UNIVERSITY OF SOUTH FLORIDA

Defense of a Doctoral Dissertation

Force Feedback and Intelligent Workspace Selection for Legged Locomotion Over Uneven Terrain

by

John Rippetoe

For the Ph.D. degree in Computer Science & Engineering

Legged robots present an incredible opportunity for humanity to conduct dangerous operations such as disaster recovery and planetary exploration without ever placing themselves in harms way. The ability of a leg to more freely dictate its shape, orientation, and length gives it the mobility and adaptability necessary of a system intended for operation outside of a controlled environment. However, there is currently an immense gap between what is possible of legged systems and their current set of capabilities. To close that gap, researchers have posed terrain classification methods that give robots the ability to learn about their environment and make intelligent decisions while walking. While current research has demonstrated methods for detecting terrain height using vision, there exists no work on giving visually blind robots the same ability. This works presents a collection of three contributions aimed at giving a visually blind robot the tools necessary to sense and understand terrain height information for its environment. Results from a variety of tests in simulation and hardware prove the effectiveness of the approach and offer a path towards more intelligent control.

Examining Committee

Zhixin Miao, Ph.D., Chairperson
Yu Sun, Ph.D., Co-Major Professor
Luther Palmer, Ph.D., Co-Major Professor
Kyle Reed, Ph.D.
Rajiv Dubey, Ph.D.
Stephen Deban, Ph.D.

Wednesday, March 20, 2019
1:30 PM
ENB 313

THE PUBLIC IS INVITED

Publications