Jirayu Burapacheep

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Education

University of Wisconsin-Madison 2019 - 2023

- B.S. in Computer Science and Data Science
- **Relevant Coursework:** Algorithms, Operating Systems, Database Systems, Optimization, Information Security, Big Data Systems, Multivariable Calculus, Quantum Algorithms — CS GPA: 3.98, GPA: 3.90
- **Online Coursework:** Deep Learning Specialization by deeplearning.ai
- Received a full scholarship from the Royal Thai government

Research Experiences

Undergraduate Research Assistant Sep 2022 - May 2023

Research Group led by Professor Sharon Li, Department of Computer Science, UW-Madison

- Conducted an extensive literature review on trustworthy machine learning, focusing on the challenges of out-of-distribution (OOD) detection and distribution shifts
- Developed and conducted extensive experiments on a novel OOD detection method based on energy-based models and representation learning via contrastive learning
- Authored a research paper on the proposed method, which is currently under review

Undergraduate Research Assistant Sep 2021 - May 2023

Collaboration between the Department of Life Sciences Communication (Professor Kaiping Chen) and the Department of Computer Science (Professor Sharon Li), UW-Madison

- Built a web application to collect conversational data between survey participants and OpenAI's GPT-3 chatbot model, contributing to the conversational data collection part of the research project.
- Studied suitable prompt design for language models to be used as chatbots, exploring effective strategies for generating meaningful and engaging interactions.

Research Project Participant Jan 2021 - May 2021

Cloud Based Prediction Tools for Materials Properties, Information Skunkworks Group (Professor Dane Morgan), Department of Material Science & Engineering, UW-Madison

- Explored statistical methods relevant to material properties prediction research, acquiring knowledge in predicting material behavior.
- Gathered performance comparison data between different models to evaluate their accuracy in predicting molecule homo-lumo gap, contributing to the ongoing research project.

Publication

Chen, K., Shao, A., **Burapacheep, J.**, & Li, Y. A critical appraisal of equity in conversational AI: Evidence from auditing GPT-3's dialogues with different publics on climate change and Black Lives Matter. 2022

- Auditing study to examine how GPT-3 responded to different sub-populations on crucial science and social topics: climate change and the Black Lives Matter (BLM) movement
- Link: https://arxiv.org/abs/2209.13627

Work Experiences

Google, Software Engineer Intern May 2022 - Aug 2022

- Improved Google Recipes Search results ranking by incorporating rating scores, thumbnail image quality, and other signals
- Enhanced recipe grouping using historical query refinements, resulting in positive metrics feedback from human evaluation

Data Wow Co., Ltd., Machine Learning Engineer Intern Jun 2021 - Aug 2021

- Reduced human workload in ID card spam checking by 83% through AI-based card recognition and backend system design
- Utilized a few-shot object detection algorithm for efficient image self-labeling application

Honors and Awards

ICPC 2020 World Finals - International Collegiate Programming Contest, High Honor Award Oct 2021

- Ranked 17th in ICPC 2020 World Finals (4th place among all North American teams)
- Ranked 1st in ICPC North Central North American Regional Contest 2020

IOI 2018 - International Olympiad in Informatics, Bronze Medalist Sep 2018

- International informatics competition for high school students worldwide

APIO 2018 - Asia-Pacific Informatics Olympiad, Silver Medalist May 2018

- International informatics competition for high school students within the Asian and Western Pacific region

eBay 2021 University Machine Learning Competition, 4th Place Jan 2022

- Trained and tuned LightGBM model on 15 million rows of eBay shipment data to accurately predict estimated delivery dates.

Google Code Jam Competition 2020, Top 1% 2020

- Implemented C++ solutions to algorithmic problems
- Ranked 621st among all contestants.

Teaching Experiences

Grader, COMP SCI 880 Quantum Algorithm, UW-Madison Jan 2023 - May 2023

- Assisted in grading graduate-level quantum algorithms homework assignments
- Provided detailed feedback and ensured adherence to course guidelines
- Collaborated with instructors to maintain consistent grading procedures

Guest Lecturer, UW-Madison ICPC Club

- Lead and facilitated discussion on centroid decomposition, an advanced graph algorithm in competitive programming, and its usage in ICPC problems Apr 2022
- Held a training session on the topic of string matching and advanced data structures problems in ICPC contests with the UW-Madison ICPC participants. Oct 2022

Private Tutor Jun 2021 - Aug 2021

- Held a weekly meeting with high school students who were interested in joining Thailand Olympiad in Informatics on fundamental topics in mathematics, algorithms, and data structures

Selected Personal Projects

Wisc-course-alert Apr 2021 - Apr 2022

- Developed a system using NodeJS and MongoDB to manage user watching lists and notify them about course availability by requesting course status from the UW-Madison enrollment website via Rest API
- Link: wiscoursealert.com

Parrot.Ai Mar 2022 - Apr 2022

- Created a platform using ReactJS and TailwindCSS to improve accessibility for users with low literacy, allowing them to fill out forms through audio interaction
- Implemented Google Form scraping and utilized Google Speech-to-Text and Text-to-Speech API for input and output conversion
- Link: parrot-ai.vercel.app

Zero-shot Voice Conversion Jun 2021 - Jul 2021

- Implemented and trained an extended deep learning model based on the StarGAN-family to modify speech from a source speaker to sound like another target speaker without altering linguistic information.
- Link: github.com/Top34051/stargan-zsvc

Music Style Transfer Mar 2021 - Jun 2021

- Scraped audio data from YouTube and performed vocal and music source separation using Demux
- Trained a generative adversarial network (GAN) family model to modify songs and adopt the genre of another song

Self-maintenance Convenient Store Shelf Mar 2021

- Trained an R-CNN object detection model to count the number of products remaining on store shelves for each brand, adapting it for densely packed scenarios

IBM Call for Code Spot Challenge for Wildfires Nov 2020 - Feb 2021

- Applied various time-series forecasting techniques and machine learning models, including AR, MA, ARIMA, FB Prophet, XGBoost, RandomForest, and LSTM, to estimate wildfires in Australia
- Achieved 1st place in January prediction

Leadership and Involvement

Event Planning Committee, Thai Student Association (TSA) at the UW-Madison Oct 2019 - Aug 2020

- Organized semester-based social events to foster member bonding and provide support
- Represented and shared Thai culture with the UW-Madison community through successful public cultural events
- Assisted in planning a fundraising event selling traditional food, raising over $600 for three international organizations

Task Setter and Staff, Thailand IOI Representative Selection Camp 2018 - Present

- Designed advanced algorithm and data structure problems of comparable difficulty to IOI (International Olympiad in Informatics) for the Thai IOI Representative Selection camps

Contest Setter, Codeforces Feb 2019

- Initiated and organized a large-scale competitive programming contest on the Codeforces platform, attracting 8,000 participants across both divisions 1 and 2
- Link: https://codeforces.com/contest/1130 and https://codeforces.com/contest/1129

Technical Skills

- Languages: C++, Python, R, Java, Javascript
- Frameworks & Platforms:
  - Deep Learning: PyTorch, Detectron2, Tensorflow, Keras, Pandas, Hugging Face
  - Web/App Dev: Docker, ReactJS, NodeJS, Flask, Celery, AWS, Google Cloud Platform, PostgreSQL, MongoDB, Elasticsearch