

EE267 project proposal

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6 May 2016

1 Introduction & Motivation

We started off wanting to design an impressive, immersive demo based off Star Wars lightsaber fighting, and quickly realized that it would require several modalities: hand tracking, position tracking, sound, networking (for multiplayer fighting), UI, model design, and much more. We are deciding to focus on solving the first of these modalities: hand tracking first then position tracking (if we have time) because we feel these modalities lie at the core of such a demo.



Figure 1: Google Chrome Star Wars Experiment

2 Milestones & Timeline

- **Milestone 1:** No position tracking - just defend bullets using lightsaber orientation (using iPhone/IMU on the wrist) + head tracking
- **Milestone 2:** Position tracking using Kinect + defend bullets using lightsaber orientation
- **Milestone 3:** Position tracking using Kinect + fight against actual opponent

In terms of the timeline, we plan to spend the next two weeks building up a nice environment and integrate the iPhone/IMU into our application. We will then spend the next week doing position tracking using the Kinect (the Kinect will *not* be head mounted, instead it will be placed in front of the user).

3 References

- [1] Michael Fleder, Sudeep Pillai, and Jeremy Scott. “3D Object Tracking Using the Kinect”. In: *MIT CSAIL 6.1* (), p. 870.
- [2] Edgar Kraft. “A quaternion-based unscented Kalman filter for orientation tracking”. In: *Proceedings of the Sixth International Conference of Information Fusion*. Vol. 1. 2003, pp. 47–54.
- [3] Jamie Shotton et al. “Real-time human pose recognition in parts from single depth images”. In: *Communications of the ACM* 56.1 (2013), pp. 116–124.