Wil Thomason

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Objective

My primary research interests are in robotics, though I'm also interested in programming languages, algorithms, machine learning, and interdisciplinary efforts among these areas. In particular, I'm interested in algorithms for efficient cooperation in heterogeneous multi-agent scenarios. I want teams of humans and arbitrary robotic systems to be able to work together in a manner which both "feels" natural (i.e. equivalent to or better than working with a team of humans alone) and is efficient and effective (i.e. utilizes differences in capabilities between the agents well, eliminates redundant work, allows for the accomplishment of tasks flexibly and quickly, etc.)

Research Interests

Robotics (planning, human-robot interaction, multi-agent coordination),
Programming Languages (type theory, effect systems, compilers),
Machine Learning (deep learning, reinforcement learning, NLP, ML for robotics)

Education

Cornell University, Ithaca, NY   August 2015 – Present
Ph.D., Computer Science
Relevant Courses: CS 6820: Advanced Algorithms (Fall 2015), CS 6786: Advanced Machine Learning (Spring 2016), CS 6110: Advanced Programming Languages (Spring 2016), MAE 6790: Intelligent Sensor Planning and Control (Fall 2016), CS 6751: Intro to Mobile Manipulation (Spring 2017)

University of Virginia, Charlottesville, VA   August 2012 – May 2015
BS, Computer Science, Mathematics
Relevant Courses: CS 6161: Graduate Design and Analysis of Algorithms (Fall 2014), CS 6610: Graduate Programming Languages (Fall 2014)

Publications

Zero-Shot Learning for Unfamiliar Gesture Recognition. *ISER* (2016)
Wil Thomason, Ross Knepper.
We explore a method for achieving increased understanding of complex, situated communications by leveraging coordinated natural language, gesture, and context. These three problems have largely been treated separately, but unified consideration of them can yield gains in comprehension.
https://www.cs.cornell.edu/~wil/papers/iser2016_unfamiliargestures.pdf

An Accurate Real-Time RFID-Based Location System. *IJRFITA* (2016)
Kirti Chawla, Christopher McFarland, Gabriel Robins, Wil Thomason.
We outline an RFID-based object localization framework addressing challenges of performance and applicability and propose the use of Received Signal Strength (RSS) to model the behavior of radio signals decaying over distance in an orientation-agnostic manner to simultaneously locate a number of stationary and mobile objects.

Awards

NDSEG Fellow   *American Society for Engineering Education*, April of 2017
The National Defense Science and Engineering Graduate (NDSEG) Fellowship is a highly competitive, portable fellowship that is awarded to U.S. citizens and nationals who intend to pursue a doctoral degree in one of fifteen supported disciplines.

NDSEG confers high honors upon its recipients, and allows them to attend whichever U.S. institution they choose. (https://ndseg.asee.org/)

NSF GRFP Fellow *The National Science Foundation*, March of 2017
The NSF Graduate Research Fellowship Program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based Master's and doctoral degrees at accredited United States institutions. (https://www.nsfgrfp.org/)

NSF GRFP Honorable Mention *The National Science Foundation*, March of 2016
The NSF Graduate Research Fellowship Program recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based Master's and doctoral degrees at accredited United States institutions.(https://www.nsfgrfp.org/)

PRESENTATIONS
Wil Thomason: "Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero Shot Learning." *ISER 2016* October 6th, 2016
http://www.iser2016.org/program/

Wil Thomason: "Recognizing Unfamiliar Gestures for Human-Robot Interaction through Zero-Shot Learning." *2nd Workshop on Model Learning for Human-Robot Communication, RSS 2016* June 19th, 2016
http://www.ece.rochester.edu/projects/rail/mlhrc2016/

RESEARCH EXPERIENCE
Graduate Research Assistant August 2015 - Present
Cornell University, Department of Computer Science
Advised by Professor Ross Knepper, I have studied problems in the domains of human robot interaction and multi-agent planning. Specifically, I have made advances in gesture recognition as well as coordination for ad hoc teams of heterogeneous robots. This work has resulted in several publications and presentations, and is ongoing.

Undergraduate Research Assistant August 2014 - July 2015
The University of Virginia, Department of Computer Science
I worked with Professor Westley Weimer on automatic software functionality transplantation. We developed an algorithm based on analyzing differences in test suite performance to identify software modules responsible for specific functionality and a combination of function dependency tracing and extraction with the GenProg program repair tool to perform transplants.

Undergraduate Research Assistant January 2013 - May 2014
The University of Virginia, Department of Computer Science
As a part of Professor Gabriel Robins' lab, I helped to create an efficient, scalable system for real-time localization of objects in 3D space using passive RFID tags. In addition to designing and running experiments for the system, I researched and created a novel approach to distinguishing between noisy measurements and measurements corresponding to moving objects. This approach, which was based on a sliding-window particle filter, significantly increased the accuracy of our system. This work resulted in a journal publication.

TEACHING EXPERIENCE
Graduate Teaching Assistant: CS 4750 Fall 2016
Cornell University

TA for Foundations of Robotics: A new course designed to introduce students to the knowledge they need to conduct research in robotics. I helped to create the course syllabus, textbook, and software for course assignments, as well as giving weekly office hours, grading, and assisting with lecturing.

Graduate Teaching Assistant: CS 1110   Fall 2015
Cornell University

Head TA for Cornell's introductory computer science course. Responsible for coordinating TA staff, giving review lectures, supervising lab sessions, grading, and giving weekly office hours.

Instructor: Introduction to Robotics   Spring 2015
University of Virginia

I designed and taught a 1-credit course introducing undergraduate students to core topics in robotics. As a part of the course, students built and programmed their own quadrotor robots and learned about basic kinematics, control, perception, and learning.

Undergraduate Teaching Assistant: CS 4610   Spring 2015
University of Virginia

TA for UVA's undergraduate programming languages course.

Undergraduate Teaching Assistant: CS 4710   Spring 2015
University of Virginia

TA for UVA's undergraduate artificial intelligence course.

Undergraduate Teaching Assistant: CS 4414   Spring 2014
University of Virginia

TA for UVA's undergraduate operating systems course. Helped create course content using the Rust programming language as well as an automatic grading server for the class.

Undergraduate Teaching Assistant: CS 2150   Fall 2013 - Spring 2015
University of Virginia

TA for UVA's undergraduate data structures and C++ programming course.

Work   **Software Engineering Intern at Fluencia**   May 2015 - August 2015

Worked on adding voice understanding for speech practice exercises

- Improved voice understanding software
- Integrated into language learning website
- Created test and development framework for voice exercises

Software Development Engineer Intern at Microsoft   May 2014 - August 2014

Microsoft Accounts Client Team

- Implemented and tested cryptographic operations and network protocol for forthcoming feature in Microsoft Accounts Android app. The implemented feature enables more convenient and more secure sign-in for Microsoft accounts via mobile devices.
- Coordinated the work of several other interns working on related components of the same project to ensure successful integration and delivery of the fully-functional feature ahead of schedule.

Software Development Engineer Intern at Microsoft   May 2013 - August 2013
Xbox LIVE Cloud Security Team

- Designed, implemented, and shipped a RESTful web service capable of logging and auditing security records in Xbox LIVE in real time. Also designed, created, and tuned associated database and procedures. Service is currently in use in the Xbox LIVE network.

- Spearheaded and completed a total rewrite of an important development library – starting with old, cobbled together library used across principal components of the Xbox LIVE network, redesigned and reimplemented the entire library to provide a faster and easier to use interface to the same core functionality.

SKILLS

- Programming Languages: Python, C++, C, Java, C#, Rust, Haskell, OCaml, Scheme, Clojure, Mathematica, LabView, SQL, JavaScript

- Technologies: Linux, ROS, Android, Arduino, Baxter, Git, PyTorch, Tensorflow, etc.

LANGUAGES

English *(Fluency: Native speaker)*
German *(Fluency: Working)*

VOLUNTEERING

Expanding Your Horizons   Spring 2016 - Ongoing
Taught middle school girls from at-risk communities about programming
https://www.eyh.cornell.edu/

- Created interface for introducing the concept of programming with state machines
- Wrote ROS software to run state machine code on a Kuka youBot

UVa High School Programming Contest   Spring 2014 - Spring 2015
Helped plan and run the biggest programming competition for high school students in the mid-Atlantic region.
http://acm.cs.virginia.edu/hspc.php

- Created contest problems
- Planned contest logistics
- Helped run contest

UVa CS Education Week   Winter 2014 - Winter 2015
Visited area schools to teach workshops on introductory programming with JKarel