classroom environment. For this purpose, we aim to develop portable laboratory models in order to supplement the instruction of undergraduate mechanics courses such as Dynamics. These models will be designed to simulate concepts such as acceleration, static and kinetic friction, as well as projectile motion, which require a precise way of capturing and presenting the kinematic data. Our solution is to use a motion capture device to collect, compile, and process positional data over a period of time. These positional data points will then be processed within our proprietary software to calculate the kinematic variables such as velocity and acceleration. There are several off-the-shelf motion capture devices on the market. Our research has revealed that two of these devices, Kinect™ (Microsoft) and Pixy CMUCam5 (Carnegie Mellon University and Charmed Labs), are the potential candidates due to their high accuracy in object tracking and popularity in academic settings. Our objective in this study is to determine which motion capture device best suits the portable models that we develop to incorporate within classrooms. We achieve this by performing an experiment in which a motion capture device tracks a copper collar as it slides down a wooden rod at varying angles. The positional data that the device inputs is used in order to find the acceleration of the copper collar; we then compare this value to the theoretical value of acceleration in order to determine the relative error of the captured motion. Factors such as the accuracy of each device, as well as other more subjective influences (cost, up-to-date software/hardware support, ease of coding etc.) are compiled into a decision matrix in order to determine the device that best suits our overall goal.