TOPIC	**Formal Verification and the Applications to Control of Autonomous Vehicles**
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Testing and Evaluation of Autonomous Vehicles, Formal Verification, Hybrid Systems, and Aerial and Ground Robotics
SPEAKER	Tadewos Getahun Tadewos
DATE	Friday August 4, 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

The operation of autonomous systems falls under the category of safety critical systems, for which a complete test of the system is mandatory before deployment. On the contrary, a complete test may require the system to undergo many (infinite) scenarios to cover all possible situations, which is practically impossible. The situation for multi-agent systems, including a team of heterogeneous autonomous vehicles, is even more challenging.

Formal verification and validation addresses this problem by modeling a system mathematically and employing optimized automatic (semiautomatic) theorem provers or model checkers to guarantee the correct (desired) behavior of a system. Theorem prover unlike simulation, tests a system using logical inference and axioms to go through all input space of an operation in a system. On the other hand, model checker (applicable only for finite systems) systematically iterates through the entire input space of a system for validating system property satisfaction.

In reviewing formal verification and validation techniques, this talk will introduce the overall methodology of applying theorem provers and model checkers to a system. This includes using formal languages for specifications (e.g. LTL- Linear Temporal logic), modeling (e.g. DFA – finite automat) and verification. It will be further supported by an application of a formal method for autonomous vehicles.

ABOUT THE SPEAKER

Tadewos Getahun Tadewos received his Bachelor of Electrical and Electronics Engineering from the Addis Ababa University in 2010. He later received his Master of Science in Electrical Engineering from Polytecnico di Torino in 2014 in Italy. In 2016, he began attending North Carolina A&T State University to pursue his Ph.D. His research interests include Testing and Evaluation of Autonomous Vehicles, Formal Verification, Hybrid Systems, and Aerial and Ground Robotics. He is a member of the Autonomous Cooperative Control of Emergent Systems of Systems (ACCESS) Lab and Testing, Evaluation and Control of Heterogeneous Large-scale systems of Autonomous Vehicles (TECHLAV) Center.