

The Field Robotics Center

Seminar Series

Fri, April 18

GHC 2109

1:30-2:30pm



Food and Drinks will be served

Chris Cunningham
PhD Student
Robotics Institute

Fusion of Visual and Thermal Sensing for Traversability Prediction

Abstract: Loose, granular soil can trap planetary rovers causing costly delays and even mission-ending failures. Soft Martian soil trapped Opportunity for more than a month and ended Spirit's mission on Mars. This research seeks to predict loose, hazardous terrain before rover entrapment using a combination of visual and thermal sensing. Non-contact traversability prediction will improve both the safety and speed of planetary rovers. This talk presents a method to predict terrain traversability by estimating the thermal diffusivity of terrain using a moving, continuous-wave laser. This approach enable differentiation between different densities of the same material, which can have a significant effect on traversability. Thermal diffusivity is estimated by fitting the temperature response of terrain to an analytical model. Experimental soil strength measurements are used to validate that this measurement is correlated traversability. Finally, thermal sensing is used in combination with visual features to show an improvement in terrain classification over strictly visual techniques.

Speaker Bio: Chris Cunningham is a Ph.D. student in the Robotics Institute advised by Red Whitaker. He received his B.S. degree in electrical engineering from the University of Virginia in 2012. His current research focuses on terrain classification and slip prediction for planetary robots.



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