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Christopher Birmingham Curriculum Vitae

Education

University of Southern California, Los Angeles, California
Computer Science, Ph.D. August 2018 - Present
- Concentration in Social Robotics in Dr. Maja Mataric's Interaction Lab

University of Bristol, Bristol, United Kingdom
Robots and Autonomous Systems, MRes May 2018
- GPA 3.95
- Research Thesis - *Visual Relocalization with RGB-D SLAM and Convolutional Neural Networks*

Gonzaga University, Spokane, Washington
Bachelor of Science, Honors, in Electrical Engineering; Computer Science Minor May 2015
- Cumulative GPA: 3.85, Magna Cum Laude
- GU Honors Program Fall 2011-Spring 2015
  - A separate humanities curriculum culminating in an undergraduate thesis

Awards
- 2015 - Marshall Scholarship - *Started at University of Bristol 2016*
- 2015 - School of Engineering and Applied Science Excellence Award - *Gonzaga*
- 2015 - NSF GRFP Honorable Mention

Relevant Coursework
- (Graduate) Advanced Natural Language Processing; AI for Social Good; Advanced Analysis of Algorithms; Computational Human-Robot Interaction; Learning in Autonomous Systems; Bio Inspired AI; Image Processing and Computer Vision; Robotics Systems; Robotic Fundamentals, Robotics Research Preparation
- (Undergraduate) – Python; UComp Arch & Assembly; C++; Electronics Design; Algorithms & Data Structures; Communication Systems; Parallel & Cloud Comp; AI; Computer Architecture

Academic Research Experience

University of Southern California, Los Angeles CA August 2018-Present
Robotics Ph.D. Student
- Studying multi-party human-robot interaction in a support group context
- Developing algorithms and deep learning models for understanding group dynamics
- Developed and supported hardware for the NSF Expeditions grant, in which tutoring robots are deployed to the homes of children with ASD

University of Bristol, Bristol UK September 2016-February 2018
Robotics Masters Student
- Explored user experience introducing assistive robots to the home with Dr. Caleb-Solly
- Combined deep learning depth estimation and RGBD SLAM algorithms for relocalization with Dr. Andrew Calway
- Developed master's thesis and presented poster at Bristol Robotics Lab Research Symposium.

Gonzaga Honors Program, Spokane WA August 2014-May 2015
Undergraduate Researcher
- Analyzed the history of AI algorithm development and contrasted it with human psychological development stages for undergraduate thesis
- Presented work to the Spokane community and written work is available in Gonzaga's library

Georgia Tech SURE REU, Atlanta, GA May 2014-August 2014
Undergraduate Research Assistant
- Designed and implemented a food delivery system using the PR2 robot with Dr. Charlie Kemp
- Wrote up and presented work for Georgia Tech faculty panel

Gonzaga University CS Department, Spokane WA September 2013- May 2014
Undergraduate Research Assistant
- Natural Language Processing
- Presented results at Spokane Intercollegiate Research Conference

Work Experience

Slyce, Philadelphia PA January 2018-August 2018

Director of Research and Development

- Developed scalable algorithms for accurate single shot image recognition
- Responsibilities included: Managing a team of researchers, Transferring research models to production servers, and Developing IP and patent applications (patents currently pending)

Anzu Partners, Washington DC January 2016-August 2016; January 2018-Present

Associate

- Diligence on prospective investments, esp. companies related to robotics and automation
- Assisted in technical project support for investment portfolio, including starting an intern program and automating elements of the manufacturing line for a photonics startup

Other Experience

European Robotics League - Service Robots Competition, Bristol UK May 2017-Present

Team Member

Developing service robot capabilities for the elderly and disabled populations on the PR2 Robot. Our team competed in the Barcelona and Edinburgh regional events.

University of Bristol Amazon Robotics Challenge, Bristol UK January 2017-May 2017

Team Leader

- Led a team of graduate students to complete the Amazon Robotics Challenge, picking a list of items off a shelf and placing them in a bin.

Robotics Club, Spokane WA Spring 2013- Spring 2015

Founding Member and President

- Developing robotic hand, quadcopter and other devices using 3D printing and Arduinos

Gonzaga IEEE Chapter, Spokane WA Fall 2013- Spring 2015

Vice President

- Organizing, leading meetings, and inviting speakers

Relevant Skills

Programming

- Python, C++, C, Matlab, Tensorflow, CSS, ROS, Assembly, Git, Bash Scripting, Docker
- Experienced working with the SoftBank Nao, Willow Garage PR2, PAL TIAGO, Universal Robots UR10, Arduino, and Raspberry Pi

Other Technical Skills

- Soldering, Eagle PCB design, Rapid Prototyping and Design

Non-Technical Skills

- Team leadership, project management, academic and professional writing, presenting, competitive analysis

Papers and Presentations

Can I Trust You? A User Study of Robot Mediation of a Support Group – 2019

- Conference paper on a user study I conducted of a robot mediator, currently under review for ICRA 2020.

Predicting Turn Taking in Multi-Party Human-Robot Interaction – 2019

- Conference paper on predicting turn taking in multi-party human-robot interaction, currently under development for submission to HRI 2020.

Visual Relocalization with RGB-D SLAM and Convolutional Neural Networks - 2017

- Master's level thesis I wrote during the first year of University of Bristol Robotics Ph.D. Poster presented at Bristol Robotics Laboratory Research Symposium.
- I combined a CNN capable of producing pixel-wise depth estimations for single RGB images with a RGB-D SLAM algorithm and tested the accuracy of the system for the task of relocalizing new RGB images in a 3D model.

Human Cognition vs AI: A Developmental Comparison and the Moral Implications - 2015

- Undergraduate Thesis, on display in the Gonzaga Library. Presented to the Gonzaga and Spokane community.
- I studied the history and trends of AI research and development and correlated those patterns with human development from infancy to young adulthood.

Creating Common Sense: Feeding Yogurt Using the PR2 with Multi-Modal Anomaly Detection – 2014

- Research Experience for Undergraduates at Georgia Tech, paper and presentation.
- Along with two other undergraduates I developed an anomaly detection system for the PR2 robot while it was feeding yogurt to a person.

Grammatical and Semantic Coherence as Related to N-Gram Size in the Brown Corpus – 2013

- Poster presented at the Spokane Intercollegiate Research Conference
- I developed a statistical model of the English language using Claude Shannon's technique for estimating the entropy and redundancy of a language and the Brown Corpus.