Hao Ji

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Education

Ph.D Mechanical Engineering, University of Southern California, 08/2021	GPA: 4.0/4.0
M.Eng Mechanical Engineering, University of California at Berkeley, 05/2014	GPA: 3.8/4.0
B.Eng Mechanical Engineering, Donghua University, 07/2013	GPA: 3.8/4.0

Work Experience

9/2021-Current   **Data Scientist**, University of Southern California, Center for Advanced Research Computing, Los Angeles, CA
- Collaborated with faculties and PhD students performing data science related research in engineering
- Taught USC Viterbi Class 'High Performance Computing in Applied Machine Learning'
- Prepared new class teaching material for department of data science at USC for Fall 2024 on advanced computing and deep learning/AI topics
- Developed distributed computing training algorithms on GPU clusters
- Worked on using AI/ML algorithms to optimize slurm job configuration parameters to reduce overall job wait time for users on the cluster
- Benchmarked deep learning training algorithms on computing nodes
- Benchmarked storage performance on Samsung, Vast and object storage file systems
- Supported hybrid cloud virtual machine setup and development
- Built singularity containers to maintain the reproductivity of research codes
- Tested Cerebras Server performance with different application codes: Computer Vision Resnet50 model, Large Language GPT3 Model and Image segmentation 3D Unet model
- Tested newly released Nvidia Grace Hopper super-chip system performance and evaluated the system compared to other Nvidia GPU devices

8/2015-8/2021   **Research Assistant**, University of Southern California, IMPACT lab, Los Angeles, CA
- Implemented multi-agent independent dueling DQN algorithms and achieved autonomous multi-agent box-pushing and self-assembly tasks in a game simulator (Pygame) environment
- Ran multiple simulations simultaneously using parallel shell command and used matplotlib package to visualize results
- Generated research findings on stability and scalability of multi-agent deep reinforcement learning to various team sizes and proposed effective entropy measurement to predict optimal team sizes without training the agents
- Analyzed sensitivity of self-organizing system performance regarding weights of reward with different types of tasks

5/2019-8/2019   **Data Scientist Intern,** Procter & Gamble, Cincinnati, OH
- Developed parallel code to extract images from videos based on timestamp information using OpenCV
- Generated key points of 18 body parts using tf-openpose and cropped images based on keypoints
- Trained Mobilenet/Resnet to generate zone prediction based on image dataset of 600GB and ground truth labels
- Used trained Resnet50 to generate feature vectors of 2048 as dataset and pushed to bidirectional GRU model for time-series training

- Combined image & sensor dataset, ensemble two separate bi-directional RNN predictions to auto-label image and sensor data
- Increased current auto-label performance by 7%

6/2016-8/2016   **Dimension Engineer Intern,** Karma Automotive LLC., Costa Mesa, CA
- Developed, validated and incorporated total vehicle GD&T requirements
- Creating, revising and releasing 2D drawings in CATIA and Smart Team
- Analyzed data coming from suppliers for same interfaces and learned how requirements specified on drawings translate to checking fixtures, manufacturing or assembly tooling and final product
- Worked on DTS Specifications of the karma K1 2.0 Platform, specifications on the gap and flush requirements of the critical components
- Certificate holder of GDTP -1994 Technologist (ASME Y14.5.2 Standard)

7/2014-4/2015   **Affiliate Researcher**, UC Berkeley, BEST Lab, Berkeley, CA
- Performed literature review on tensegrity spine designs
- Generated concepts of a mechanical, actuated tensegrity spine, chose the best candidate
- Designed a CAD model of the most promising concept
- Selected the most optimum brushless motor with hall sensors and gears for the design

Awards and affiliations
- Provost's Fellowship of University of Southern California
- Volunteer of 2010 World Expo
- Volunteer of 2011 World Swimming Championship
- Torchbearer of 2008 Olympic Games
- National Merit Scholarship by Chinese government (Top 1%)
- Shanghai Excellent Student Award (Top 3%)
- Reviewer of Journal AI EDAM (Artificial Intelligence for Engineering Design, Analysis and Manufacturing)
- Reviewer of Journal Smart Energy
- Reviewer of Journal Building Engineering (Q1, Top Journal)
- Reviewer of Journal Automation in Construction (Q1, Top Journal)
- Reviewer of Journal Computer Aided Design (Top Journal in the field)
- Reviewer of Journal of Mechanical Design (Top Journal in the field)
- Reviewer of Journal PLOS ONE
- Reviewer of Journal Neural Processing Letters
- Reviewer of International Journal of Machine Learning and Cybernetics
- Reviewer of ASME IDETC Conference 2022 & 2023
- Reviewer of PEARC Conference (Reviewed: 4)

Publications

1 Sabelhaus, Andrew P., Ji, Hao et al. "Mechanism design and simulation of the ULTRA spine: a tensegrity robot." ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2015.

2 Ji, Hao, Jin, Yan. "Adoption of Social Rules in Teams of Different Sizes". Engineering Management Reviews, 2017, 6(1), 6-15. doi: 10.14355/emr.2017.0601.002

3 Ji, Hao and Yan Jin. "Modeling trust in self-organzing systems with heterogeneity." ASME 2018 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2018.

4 Ji, Hao, and Yan Jin. "Designing Self-Organizing Systems with Deep Multi-agent Reinforcement Learning." ASME 2019 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference. American Society of Mechanical Engineers, 2019.

5 Ji, Hao, and Yan Jin. "Designing Self-Assembly Systems with Deep Multi-agent Reinforcement Learning. "Design Computing and Cognition, 2020

6 Ji, Hao, and Yan Jin. "Evaluating the Learning and Performance Characteristics of Self-organizing Systems with Different Task Features." AIEDAM Artificial Intelligence for Engineering Design, Analysis and Manufacturing, 2021

7 Ji, Hao, and Yan Jin. "Knowledge Acquisition of Self-Organizing Systems with Deep Multiagent Reinforcement Learning." ASME Journal of Computing and Information Science in Engineering. American Society of Mechanical Engineers, 2022 **(Journal Spotlight of JCISE Journal at IDETC 2022 Conference)**

8 Ji, Hao, and Yan Jin. "Impact of Task Constraint on Agent Team Size of Self-Organizing Systems Measured by Effective Entropy." ASME Journal of Computing and Information Science in Engineering. American Society of Mechanical Engineers, 2024