TOPIC	Data Analysis, Estimation, and Fault Detection of Large-scale Autonomous System of Vehicles Using Neural Networks
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Data Analytics, Big Data, Robotics, Fault diagnosis, and Neural Network
SPEAKER	Parsa Yousefi
DATE	Friday June 23, 2017
TIME	3:00 – 4:00 P.M. (EST)
VENUE	Fort IRC 410, North Carolina A&T State University, NCAT and SIPI will be joining through video-conferencing
FEES	No Charge

SYNOPSIS

A data analytic approach is commonly used to obtain a non-parametric model for Large-scale Autonomous Systems of Vehicles (LSASV). To achieve this paradigm, two challenges are confronted; one is the ***latency*** in receiving data when all systems need to collaborate with each other, and the other is the ***occurrence of faults*** due to failure in sensors, computation, etc.

In this seminar, a summary of data analytic paradigms is presented, followed by an introduction of the recurrent neural network, long short-term memory (LSTM). The first application of LSTM is estimation and prediction of future responses of a system of vehicles via reducing the effect of latency on the network. By simulating latency, the datasets that are the output errors gathered by UAVs and UGVs are categorized and divided into two parts for training and testing of the neural network. As a result of this section, a comparison between actual and predicted data and the accuracy of the aforementioned method will be demonstrated.

In the second part, LSTM is utilized to detect faults from multi-agent systems' data. To fulfill this approach, two robots—one as the reference with the label of "Helper" and the other as the "Faulty"—are considered. Data captured from odometry sensors of two Kobuki TurtleBot 2 robots are fed into the neural network (LSTM) to train the model to result in a comparison of the detected fault state and actual state. An extended version of Agent-Speak agent-oriented programming language (JASON) will later be used to program the "Helper" and "Faulty" behaviors of the robotic agents.

ABOUT THE SPEAKER

Parsa Yousefi received his B.Sc. from Sharif University of Technology in 2015 in the field of Electrical Engineering. He joined the ACE Team as a direct Ph.D. student of Electrical and Computer Engineering Department, at the University of Texas at San Antonio in spring 2017. His main research interests are Cloud Computing, Machine Learning, and their applications in Control Systems.