

Motivation, Emotion, and Learning for Human-Robot Interaction: A Spectrum of Research at Georgia Tech's Mobile Robot Lab

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The Georgia Tech Mobile Robot Laboratory has been studying the biological basis of behavior regarding its application to robotics systems for almost 25 years. This talk first presents a trajectory of relevant research drawn from our studies of motivational behavior and emotion using a schema-theoretic approach and its application to human-robot interaction. Included are brief overviews of robotic models and implementations of:

- Tolman's schematic sowbug.
- Motivational systems for the praying mantis.
- Attachment theory as developed by Bowlby.
- Canine and human ethology as applied to Sony's AIBO and QRIO.
- Complex time-varying affective systems spanning Traits, Attitudes, Moods, and Behaviors (TAME).

This sequence marks a natural progression of capabilities achieved during this time span leading to our current research.

The major portion of the presentation will address ongoing research using TAME as part of a project funded by Samsung Electronics in involving machine learning, affective behavior, and humanoid robots. The use of case-based reasoning and learning momentum (a form of reinforcement learning) are presented in the context of entraining a humanoid robot to its user over time, with the ongoing goal of creating affective human-robot interaction consistent with creating a life-long partner that can adapt to the varying affective states of its human user over time.

As time will limit the details presented for each of these systems, supporting papers for all of this work are available at:

<http://www-static.cc.gatech.edu/ai/robot-lab/publications.html>