ZHIQIANG PI

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Education

Northwestern University, Evanston

PhD. **Computer Science and Learning Science** Expected: 06/*2030*

University of California, San Diego

B.S. **Computer Science** with Minors in **Cognitive Science** and **Education Studies** *12/2022*

- Major GPA: 3.99 Cumulative GPA: 3.94

Honors and Awards

- Provost Honors in WI22, SP21, WI 21, FA20, SP20, WI20, SP19, WI19 and FA18 quarters
- Member of honor societies IEEE-Eta Kappa Nu, Tau Beta Pi and Phi Beta Kappa
- Excellence in Social Psychology Research (Department of Psychology, UCSD)

Research Experience

Undergraduate Researcher, Social Cognition Lab at UCSD *10/2021-current*

Python, Natural Language Processing

- Scraped and analyzing over 200,000 posts from Twitter and Weibo to study **cultural differences in loneliness expressions**
  - Revised and adapted code to scrape Twitter and Weibo posts
  - Utilized GPT-3 to perform 0-shot learning on loneliness classification on Twitter data
  - Implemented and evaluated various screening methods to filter posts about loneliness to achieve a classification accuracy of 80%
  - Examining possible relationships between the level of collectivism and patterns of loneliness expression across states and countries
- Working in a team of researchers to study the **relationship between discussed issues and emotional expression in manifestos** from the two major parties in the United States across two decades
  - Compiled a political manifesto dataset to incorporate critical information from multiple sources
  - Identified potential issues in the datasets (missing data, unclean data, etc.) and proposed solutions
  - Performed sentiment analysis using dictionary methods (LIWC, NRC lexicon, Vader) and interpreted the results
  - Participating and contributing in meetings regarding experimental design
- Performing analysis on congressional speech data and manifestos from the two major parties in the US to study the relationship between **emotional expression and left-right orientation**
  - Compiled a text-based datasets from party manifestos and congressional debates from 1960 to 2020 consisting of **over 10 million records**
  - Performing sentiment analysis on both datasets using a BERT-based emotion classifier

Research Assistant, Language and Cognition Lab at UCSD *11/2022-current*

OpenAI, HuggingFace, Excel

- Documenting large language models' theory-of-mind capabilities through text-based false-belief tasks
- Analyzing large language models' failure on adversarial modifications on the unexpected-contents task
- Participating in discussions to develop more holistic measures for theory-of-mind capabilities such as linguistic features and human reaction for large language models
- Coded textual responses to questions probing first and second order capabilities of theory-of-mind for humans and GPT-3
- Conducted literature review on the unexpected contents task
- **Preprint**: **Z. Pi**, A. Vadaparty, B. K. Bergen, C. R. Jones, Dissecting the Ullman variations with a SCALPEL: Why do LLMs fail at trivial alterations to the false belief task? arXiv [Preprint] (2024). https://arxiv.org/abs/2406.14737

Skin Lesion Classification Project *05/2021-08/2021*

Python, TensorFlow, pandas, Natural Language Processing

- Applied TensorFlow and natural language processing techniques to build a machine learning application that classifies skin lesions from images and text input
- Collected and implemented novel methods based on research papers, and improved model accuracy from 67% to 82%
- **Publication**: X. Li, **Z. Pi** and Y. Zhong, "A Web-based Hybrid System for Skin Lesion Classification," 2021 2nd International Seminar on Artificial Intelligence, Networking and Information Technology (AINIT), 2021, pp. 162-168, doi: 10.1109/AINIT54228.2021.00040.

Professional Experience

Camera Software Engineer, Qualcomm Innovation Center, Inc. *01/2023-04/2024*

C++, Image Signal Processing

- Led the design, analysis, implementation and validation of code flow refactors and optimizations to enable efficient memory utilization and reduce instruction count
- Collaborated across teams in multiple functional areas to triage failures and develop features that improves image quality
- Create, maintain and present on thorough documentations of internal debugging tools to shorten the learning curve for new engineers

Machine Learning Team Lead, Tech For Good Inc. *06/2021-09/2021*

TensorFlow, GitHub, OpenCV

- Collected, designed, proposed and implemented distracted driving detection architectures using TensorFlow and improved model performance by 40%
- Coordinated a machine learning team of 4 interns to carry out experiments using different architectures for video and image classification
- Surveyed basic methods for anomaly detection and object segmentation to detect weapons in surveillance videos

Software Development / Teaching Intern, ThoughtSTEM LLC. *07/2019-08/2019*

Racket, GitHub, Curriculum Design, Teaching

- Coordinated with a small team of interns to design and implement programs in Racket for a K-12 setting
- Devised and managed a structure page of tutorials and sample programs using GitHub
- Taught computing concepts such as functions, conditionals and loops to K-12 students
- Guided K-12 students to create simple games using a custom library in Racket

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Other Experience

Lab Manager, Social Cognition Lab at UCSD *08/2022-12/2022*

- Attending lab meetings and contributing to discussions about research projects and paper reviews
- Coordinating 10+ undergraduate research assistants and their assignments to different researchers in the lab
- Managing the SONA subject pool system so that researchers can run lab studies smoothly
- Conducted experiments using fEMG and ECG

Research Assistant, under Dr. Amy Eguchi at UCSD *04/2021-12/2022*

Curriculum Design, AI/ML, Robotics

- Collaborating with a small team to test CogBot AI, a robotics kit with ML integration
- Developing various lesson plans to teach students the foundation of programing and machine learning in a K-12 setting

Quarterly Projects Chair, IEEE UC San Diego Branch *05/2021-05/2022*

- Co-organized quarterly projects within IEEE UC San Diego branch and increase number of applications by ~200%
- Planned and hosted 10+ events (ex. workshops, quarterly project showcases, Robofest) with ~100 participants each
- Mentored various project teams in developing software and hardware projects
- Assisted in outreach programs to teach technical subjects such as cryptography in K-12 setting

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Projects

UFO Sighting vs. Party Affiliation *04/2021-06/2021*

Pandas, Beautiful Soup

- Applied data science packages including pandas to explore the correlation between the number of UFO sightings in a county and the county's party affiliation ratios
- Used Beautiful Soup to perform web scraping from wikipedia for be analyzed in the project

Meaning Making In Carcassonne *02/2021-03/2021*

Cognitive Ethnography, Video Taping, Transcription

- Video taped and transcribed a segment of a game called Carcassonne with my roommate in detail
- Analyzed the interaction and how meaning is expressed and understood through a multitude of mediums involving bodies, language and the game board

KIWIS *03/2020-06/2020*

React, Node.js, CSS, JavaScript, GitHub

- Constructed KIWIS, a forum for companies, in a team of 10 student engineers in an **agile** environment
- Worked on the front-end team to develop and test multiple features, in addition to performing code reviews

MASK Project *03/2020-11/2020*

Audio Processing, Arduino, Circuitry

- Designed and implemented a mask that produces visual stimuli when the wearer speaks using Arduino,
- Applied multiple audio processing techniques such as windowing and Fourier Transform

MoodCube *10/2019-12/2019*

Flutter, Arduino, Circuitry, Android Studios

- Built the MoodCube, a Flutter-based phone app with an Arduino-based hardware component that tracks of the mood of its user and makes music and movie suggestions accordingly in a group of 4
- Debugged and optimized the algorithm and experimented with different UI designs
- Won **first place overall** in Quarterly Projects in IEEE@UCSD in Fall 2019

Skills

- **Data Analysis**: Python, statsmodels, matplotlib.pyplot, seaborn, pandas, numpy, scipy, Librosa
- **Machine Learning**: OpenCV, NLTK, SpaCy, scikit-learn, Keras, TensorFlow, PyTorch, HuggingFace
- **Software Development**: GitHub, C, C++, Java, ARM Assembly, x86, JavaScript, Haskell, Clojure, C#
- **Cognitive Ethnography:** interview, transcription, photo-based analysis, audio-based analysis, video-based analysis