Kaushik Subramanian

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Academic Qualifications

Georgia Institute of Technology — August 2010 - Present
Doctor of Philosophy in Robotics (Computer Science) — GPA - 3.6/4

Rutgers, The State University of New Jersey — August 2008 - May 2010
Master of Science in Electrical and Computer Engineering (ECE) — GPA - 3.57/4

Anna University, India — July 2004 - May 2008
Bachelor of Engineering in ECE — GPA - 72/100

Research Experience

Member of the Socially Intelligent Machines Lab (SIM), GAtech. — August 2010 - Present

Adjunct Member of the Real Life Reinforcement Learning Lab (RL^3), Rutgers. — January 2009 - May 2010

Intern at RWTH Aachen University, Germany — June 2009 - August 2009
Completed a 3 month internship on Humanoid Robot Learning by Demonstration using Gaussian Mixture Models.

Intern at Texas Instruments, India — May 2008 - July 2008
Completed a 3 month internship focusing on Data Compression in Video Encoding Techniques.

Research Trainee at WAran Research FoundaTion, India — June 2006 - May 2008
Completed a 2 year Research Training program with specialization in Signal Processing.

Masters Dissertation

"*HELP - Human assisted Efficient Learning Protocols*" - an analysis into the effect of human interactions on learning algorithms, with focus on methods like Learning by Demonstration and Apprenticeship Learning.
Advisor - Prof. Michael Littman

Publications

Thomas J. Walsh, Kaushik Subramanian, Michael L. Littman, Carlos Diuk: *Generalizing Apprenticeship Learning across Hypothesis Classes.* Appeared in ICML 2010, Haifa, Israel, June 2010.

Workshops

Monica Babes, Vukosi Marivate, Michael L. Littman, Kaushik Subramanian: *Apprenticeship Learning about Multiple Intentions.* Presented at NYAS 2010 Machine Learning Workshop in New York, USA, Oct 2010.

Kaushik Subramanian: *Task Space Behavior Learning for Humanoid Robots using Gaussian Mixture Regression.* Appeared in AAAI 2010, Atlanta, USA, July 2010.

Kaushik Subramanian: *Higher Order Gabor Statistics for Speech and Image Signal Feature Extraction.* Presented at Dhi Yantra 2008, Workshop on Supercomputing and Brain Modeling conducted by the WARFT, India.

Technical Reports

Kaushik Subramanian and Michael Littman: *Efficient Apprenticeship Learning with Smart Humans.* Appeared in AAAI 2010, Atlanta, USA, July 2010.

Working Papers

Kaushik Subramanian, Andrea Thomaz, Charles Isbell: *Learning Options through Human Interaction.* Submitted to AAAI 2011, San Francisco, USA.

Monica Babes, Kaushik Subramanian, Vukosi Marivate, Michael L. Littman: *Apprenticeship Learning about Multiple Intentions.* Submitted to ICML 2011, Bellevue, Washington, USA.

Computing Skills

Programming - C, C++, Java, Python, Matlab
Softwares - ROS, OpenCV, Tekkotsu, Fawkes
Assembly Language - AVR Microcontroller, 8051, 8086, 8085
Operating Systems - Unix and Windows

Completed Projects

MDP-based Planning for a Table-top Search and Find Task (GAtech) December 2010
A novel tree-based task representation was developed to perform table-top search of occluded objects. The problem was modeled as a POMDP and solved to acquire the set of actions that lead to efficient object retrieval. *Advisor - Prof. Mike Stilman*

AAAI 2010 *Learning by Demonstration Challenge* (GAtech) July 2010
A live demonstration was performed of the "Taxi Task" using Apprenticeship Learning. A Mindstorms^{TM}Lego robot was navigated through a discrete world and it was allowed to build a model of the environment. The robot was able to learn the optimal policy from a single demonstration. *Advisor - Prof. Michael Littman*

Interactive Learning with the Highway Car Domain (RL^3 Lab) December 2009
A novel approach was developed where the humans provides high-level state abstractions to learn the task of navigating on a simulated highway. The criteria used by the human was - "states are similar if the same optimal action is to performed in both the states". The interactive abstraction significantly sped-up the performance of the agent. *Advisor - Prof. Michael Littman*

Robot Learning by Demonstration using GMM's (KBSG Lab, RWTH University) July 2009
A behavior acquisition model was developed for the Nao's using Gaussian Regression. After generalizing the kinesthetic demonstrations, the robot was used to imitate constrained reaching gestures. *Advisor - Prof. Gerhard Lakemeyer*

Best Narration Award - Introduction to Reinforcement Learning (RL^3 Lab) April 2009
The Lego Mindstorms was programmed to learn real-time in a deterministic environment and to build a model of the world using concepts of Graph Search and Dynamic Programming. A video tutorial was submitted to IJCAI 2009. *Advisor - Prof. Michael Littman*

Autonomous Object Recognition using Corner Detection (Rutgers) December 2008
Implemented using Corner Descriptors and Geometric Point Matching methods. The advantage of the system was the reduced number of descriptor points as compared to the SIFT algorithm. *Advisor - Prof. Lawrence Rabiner*

Parallel Particle Swarm Optimization (Rutgers) December 2008
Parallel implementation of the PSO algorithm using MPI. The aim is perform a comparative analysis with the sequential algorithm and to test its application for Multi-Agent Systems. *Advisor - Prof. Manish Parashar*

Mobile Video Reference Data Compression (TI) July 2008
Developed transform-based techniques using C to compress the reference data acquired from videos captured using mobile phones. This technique was implemented in the H.264 standard. *Advisor - Mr. Ajit Gupte*

Extra-Curricular Activities

Proficient in Chess.
Trained in singing and can play the guitar and keyboard.
Active participation in Soccer events.
Ardent fan of Origami and Sudoku.