

# YUNZHE WANG

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## OBJECTIVE

With an interdisciplinary passion for Artificial Intelligence and Cognitive Science, I seek to answer: "What is intelligence and how should we recreate it?" As generalist superintelligent agents emerge, I wish to shape their primary purpose to augment human capabilities and expedite scientific discovery. Keywords below best encapsulates my interests:

Self/weakly-supervised/Few-Shot/Continual Learning, Multi-Modal Perception, Knowledge Representation, Intelligent Agent Robustness, Fairness, Alignment, Human-AI Interaction/Collaboration, Augmented Intelligence, Assistive Technologies

## EDUCATION

**Columbia University** (GPA: 3.95/4.00)

New York, NY

*M.S. Computer Science: Machine Learning Track + Advanced Research*

Aug 2021 - May 2023

**University of Southern California** (GPA: 3.83/4.00)

Los Angeles, CA

*B.S. Computational Neuroscience*

Aug 2017 - May 2021

*B.A. Applied Mathematics*

*Minor Computer Science*

**Relevant Coursework:** Machine Learning, Unsupervised Learning, Natural Language Processing, Reinforcement Learning, Computer Vision, Robotics, 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

**Bubble Group, Inc. – A leader in the Low-Code/No-Code (LCNC) tech domain**

New York, NY

*Software Engineer II (Generative AI)*

Jul 2023 - Present

- Led Generative AI research and development in Text-to-Web-Application Generation, creating an AI-Copilot Assistant.
- Initiated LLM-Agents, modularizing stylistic and responsive website generation through natural language interaction. Singled-handedly coded the pipeline from scratch and shipped an Alpha release, aligning team vision consistently.
- Formulated Vision-based Reward Model on DINOv2, tuned Falcon40B LLM, applied VQ-Diffusion for Layout Generation.

**Creative Machines Lab at Columbia University**

New York, NY

*Student Researcher*

Sep 2021 - May 2023

- Machine Learning and Robotics research under Prof. Hod Lipson.
- Keywords: Human-Robot Interaction, Generative AI, Transfer and Few-Shot Learning, Model Predictive Control

**Project: Conversational Humanoid Face Robot**

- Collaborated on creating a conversational face robot with human-like lip-sync and co-expressive facial dynamics.
- Led the Machine Learning Aspects:
  - Designed a talking face generation model from scratch, autoregressively decodes robot motor actions from speech, bridging the gap to enabling non-verbal robot facial interaction capabilities.
  - Utilized self-supervised learning, achieving model robustness for varied speakers and languages with limited data.
  - Utilized GAN, LSTM, and Multi-Modal Transformer architectures, modalities in speech, videos, and 3D keypoints.

**Project: Robot Morphology Transfer Learning**

- Developed a 12-DOF quadruped robot capable of self-morphology identification and realtime trajectory optimization.
- Led the Machine Learning Aspects:
  - Developed a classifier capable of identifying 12-DOF robot morphologies from intrinsic dynamics (kinaesthesia), enabling conditional model predictive control for trajectory planning on robot with unseen morphologies.
  - Utilized Transfer Learning and Multi-Task Learning; Data modalities in time-series (IMU) and point cloud.

**Cognitive Architecture Lab at USC Institute for Creative Technologies**

Los Angeles, CA

*Student Researcher*

Feb 2020 - Aug 2021

- Cognitive Architecture and Reinforcement Learning research under Dr. Volkan Ustun and Prof. Paul Rosenbloom.
- Led a real-time routing decision-augmenting framework for Urban Search-and-Rescue task, creating a Social AI-Agent to enhance Human-AI teaming. Leveraged Graph Machine Learning, Reinforcement Learning, and Unsupervised Learning.
- Software development for the Graphical Model aspects of the (Py)Sigma Cognitive Architecture.

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

PUBLICATIONS

<b>Robot Configuration Identification from Motion Data</b>	2023
Y. Hu, <u>Y. Wang</u> , R. Liu, Z. Shen, H. Lipson.	
<i>Submitted to the 2024 IEEE International Conference on Robotics and Automation (ICRA 2024)</i>	
<b>Lip Synchronization for Animatronic Robot Face</b>	2023
Y. Hu, <u>Yu. Wang</u> , B. Chen, Yi. Wang, J. Lin, H. Lipson.	
<i>In Submission</i>	
<b>Human-Robot Facial Co-expression</b>	2023
Y. Hu, B. Chen, J. Lin, <u>Yu. Wang</u> , Yi. Wang, C. Mehlman, H. Lipson.	
<i>Science Robotics (Under Review)</i>	
<b>Assessing Routing Decisions of Search and Rescue Teams in Service of an ASI Agent</b>	2023
V. Ustun, R. Jorekar, N. Gurney, D. Pynadath, <u>Y. Wang</u>	
<i>Accepted to 16<sup>th</sup> International Conference on Agents and Artificial Intelligence (ICAART 2024)</i>	
<b>Route Optimization in Service of a Search and Rescue Artificial Social Intelligence Agent</b>	2022
<u>Y. Wang</u> , N. Gurney, J. Zhou, D. Pynadath, V. Ustun.	
<i>Association for the Advancement of Artificial Intelligence 2021 Fall Symposium Series (AAAI FSS 2021)</i>	

TEACHING

Applied Computer Vision (Teaching Assistant)	Spring 2023
Introduction to Natural Language Processing (Teaching Assistant)	Fall 2022
Introduction to Natural Language Processing (Teaching Assistant)	Summer 2022
<b>Duties: Weekly Office Hours, Grading, Exam Proctoring, Leading Review Sessions</b>	

HONORS

USC Graduate with Distinction (Magna Cum Laude)	
Academic Achievement Award, University of Southern California (~\$4400 tuition benefit)	
Dean's List, all semesters, University of Southern California	
American Mathematical Contest 12 (top 5%), Mathematical Association of America	

PROJECTS

Medium Writer on AI Topics	<a href="https://bit.ly/medium-yunzhe">bit.ly/medium-yunzhe</a>	2023
Interactive Data Visualization of 1.7M arXiv Papers	<a href="https://bit.ly/arxiv-embed-viz">bit.ly/arxiv-embed-viz</a>	2023
Audio-Visual Speaker Diarization	<a href="https://bit.ly/syncnet-spk">bit.ly/syncnet-spk</a>	2023
Unsupervised Neural Machine Translation	<a href="https://bit.ly/unmt-survey">bit.ly/unmt-survey</a>	2022
Autonomous Car-Racing Game Agent in Unity	<a href="https://bit.ly/auto-drive-agent">bit.ly/auto-drive-agent</a>	2021

SKILLS

<b>Programming and Development:</b> Python, JavaScript/TypeScript, C++, SQL, Git, LaTeX, Web Development, Web Scraping
<b>AI and Machine Learning:</b> PyTorch, scikit-learn, Tensor Programming, Data Visualization, Deep Learning, Reinforcement Learning, Unsupervised Learning, Sequence Modeling, Prompt Engineering, Large Language Model
<b>Others:</b> Bilingual in English and Chinese, Drawing, Photography, Singing, Culinary