

Evaluation of Gesture-Based Controls for Robotic Systems

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Acknowledgements

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Abstract

This thesis aims to test the effectiveness/ease of use of smartphone gesture-based robotic control systems vs. traditional control systems. Robotic control systems are becoming more common, especially in the military. Arm and hand gestures are typical human forms of communication, so applying that to a robotic control system can yield a more intuitive system. With military applications, there are lives at stake, so having the most efficient, intuitive control system can make a large difference in the success of a mission and the safety of the soldiers involved. "Interactions and Training with Unmanned Systems and the Nintendo Wiimote" (Varcholik, Barber, and Nicholson) describes a gesture based control system that uses the Nintendo Wiimote to determine arm/hand gestures and control a robot. I propose to create a gesture based system using a smartphone and conduct an experiment similar to Varcholik, Barber, and Nicholson, collecting survey data from the participants on the the effectiveness and ease of use of each system.

Chapter 1

Introduction

This thesis aims to test both the perceived and actual effectiveness and ease of use of smartphone gesture-based robotic control systems vs. traditional control systems.

The need for human-robot interfaces is increasing rapidly. The military has already begun using unmanned vehicles in several different arenas (air, ground, water). In order to develop the most efficient human-robot interface, we turned to a traditional form of human-human communication, arm and hand gestures. Arm and hand gestures are typical human forms of communication, so applying that to a robotic control system can yield a more intuitive system. With military applications, there are lives at stake, so having the most efficient, intuitive control system can make a large difference in critical moments and improve the safety of those involved. A more intuitive system will also reduce the training time and expenses for the operators of the vehicle.

Chapter 2

Related Work

Chapter 3

Control Systems

Chapter 4

Human Factors Experiment Design

Chapter 5

Results

Chapter 6

Conclusion

Bibliography

- [1] Paul Varcholik, Daniel Barber, and Denise Nicholson. *Interactions and Training with Unmanned Systems and the Nintendo Wiimote*, volume 2008, pages 1–9. NTSA.