Thomas R. Groechel

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TECHNICAL

Languages: Proficient {**C++**, **C#**, **Python**} Working Knowledge {**Javascript**, R, Bash}
Tools: ROS 2 / ROS, Unity, Docker, Git, Jupyterlab, Pandas, Scikit-learn, Firebase, Mixed Reality Toolkit (MRTK)

RELEVANT WORK EXPERIENCE

Robotics Software Engineer PhD Temp, iRobot, Pasadena, CA & Remote *May 2021 - Aug 2021, February 2023-Present*

- (**C++**) Open source ros2/rclcpp:#2213 - ROS 2 asynchronous services for user response deferral within lifecycle nodes
- (**C++**) Open source ros2/rclcpp:#2212 - Re-architectured ROS 2 lifecycle nodes by separating out model-view-controller
- (**C++**) ROS-ified backend robot actuators with more robust service calls
- (**C++**) Developed key components for the new robot behaviors framework, reducing multithreaded programming errors
- (**C++**) Improved behavior framework engine for reduced latency and enhanced sequential and fallback behaviors
- Pitched new behaviors framework to external teams for wider adoption

Software Developer, Interaction Lab - University of Southern California, Los Angeles CA *July 2018-February 2023*

- (**C#**) Built MoveToCode, a custom visual programming language for embodied autonomous agents
- (**Python**) Built RE:BT-Espresso, a multi-threaded learning from demonstration pipeline for real-time agent control
- (**C#/Python**) Built NRI-SVTE, a system for robot capability visualization and user-robot proxemic preference learning
- (**Javascript**) Built PoseToCode, a real-time system mapping user pose landmarks to coding blocks with a neural network

Researcher, Interaction Lab - University of Southern California, Los Angeles CA *July 2018-February 2023*

- Planned and executed end-to-end research projects including question ideation/background research, system design, technical implementation, system testing, user studies, data analysis, and paper writing
- Managed 26 Undergraduate (UG), Master's (MS), and high school (HS) students first-time research students resulting in 7 total UG/MS first author papers, 7 UG research awards, and 2 UG first-author best-conference paper runner-ups
- Designed, conducted, and analyzed data of user studies across a variety of target populations/clients
- Created both technical and non-technical documentation along with handoff documentation for new and current students
- Co-authored awarded grant proposals (~$1.55m total) - NSF IIS-1925083, Amazon Research Award, ITE-2236320
- Co-organized VAM-HRI workshop (3 years total with 60-110 attendees, website: https://vam-hri.github.io/)
- First authored or co-authored 2 journal, 10 conference, and 9 workshop peer-reviewed papers

Undergraduate Research Assistant, Laboratory for Progress, Ann Arbor, MI *May 2016 - May 2018*

- (**C++/Javascript**) Developed 2D SLAM algorithm using Iterative Closest Point visualization
- (**C++/Javascript**) Implemented Stochastic Gradient Descent for loop closure based on Fast Iterative Alignment of Pose Graphs with Poor Initial Estimates (Olson et al.) using the Fetch robot

Robotics Software Intern, TRACLabs, Houston, TX *May 2017 - August 2017*

- (**C++**) Adapted local mapping and navigation to move TRACBot, a mobile-manipulator, to maneuver dynamically through obstacles such as doors and people in order to reach/use items in Affordance Template library
- (**C++**) Rebuilt action server nodes into custom system to perform dynamic re-planning based on real time observations

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HONORS AND AWARDS

USC Computer Science Best Research Assistant (2x) *May 2020 & May 2022*
Awarded to top research assistant out of all of USC Computer Science graduate students
USC Viterbi Undergraduate Research Mentoring Award (2x) *May 2020 & May 2021*
Awarded to top research mentor out of all of USC Viterbi (Engineering) graduate students

EDUCATION

University of Southern California **Los Angeles, CA**
Ph.D. Computer Science (GPA: 4.0) Advisor: Prof. Maja Matarić *July 2018-February 2023*
M.S. Computer Science (GPA: 4.0) *July 2018-August 2021*
University of Michigan **Ann Arbor, MI**
B.S.E. Computer Science (GPA: 3.57) Advisor: Prof. Chad Jenkins *August 2014-May 2018*