YUNZHE WANG

784 Columbus Ave, New York, NY
(213) - 421 - 9274 | yw3737@columbia.edu | Home Page: yunzhew.com

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-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, Artificial Intelligence, Robotics, Cognitive Neuroscience, Sensation and Perception, Neurobiology, Brain Architecture, 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. Emphasized scalability and efficiency.
- 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 with Prof. Hod Lipson.
- Keywords: Human-Robot Interaction, Generative AI, Transfer Learning, Multi-Task 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 with Prof. Paul Rosenbloom and Dr. Volkan Ustun.
- Led a real-time routing decision-augmenting framework for Urban Search-and-Rescue team, leveraging Graph Machine Learning, Reinforcement Learning, and Unsupervised Learning to enhance Human-AI collaboration.
- Software development for the Graphical Model aspects of the (Py)Sigma Cognitive Architecture.

Institute of Computing Technology, Chinese Academy of Science Beijing, China
Research Internship May 2019 - Aug 2019

- Natural Language Processing Research with Prof. Cungen Cao, focused on Knowledge Extraction.
- Created a rule-based system to improve Chinese Part-of-Speech tagging accuracy, vital for downstream knowledge extraction, integrating data mining and pattern matching to boost model accuracy and efficiency.

PUBLICATIONS

Robot Configuration Identification from Motion Data 2023
Y. Hu, Y. Wang, R. Liu, Z. Shen, H. Lipson.
Submitted to the 2024 IEEE International Conference on Robotics and Automation (ICRA 2024)

Lip Synchronization for Animatronic Robot Face 2023
Y. Hu, Yu. Wang, B. Chen, Yi. Wang, J. Lin, H. Lipson.
In Submission

Human-Robot Facial Co-expression 2023
Y. Hu, B. Chen, J. Lin, Yu. Wang, Yi. Wang, C. Mehlman, H. Lipson.
Science Robotics (Under Review)

Assessing Routing Decisions of Search and Rescue Teams in Service of an ASI Agent 2023
V. Ustun. R. Jorekar, N. Gurney, D. Pynadath, Y. Wang
Accepted to 16th International Conference on Agents and Artificial Intelligence (ICAART 2024)

Route Optimization in Service of a Search and Rescue Artificial Social Intelligence Agent 2022
Y. Wang, N. Gurney, J. Zhou, D. Pynadath, V. Ustun.
Association for the Advancement of Artificial Intelligence 2021 Fall Symposium Series (AAAI FSS 2021)

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
Duties: Weekly Office Hours, Grading, Exam Proctoring, Leading Review Sessions

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	bit.ly/medium-yunzhe	2023
Interactive Visualization of 1.7M arXiv Papers	bit.ly/arxiv-embed-viz	2023
Audio-Visual Speaker Diarization	bit.ly/syncnet-spk	2023
Unsupervised Neural Machine Translation	bit.ly/unmt-survey	2022
Autonomous Car-Racing Game Agent in Unity	bit.ly/auto-drive-agent	2021

SKILLS

Programming and Development: Python, JavaScript/TypeScript, C++, SQL, Git, LaTeX, Web Development, Web Scraping

AI and Machine Learning: PyTorch, scikit-learn, Tensor Programming, Data Visualization, Deep Learning, Reinforcement Learning, Unsupervised Learning, Sequence Modeling, Prompt Engineering, Large Language Model

Others: Bilingual in English and Chinese, Photography, Drawing, Culinary