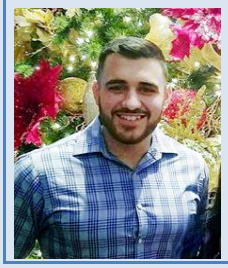
TOPIC	Task Allocation Using Parallelized Clustering and Auctioning Algorithms for Heterogeneous Robotic Swarms Operating on a Cloud Network
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Sensor Fusion, Optimization, Swarm Robotics
SPEAKER	Jonathan Lwowski, PhD Student, The University of Texas at San Antonio
DATE	Friday February 10, 2017
TIME	3:00 – 4:00 P.M. (EST)
VENUE	Fort IRC 410, North Carolina A&T State University, UTSA and SIPI will be joining through video-conferencing
FEES	No Charge

SYNOPSIS

In this presentation, a novel centralized robotic swarm of heterogeneous unmanned vehicles consisting of autonomous surface vehicles and micro-aerial vehicles is presented. The swarm robots operate in an outdoor environment and are equipped with cameras and Global Positioning Systems (GPS). Manipulations of the swarm demonstrate how aspects of individual robotic platforms can be controlled cooperatively to accomplish a group task in an efficient manner. We demonstrate the use of air-based robots to build a map of important features of the local environment, such as the locations of targets. The map is then sent to a cloud-based cluster on a remote network. The cloud performs clustering algorithms using the map to calculate optimal clusters of the targets. The cloud then performs an auctioning algorithm to assign the clusters to the surface-based robots based on several factors such as relative position and capacities. The surface-robots travel to their assigned clusters to complete the allocated tasks. Lastly, we present the results of simulating our cooperative swarm in both software and hardware, demonstrating the effectiveness of our proposed algorithm.

ABOUT THE SPEAKER



Jonathan is a first year Electrical Engineering Doctoral student at the University of Texas at San Antonio, with research focus on controls. He completed his B.S. in Computer Engineering at The University of Texas at San Antonio in May of 2016. His research interests include cooperative control, machine learning, sensor fusion and cloud computing. Email: jonathan.lwowski@gmail.com