UW CENTER FOR
PATTERN ANALYSIS AND MACHINE INTELLIGENCE

GRADUATE SEMINAR SERIES

An experimental platform for real-time SLAM, path planning, and object detection algorithms

Speaker: Arun Das, Frank Imeson, Christian Scharfenberger, Andy Wong

Date: December 12, 2012

Time: 4:30 pm – 5:00 pm

Place: E5 (4128) Refreshments will be served

Abstract :

UW Space Robotics Team will present two algorithms developed for and results from their participation in the NASA(2012) Sample Return Robot Challenge. The main objective of the challenge is to develop a fully autonomous rover to locate and retrieve specific sample types from unknown locations over a wide and varied terrain, and return those samples to the starting position. This is in a GPS-denied environment, under a time constraint and with limited mapping data. The two algorithms are a visual saliency model for detecting the presence of any relevant object in the frame, and a real-time method to convert 3D point cloud data into a 2D drivability map.

Key challenges for the 2013 competition, for which we are seeking consultants and volunteers, will also be presented. One primary task is the "kidnapped robot problem". That is, with very limited apriori knowledge, the robot must localize itself against a set of visual features in the environment in order to determine its position and orientation in the global frame. Another challenge is to probabilistically detect and classify candidate samples when the sensor readings have varying reliability. Once a map is attained and localization achieved, there then remains the issue of path planning an efficient course for search. Currently, a sweeping method is utilized whereby the map is broken down into sectors, and connected with solutions for a TSP (traveling salesman problem) to minimize the amount of path overlap.

WATERLOO ENGINEERING

CPAMI