

Feiyu “Gavin” Zhu

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EDUCATION

Carnegie Mellon University School of Computer Science

Aug. 2020 – May 2024

B.S. in Artificial Intelligence with additional major in Cognitive Science (QPA 4.0/4.0)

Pittsburgh, PA, USA

Thesis (work in progress): Incorporating Instructive Feedback in Human-AI Interaction

RESEARCH EXPERIENCE

Research Assistant (Advisor: Prof. Reid Simmons)

Feb. 2021 – Present

Reliable Autonomous Systems Lab, Carnegie Mellon University

Pittsburgh, PA, USA

- Developed a bootstrapping framework to initiate cognitive agents with large language models
- Developed a cognitive architecture for embodied agents for household tasks
- Conducted and analyzed online user study for partnering with human players in Hanabi
- Developed behavior cloning and imitation learning models with LSTM backbones
- Developed decision-tree-based agents that execute human-like strategies

Research Assistant (Advisor: Prof. Alexander Mathis)

May 2022 – Jan. 2023

Center for Neuroprosthetics, École Polytechnique Fédérale de Lausanne (EPFL)

Geneva, Switzerland

- Built random forest model for healthy subjects' movement trajectory classification
- Developed weakly supervised local feature descriptor for localization and evaluation of stroke-related movements
- Experimented with rendering tools based on SMPL models for better annotations
- Built Fugl-Meyer Assessment estimator for stroke patients performing activities of daily living
- Explored intrinsic properties of stroke/healthy movement trajectories with functional PCA

Research Assistant (Advisors: Prof. Yonatan Bisk, Dr. Chris Paxton [NVIDIA])

Feb. 2021 – Dec. 2021

Connecting Language to Actions & the World Lab, Carnegie Mellon University

Pittsburgh, PA, USA

- Worked on multimodal action anticipation in the kitchen environment with transformer models
- Designed crowd-sourcing interface for kitchen video data annotation on AWS Mechanical Turk
- Implemented video summarization algorithm for video processing
- Analyzed egocentric kitchen videos using SpaCy (for natural languages) and PyTorch (for images/videos)

Intern (Advisor: Dr. Guyue Zhou)

Dec. 2020 – Feb. 2021

Institute for A.I. Industry Research (AIR), Tsinghua University

Beijing, China

- Designed customizable robot and educational games for 4-8th grade STEM education
- Developed object detection toolkit on Kendryte K210 MCU

Research Intern (Advisors: Xi Qiu, Jianan Wu)

Aug. 2019 – Sep. 2020

Megvii Inc. (Face ++)

Beijing, China

- Researched in automatic parameter optimization and self-supervised feature extraction in pedestrian tracking
- Developed and maintained pedestrian tracking module in video structuralization pipeline
- Designed drone-based electric grid visual inspection algorithm for China Southern Power Grid

PUBLICATIONS

Bootstrapping Cognitive Agents with a Large Language Model

in *The AAAI Conference on Artificial Intelligence (2024)* under second phase review

Feiyu Zhu, Reid Simmons

SQE: Self Quality Evaluation Metric for Parameters Optimization in Multi-Object Tracking

in *CVF/IEEE Conference on Computer Vision and Pattern Recognition (CVPR) 2020*

Yanru Huang, **Feiyu Zhu**, Zheni Zeng, Xi Qiu, Yuan Shen, Jianan Wu

HONORS AND AWARDS

Summer Undergraduate Research Fellowship , <i>Carnegie Mellon University</i>	Jun. 2023
Member , <i>Mortar Board</i>	Apr. 2023
Member , <i>Psi Chi</i> , <i>The International Honor Society in Psychology</i>	Jan. 2023
Summer@EPFL Research Fellowship , <i>École Polytechnique Fédérale de Lausanne (EPFL)</i>	Aug. 2022
ThinkSwiss Research Scholarship , <i>Embassy of Switzerland in Washington, D.C.</i>	Feb. 2022
Dean's List , High Honors , <i>School of Computer Science, Carnegie Mellon University</i>	All semesters
Outstanding Intern , <i>Megvii Inc.</i>	Dec. 2019, Jan. 2020, Feb. 2020
Finalist , <i>2019 Intel International Science and Engineering Fair (ISEF)</i>	May 2019

TEACHING EXPERIENCE

Teaching Assistant (<i>Primary Instructor: Prof. Stephanie Rosenthal</i>) <i>CMU 15-281 Artificial Intelligence: Representation and Problem Solving</i>	Aug 2022 – Present <i>Pittsburgh, PA, USA</i>
<ul style="list-style-type: none">• Head TA for Fall 2023• Design and grade written assignments• Lead weekly recitation with 30 students• Hold weekly office hours and midterm review sessions• Answer students' questions online• Interview TA candidates for future semester	
Teaching Assistant (<i>Primary Instructor: Prof. Reid Simmons</i>) <i>CMU 07-180 Concepts in Artificial Intelligence</i>	Jan. 2022 – Present <i>Pittsburgh, PA, USA</i>
<ul style="list-style-type: none">• Head TA for Spring 2023, Spring 2024• Prepare lecture and recitation materials on deep learning• Design and grade written and programming assignments and the final exam• Hold weekly office hour• Answer students' questions online• Interview TA candidates for future semester	

COURSE PROJECTS

Natural Language Instruction Following (<i>Advisor: Prof. Yonatan Bisk</i>) <i>Team course project for CMU 11-777 Multi-modal Machine Learning (Graduate)</i> <i>(with Daphne Chen, Jiatai Li, Hariharan Manikandan, Himanshu Thakur)</i>	Jan. 2023 - May. 2023
<ul style="list-style-type: none">• Working on embodied agent instruction following on the Alfred dataset• Incorporating visual modality into sub-task decomposition• Developing explicit memory scene graph for semantic map search	
Robot Planning for Household Tasks (<i>Advisor: Prof. Maxim Likhachev</i>) <i>Team course project for CMU 16-350 Planning Techniques for Robotics</i> <i>(with Nick Alvarez, Helen Mao)</i>	Mar. 2023 - May. 2023
<ul style="list-style-type: none">• Developing an online robot planner for household tasks in the AI2THOR environment	
Few-Shot Preference Learning (<i>Advisors: Prof. Henny Admoni, Michelle Zhao</i>) <i>Team course project for CMU 16-867 Human-Robot Interaction (Graduate)</i> <i>(with Daphne Chen)</i>	Sept. 2022 - Dec. 2022
<ul style="list-style-type: none">• Developed a nearest neighbor model for few-shot preference learning through interaction in the kitchen domain• Conducted user study on assistive agents with preference adaptation• Built an interface based on AI2THOR simulator for user study	
Visual False Memory Experiment (<i>Advisor: Dr. Abigail Noyce</i>) <i>Individual course project for CMU 85-211 Cognitive Psychology</i>	Oct. 2022 - Nov. 2022
<ul style="list-style-type: none">• Extended the false memory experiment from a list of words to a list of images (cartoon cat faces)• Generated the list of cartoon cat faces and synthesized the critical lures• Built an online interface and hosted it on AWS for human participants study• Conducted statistical analysis based on the results	
Hanabi Agent in ACT-R (<i>Advisors: Prof. John Anderson, Dan Bothell</i>) <i>Individual course project for CMU 85-412 Cognitive Modeling</i>	Apr. 2022 - May 2022
<ul style="list-style-type: none">• Developed an ACT-R model for simulating human cognition in playing the cooperative board game Hanabi• Achieved human comparable performance	

SKILLS

Programming Languages: Python, C, SML, HTML

Programming Libraries: Pytorch, Tensorflow, spaCy, scikit-learn, NumPy, OpenCV, lightgbm, ACT-R

Other Tools: L^AT_EX, Unix, Vim, Git, Docker, Markdown

Languages: Chinese (Native), English (Native), French (Elementary)

REFERENCES

Prof. Reid Simmons, *Carnegie Mellon University*

Research advisor; Academic advisor

Prof. Alexander Mathis, *École Polytechnique Fédérale de Lausanne (EPFL)*

Research advisor

Prof. Yonatan Bisk, *Carnegie Mellon University*

Research advisor