Yunzhe Daniel **Wang**

Research · Machine Learning · Software

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Education

University of Southern California — *Los Angeles, CA*

PhD in Computer Science — *Aug 2024 - Present*

- Tactical AI; Advisor: Prof. William Swartout

Columbia University — *New York, NY*

MS in Computer Science, Machine Learning Track (GPA: 3.96/4.00) — *Aug 2021 - May 2023*

- Machine Learning and Robotics Research at Creative Machines Lab under Prof. Hod Lipson

University of Southern California — *Los Angeles, CA*

BA in Applied Mathematics, BS in Computational Neuroscience, Minor in Computer Science (GPA: 3.84/4.00) — *Aug 2017 - May 2021*

- Machine Learning and Cognitive Architecture research under Dr. Volkan Ustun and Prof. Paul Rosenbloom

Relevant Coursework: Machine Learning, Unsupervised Learning, Natural Language Processing, Reinforcement Learning, Computer Vision, Robotics, Autonomous Systems, Artificial Intelligence, Cognitive Neuroscience, Sensation and Perception, Brain Architecture, Neurobiology, Cellular and Molecular Neuroscience, Statistics, Probability Theory, Numerical Methods, Calculus, Optimization, Computer Networks, Social Networks, Databases, Data Structure, Algorithm Analysis, Advanced Algorithms

Experience

University of Southern California — *Los Angeles, CA*

Graduate Research Assistant — *Aug 2024 - Present*

- Conducted PhD Research in Machine Learning, focusing on enhancing Reinforcement Learning performance through the integration of generative models and human data under multi-agent scenarios
- Developed a 3D multi-agent simulation environment in a geospatial terrain using Unity, laying the groundwork for reinforcement learning and Human-AI collaboration research.
- Keywords: Multi-Agent Reinforcement Learning, Graph Neural Networks

Bubble Group, Inc. — *New York, NY*

AI Resident → Software Engineer II — *Jul 2023 - Jul 2024*

- Led Generative AI Research and Development for UI/UX Generation in No-Code Platform through Large Language Models and Diffusion Models
- Developed and launched Bubble AI PAGE DESIGNER from-zero-to-one, generating customized and responsive interfaces from text prompt
- Designed the overall Large Language Model Agentic (LLM-Agent) architecture and Domain-Specific Language (DSL). These components plan and communicate to generate full-stack web apps while interacting with users, serving as the core backend of the Bubble AI service
- Keywords: Large Language Models, Retrieval-Augmented Generation, AI-Assisted Design

Creative Machines Lab at Columbia University — *New York, NY*

Research Assistant — *Sep 2021 - May 2023*

- Developed and implemented a novel deep learning algorithm capable of identifying 12-DOF quadruped robot morphologies from intrinsic motion dynamics (kinaesthesia), enabling control and planning on robots with unseen morphologies Paper
- Developed a conversational face robot with co-expressive facial dynamics and can generate lip-synced speech-driven talking faces through novel deep learning algorithms, bridging the gap to enable non-verbal communication capabilities in robots Paper
- Led machine learning in both projects, utilized GAN, LSTM, and Transformer Architectures, handling modalities in speech, videos, 3D keypoints, pointcloud, and timeseries (IMU)
- Keywords: Generative AI, Multimodal Learning, Transfer Learning, Model Predictive Control, Human-Robot Interaction

USC Institute for Creative Technologies — *Los Angeles, CA*

Student Worker/Researcher — *Feb 2020 - Aug 2021*

- Developed a Multi-Agent Reinforcement Learning Algorithm that efficiently and approximately solves Traveling Salesman Problem variants for Search-and-Rescue tasks using Graph Transformers, creating a Social AI-Agent that enhances Human-AI teaming Paper
- Software development for the Graphical Model aspects of the (Py)Sigma Cognitive Architecture

Institute of Computing Technology, Chinese Academy of Science — *Beijing, China*

Research Engineer Intern — *May 2019 - Aug 2019*

- Natural Language Processing Research under Prof. Cungen Cao, focused on Knowledge Extraction
- Developed a rule-based system to improve Chinese Part-of-Speech tagging, boosting downstream knowledge extraction accuracy, integrating heuristic and data-mined rules through pattern matching

Skills

AI/ML	PyTorch, Scikit-Learn, PyG, Tensor Programming, Data Visualization, Deep Learning, Large Language Models
Programming	Python, JavaScript/TypeScript, Node.js, MATLAB, LaTeX, Git, C#, Unity, HTML/CSS, Tailwind CSS, SQL, Web Scraping
Languages	English, Chinese

Teaching

Applied Computer Vision (Course Assistant) *Columbia - Spring 2023*

Introduction to Natural Language Processing (Course Assistant) *Columbia - Fall 2022*

Introduction to Natural Language Processing (Course Assistant) *Columbia - Summer 2022*

Publications

1. Yuhang Hu, Yunzhe Wang, Ruibo Liu, Zhou Shen, Hod Lipson. "**Robot Configuration Identification from Motion Data**." *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2024) (oral)*.
2. Yuhang Hu, Boyuan Chen, Jiong Lin, Yunzhe Wang, Yingke Wang, Cameron Mehlman, Hod Lipson. "**Human-Robot Facial Co-expression**." *Science Robotics, 2024*.
3. Volkan Ustun, Ronit Jorvekar, Nikolos Gurney, David Pynadath, Yunzhe Wang. "**Assessing Routing Decisions of Search and Rescue Teams in Service of an ASI Agent**." *International Conference on Agents and Artificial Intelligence (ICAART 2024)*.
4. Yunzhe Wang, Nikolos Gurney, Jincheng Zhou, David Pynadath, Volkan Ustun . "**Route Optimization in Service of a Search and Rescue Artificial Social Intelligence Agent**." *Association for the Advancement of Artificial Intelligence 2021 Fall Symposium Series (AAAI FSS 2021)*.