BRYON TJANAKA

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RESEARCH INTERESTS

Robotics, (Hierarchical) Reinforcement/Imitation Learning, Clustering, Human-Robot Collaboration, Algorithms

EDUCATION

Ph.D. Computer Science Aug. 2020 - Present
University of Southern California
Advisor: Stefanos Nikolaidis

B.S. Computer Science (ICS Honors program, AI specialization) Sept. 2017 - Jun. 2020
University of California, Irvine
GPA: 4.0/4.0 • **GRE:** 170/170 quant., 161/170 verbal, 5/6 writing

High School Aug. 2013 - May 2017
Bellarmine College Preparatory (San Jose, California, USA)
GPA: 4.3/4.0 • **SAT:** 2350/2400

HONORS AND AWARDS

USC Graduate School Fellowship for Incoming Students — Feb. 2020
Summa Cum Laude, UCI School of ICS — Jun. 2020
NSF GRFP Honorable Mention — Mar. 2020
UCI Dean's Honor List — Sept. 2017 - Mar. 2020
UCI Regents' Scholarship — Sept. 2017 - Jun. 2020
UCI UROP Fellowship for *Improving Molecular Simulations* — Jan. 2020
UCI UROP Fellowship for *Improving Molecular Simulations* — Jan. 2019
UCI UROP Honorary Fellowship for *Implications of Mall Security Robots* — Jan. 2018
7^{th}/88 at ACM ICPC 2019 SoCal Regional — Nov. 2019
9^{th}/98 at ACM ICPC 2018 SoCal Regional — Nov. 2018
16^{th}/105 at ACM ICPC 2017 SoCal Regional — Nov. 2017
39^{th}/4103 in world, 4^{th}/202 in US at IEEExtreme 13.0 — Oct. 2019
74^{th}/4049 in world, 7^{th}/188 in US at IEEExtreme 12.0 — Oct. 2018
Best Entrepreneurial Hack at HackUCI V hackathon — Feb. 2019
John Hollowell Composition Program Award for Best Advocacy Project, UCI School of Humanities — May 2018
2017 VEX Robotics High School World Champion — Apr. 2017
Recognition for VEX Robotics Championship, Rep. Ro Khanna, CA-17 — Aug. 2017

RESEARCH AND PROFESSIONAL EXPERIENCE

Software Engineering Intern, Mountain View, CA Jun. 2020 - Aug. 2020
Google, Inc.

Undergraduate Researcher Oct. 2019 - Jun. 2020
Intelligent Dynamics Lab, UC Irvine
Advisor: Professor Roy Fox

Undergraduate Researcher Oct. 2018 - Jun. 2020
Mobley Lab, UC Irvine
PI: Professor David Mobley, Graduate Mentor: Jessica Maat

Software Engineering Intern, Mountain View, CA Jun. 2019 - Sept. 2019
Google, Inc.

Engineering Practicum Intern, Mountain View, CA Jun. 2018 - Sept. 2018
Google, Inc.

Independent Undergraduate Researcher Oct. 2017 - Jun. 2018
Mentor: Professor Caesar Sereseres

PRESENTATIONS

Improving Molecular Simulations through Force Field Development and Computational Techniques
2019 UCI Undergraduate Research Symposium
Implications of Mall Security Robots on Privacy of Shoppers
2018 UCI Undergraduate Research Symposium

ATTENDED CONFERENCES

ICLR 2020 (virtual; received travel award) April 2020
UCI Undergraduate Research Symposium May 2018, May 2019

SELECTED PROJECTS

Actor-Critic by Committee (ACBC) Oct. 2019 - Jun. 2020
Associated with: Undergraduate Researcher at Intelligent Dynamics Lab
Hierarchical reinforcement learning algorithms typically use a high-level controller to compose sub-policies sequentially or combinationally. Inspired by work on ensembles, we developed an algorithm, ACBC, in which outputs from multiple sub-policies, or experts, are composed with a linear combination. As the experts can control their weights, ACBC performs both sequential and combinational composition without a high-level controller.

Improving Molecular Simulations through Force Field Development and Computational Techniques Oct. 2018 - Jun. 2020
Associated with: Undergraduate Researcher at Mobley Lab
smirnoff99Frosst is a molecular dynamics force field, a set of parameters which defines how atoms interact in a system. Like many force fields, smirnoff99Frosst lacks parameters for improper torsions, which determine the planarity of molecules. This project involved building a pipeline which analyzes the eMolecules database of 6 million molecules to create new parameters, thus increasing the accuracy of smirnoff99Frosst.

Utilize All Parameters May 2019 - Jun. 2019
Associated with: Undergraduate Researcher at Mobley Lab
To benchmark a molecular dynamics force field, one needs a set of molecules which exercises all of the force field's parameters. Here, a greedy solution to the weighted set cover problem was used to select such a set for the smirnoff99Frosst force field from the eMolecules database of 6 million molecules. This work is included in a pending publication.

Multithreaded Affinity Clustering Jun. 2019 - Sept. 2019
Associated with: Software Engineering Intern at Google
Affinity clustering is a clustering algorithm which approximates the high quality of hierarchical agglomerative clustering while running in linear time. In this project, a multithreaded version of affinity clustering was implemented, optimized, and evaluated. Ultimately, this algorithm has applications in Ads and Search quality. This work is included in two pending publications.

Safeline Feb. 2019
Associated with: Best Entrepreneurial Hack at HackUCI V hackathon
Falls are one of the leading causes of injury for the elderly. In this hackathon project, a Raspberry Pi, a camera, and OpenCV were used to detect falls and send alerts to an iPhone.

3P Agent Crawl Tool Jun. 2018 - Sept. 2018
Associated with: Engineering Practicum Intern at Google
Third-party (3P) agents are plugins which provide additional functionality to Google Assistant. This project involved building a tool which evaluates an agent by analyzing its responses to thousands of relevant queries.

Implications of Mall Security Robots on the Privacy of Shoppers Oct. 2017 - Jun. 2018
Associated with: Independent Undergraduate Researcher with Dr. Sereseres
This independent project explored several privacy concerns which arise as a result of the introduction of security robots into malls.

SELECTED COURSES

Neural Networks and Deep Learning — Spring 2020
Optimal Control and Reinforcement Learning — Winter 2020
Formal Languages and Automata — Spring 2019

LEADERSHIP & SERVICE ACTIVITIES

Internal Vice President, Competitor — Sept. 2017 - Feb. 2020
ACM, UC Irvine Chapter
- Collaborated in teams of three to solve algorithm problems in programming contests such as ICPC
- Trained other students to compete by organizing events such as a series of 3 campuswide competitions

Speaker, Volunteer — 2017-2019
Google Girl-Powered VEX Robotics Workshop
- Annual workshop aimed at increasing female involvement in STEM and VEX Robotics