Shuangge Wang

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Research Interest

Human-Robot Interaction, Dynamic Optimization, Deep Learning, Game Theory

Education

2019 – 2023 **University of Southern California** Los Angeles, CA
B.S. in Electrical and Computer Engineering (Honors)
B.S. in Applied and Computational Mathematics
Advisor: Bhaskar Krishnamachari
Honors Thesis: Towards Heuristic Agnostic Active Information Gathering Objective in Human-Robot Interaction: A Deep Q-Learning Approach

2021 – 2021 **Tsinghua University** Beijing, China
Exchange in Electronic Engineering

Publications

2023 **S. Wang**, Y. Lyu, J. M. Dolan, "Active Probing and Influencing Human Behaviors Via Autonomous Agents," in *2023 IEEE International Conference on Robotics and Automation (ICRA)*, 2023 (under review)

2022 **S. Wang** and B. Krishnamachari, "Optimal Trading on a Dynamic Curve Automated Market Maker," in *2022 IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, 2022 (acceptance rate 18.6%)

Research

2021 – 2022 **Autonomous Networks Research Group** Los Angeles, CA
Research Fellow
Advisor: Bhaskar Krishnamachari
Adopted deep Q-learning to train an agent to learn the most efficient and precise policy network for active information gathering in HRI

2022 – 2022 **The Robotics Institue** Pittsburgh, PA
Research Fellow
Advisor: John M. Dolan
Devised a theoretic framework that empowers autonomous agent to probe a human agent to clarify its belief on human's underlying model by optimizing the Jensen-Shannon Divergence on its belief
Identified two use cases in autonomous driving where autonmous vehicle leverages the probed information to influence human vehicles to create better participant experience and system efficiency
Submitted paper to *2023 IEEE ICRA* (Preprint, Research Poster)

2021 – 2022 **Autonomous Networks Research Group** Los Angeles, CA
Research Fellow
Advisor: Bhaskar Krishnamachari
Devised a polynomial-time DP-based algorithm that solves the optimal trading policy under dynamic AMMs that performs drastically better than baseline algorithms like the exhaustive search or the Lagrange multiplier
Presented the paper at *2022 IEEE ICBC* and answered questions from peers (Conference Paper, Presentation Video)

Projects

2022 **Spatial Separable Convolutional NN Parallelization and Acceleration** Los Angeles, CA
CUDA Engineer
Advisor: Viktor K. Prasanna
Redesigned MobileNets' kernel dimensions to reach more homogeneous convolution size for maximum parallelism
Adopted constant memory in CUDA to increase shared memory usage during 1D convolution (Technical Report)

2021 **HARPO: Learning to Subvert Online Behavioral Advertising** Los Angeles, CA
Backend Developer
Supervisor: Konstantine Psounis, NSF Award Number: 1956435
Used PyTorch to develop the machine learning inference pipeline of a user data obfuscation Firefox extension
Implemented the extension in REST API and socket server and deployed the application to Docker environment

Professional Activities

2022 **Department of Mathematics** Los Angeles, CA
Teaching Assistant
Supervisor: Stanislav Minsker, Course: MATH 447: Mathematics of Machine Learning (Syllabus)
Held weekly office hours to answer students' questions; graded homework and programming assignments

2021 **Siemens** Beijing, China
Edge Computing Intern
Developed "Siemens Industrial Edge WeChat Mini Program" that interactively displays industrial data from Siemens industrial edge devices
Established MQTT communication environment and deployed data-filtering APIs to cloud

Awards & Honors

2022 Ming Hsieh Institute Undergraduate Scholar *(4/330)*

2022 Carnegie Mellon University RISS Research Scholarship *(5% hit ratio)*

2022 USC Provost's Undergrad Research Fellowship

2022 Summa Cum Laude *(Highest Distinction)*

2022 USC W.V.T. Rusch Undergraduate Engineering Honors *(Graduation with Honors)*

2022 Atoms Bits Cells (ABC) Innovation Prize *(3/100)*

2021 USC IEEE IoT Hackathon Silver

2020 – 2022 USC Viterbi Dean's List

2019 – 2022 USC Dornsife Dean's List

Talks & Presentations

2022 Ming Hsieh Institue Annual Electrical and Computer Engineering Research Festival

2022 Carnegie Mellon University RISS Symposium

2022 IEEE International Conference on Blockchain and Cryptocurrency (ICBC) Decetralized Finance Panel

Skills

Languages C/C++, Python, MATLAB, R, Verilog, MongoDB, CUDA

Tools GitHub, Linux, VMware, Docker, DipTrace, LTspice, Xilinx Vivado, DMM, Oscilloscope

Relevant Coursework

Linear Algebra, Probability Theory, Statistics, Analysis, Machine Learning, Optimization, Numerical Methods, Embedded Systems, Linear Circuits, IoT, E&M, Digital Circuits, Parallel Computing, Computer Architecture, Discrete Mathematics, Software Design