

Krirk Nirunwiroj

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Education

Johns Hopkins University

M.S.E. in Computer Science (Human Language Technology Concentration)

Baltimore, MD

Jan 2025 - Present

University of Wisconsin-Madison

B.S. in Computer Science, Data Science, and Certificate in Mathematics

Madison, WI

Sep 2020 - May 2024

(Graduated with **Distinction in the Major**)

GPA: 3.80/4.00

Relevant Coursework: Large Language Model in Practice, Artificial Intelligence, Classification and Regression Trees, Database Management Systems, Big Data Systems, Algorithms, Multivariable Calculus, Linear Algebra, Linear Optimization, Theory of Probability, Graphs and Networks

Research Experiences

Research Assistant

Madison, WI

A research sub-group led by **Dr. Yun-Shiuan Chuang**, advised by **Professor Junjie Hu** and

Dec 2023 - Sep 2024

Professor Timothy T. Rogers, Knowledge and Concepts Lab, UW-Madison

- Studied human-like LLM agent construction by infusing topic-specific opinions based on belief networks.
- Conducted a factor analysis to identify the underlying belief network across 64 topics and 564 instances.
- Developed LangChain pipeline and a wrapper class for quantization and local loading of open-source models.
- Optimized large-scale experiments with the HTC system, improving experiment efficiency.

Data Analyst Research Intern

Madison, WI

[Epistemic Analytics Lab](#), Center for Research on Complex Thinking, Wisconsin Center for

Mar 2023 - May 2024

Education Research, UW-Madison, advised by **Professor David Williamson Shaffer**

- Implemented the data analysis pipeline of iPlan, a land-use management game, using Ordered Network Analysis (ONA) to study the strategic thinking of players, collaborating with multiple classes across the USA. [\[Repo\]](#) [\[Game\]](#)
- Engaged in QA testing, identified challenges, and proposed solutions for [Codey](#), an application for developing, validating, and implementing automated coding schemes.
- Collaborated with multiple external researchers on formatting data and using [ENA and ONA](#) in their projects.

Student Researcher

Madison, WI

TRASHBOT, an automated trash collection drone project led by **Dr. Ryan Jacobs**,

Oct - Dec 2022

Informatics Skunkworks, Department of Material Science & Engineering, UW-Madison

- Trained and fine-tuned a YOLOv7 model with the TACO dataset to identify trash in 80 categories.
- Collaborated with the drone navigation team for real-time trash detection integration.

Research Assistant

Nakhon Pathom, Thailand

LAIGA, a machine learning-based framework for assessing and identifying leaders in

Jun - Aug 2021

college students, advised by **Professor Suppawong Tuarob**, Mahidol University

- Conducted an extensive literature review on 21st-century skills and leadership assessment.
- Automated correlation-based feature subset selection and model selection algorithms using Java with Weka API.
- Tuned model hyperparameters to optimize performance, ensuring the resulting model's accuracy.
- Achieved a 5.87% MAPE in leadership assessment and an 83.2% F1 score in leadership identification.

Publications

- [1] Chuang, Y. S., **Nirunwiroj, K.**[†], Studdiford, Z.[†], Goyal, A., Frigo, V. V., Yang, S., Shah, D., Hu, J., & Rogers, T. T. (2024). Beyond demographics: Aligning role-playing LLM-based agents using human belief networks. In **Findings of the Association for Computational Linguistics: EMNLP 2024**, pages 14010–14026, Miami, Florida, USA. Association for Computational Linguistics. <https://doi.org/10.18653/v1/2024.findings-emnlp.819>
- [2] Chuang, Y. S., **Nirunwiroj, K.**[†], Studdiford, Z.[†], Goyal, A., Frigo, V. V., Yang, S., Shah, D., Hu, J., & Rogers, T. T. (2024). Beyond demographics: Aligning role-playing LLM-based agents using human belief networks. **NeurIPS 2024 Workshop on Behavioral Machine Learning**. Available at <https://openreview.net/forum?id=yhF93Bwmmmd> [arXiv: <https://doi.org/10.48550/arXiv.2406.17232>]

([†] joint second author)

- Explores how integrating empirically derived human belief networks can significantly improve the alignment of role-playing LLM agents with human behavior beyond demographic information alone.
- [3] **Nirunwiroj, K.** (2023). Chitchat bots: A comparative study and behavioral analysis of large language models using epistemic network analysis. In G. Arastoopour Irgens & S. Knight (Eds.), *Fifth International Conference on Quantitative Ethnography: Conference Proceedings Supplement* (pp. 154–157). Retrieved from https://www.qesoc.org/images/pdf/ICQE23_Supplement_Proceedings.pdf#page=157
- Used Epistemic Network Analysis (ENA) to conduct a comparative behavioral analysis between Bard AI and GPT3.5 with over 200 responses on 2 topics.
- [4] Pongpaichet, S., **Nirunwiroj, K.**, & Tuarob, S. (2022). Automatic assessment and identification of leadership in college students. *IEEE Access*, 10, 79041–79060. <https://doi.org/10.1109/access.2022.3193935>
- Presents an automated system for assessing and identifying leadership in college students using multiple machine learning techniques.

Presentation

Nirunwiroj, K., "Chitchat Bots: A Comparative Study and Behavioral Analysis of Large Language Models Using Epistemic Network Analysis," International Conference on Quantitative Ethnography 2023, *October 8-12, 2023, Melbourne, Australia*

Honors and Awards

- Winner**, Semi-finals of the **Meta Llama Hackathon** (Meta AI Accelerator Pitchathon Thailand) Sep 2024
- Engaged in core experiments and benchmarks for the proposed product with the [Preceptor AI](#) team.
- First Runner-up**, Agoda Intern Pitch Competition 2022 Jul 2022
- Pitched a [new travel planner feature](#) with a team of 7, competing among 100+ interns.
- Winner**, CheeseHacks 2021 at UW-Madison Oct 2021
- Developed a [deaf-blindness assistance app](#) with a team of 4, winning against 100+ participants.
- Dean's List**, College of Letters and Science at UW-Madison 2020 - 2023
- Full Scholarship**, The Ministry of Higher Education, Science, Research and Innovation of Thailand 2019 - Present
(Royal Thai Government Scholarship)
- Selected from approximately 1,000 students nationwide for the fully-funded scholarship, which supports undergraduate, master's, and Ph.D. studies at leading international universities.

Work Experiences

- CARIVA (Thailand) Co., LTD.** Bangkok, Thailand
AI Engineer Intern, PreceptorAI Team Jul - Oct 2024
- Developed LLM systems for generating differential diagnoses from patient cases.
 - Proposed customized SAMMO and ensemble techniques, improving top-5 diagnostic accuracy by up to 7.14%.
 - Integrated Prompt Flow into the pipeline, streamlining experimentation and accelerating product deployment.
 - Integrated [RAGChecker](#) and Rerankers into the medical RAG system, increasing response quality and relevance.
- Phuket Wittayalai School** Phuket, Thailand
UX/UI Designer & Full Stack Developer Aug 2024 - Present
- Developed a scalable course enrollment platform, supporting over 2,000 users with high uptime and efficiency.
 - Designed and delivered a Figma prototype, securing approval from the curriculum committee.
 - Architected the full-stack solution, implementing the front end with React and the back end with Firebase.
- Agoda Services Co., LTD.** Bangkok, Thailand
Software Engineer Intern, YCS Desktop team May - Aug 2022
- Boosted website efficiency by removing RUM and BoomerangJS and utilized Grafana for performance tracking.
 - Fortified security by transitioning the C# codebase from REST to Gateway API.
 - Modified database queries, tests, and codes in Scala and SQL, shifting from the main to a copied database.
 - Updated payment method appearance using React, anticipating a 5% UPC payment option increase.

Teaching Experiences

- Student Assistant** Madison, WI
College Algebra (Precalculus), Department of Mathematics, UW-Madison Sep 2021 - May 2022
- Facilitated in-class discussions and managed student queries during breakout groups for 50+ students.

- Hosted drop-in sessions in the Pre-Calculus Lab, providing support to fellow students.
- Collaborated with professors to address challenges, offering solutions and teaching approaches.

Instructor

Phuket, Thailand

C++ Programming Workshop, Phuket Wittayalai School

Oct 2017

- Delivered an intensive C++ programming lecture to 30 gifted-program middle school students.
- Offered after-class consultations, assisting with programming concepts and advising on educational pathways.

Selected Projects

Oyasumi

Madison, WI

Team Lead, Android Developer; Team of 4 [[Repo](#)]

Sep - Dec 2023

- Developed a sleeping diary app with features: dream notes, AI interpretation, and a sleep tracker.
- Designed user interfaces and created a prototype for the app proposal using Figma.
- Implemented the app in Android Studio using Java, integrating SQLite, GPT-3.5, and visualization libraries.
- Created a presentation poster and demonstration video, presenting the app to an audience of over 100 people.

Agoda Travel Planner

Bangkok, Thailand

UX/UI Designer, Presenter; Team of 7

Jun - Aug 2022

- Used Figma to design a new travel planner feature for the Agoda mobile application.
- Demonstrated and presented to over 100 interns, senior employees, and the executive board of Agoda.

SixCents

Madison, WI

Full Stack Developer; Team of 4; [React: [Repo](#); [Present](#)] [Flutter: [Repo](#); [Present](#)]

Oct 2021 - Mar 2022

- Developed a deaf-blindness assistance app featuring Text-to-Braille, Image-to-Braille, and handwriting recognition
- Assumed a leadership role, providing direction for naming, graphics, demonstration, and presentation.
- Implemented vibration features and image recognition for the image-to-Braille feature using Heroku and Flask.

Leadership and Involvement

International Conference on Quantitative Ethnography 2023

Melbourne, Australia

Poster Presenter/Reviewer and Organizer Assistant

2023

- Anonymously reviewed research posters, maintaining high academic and presentation standards.
- Developed and designed instructional materials for ENA and ONA workshops.
- Managed bibliographic data for conference proceedings using Zotero.

Epistemic Analytics Lab

Madison, WI

Data Analyst Research Intern and Outreach Member

2023 - 2024

- Reviewed prospective interns' profiles and interviewed candidates for internship positions.
- Improved guidelines for new interns, mentoring in data analysis techniques and lab technologies.
- Facilitated technical support and problem-solving in Codey and ONA workshops at the QE Summer Institute 2023, assisting over 20 international quantitative ethnography researchers.

Thai Student Association at UW-Madison

Madison, WI

Vice President

2021 - 2022

- A key organizer of the Laos-Thai-Cambodian New Year event, drawing nearly 100 attendees in collaboration with APIDA, the Multicultural Student Center, and Thai instructors at UW-Madison.
- Oversaw 3 event planning committees, ensuring effective collaboration and event success.
- Enhanced and maintained the organization's online presence, including the website, social media, and store.
- Handled financial oversight, maintaining expenditure records in collaboration with the financial chair.

Technical Skills

Languages: Python, R, SQL, AQL, C, C++, C#, Scala, Java, JavaScript, HTML, CSS, Dart, LaTeX

Frameworks & Platforms:

- **NLP/ML/Analytics:** Hugging Face, Transformers, LangChain, LlamaIndex, OpenAI, Vertex AI, Azure AI, MLflow, Prompt Flow, PyTorch, Scikit-learn, TensorFlow, Weka, Epistemic Network Analysis, Ordered Network Analysis
- **Web & App Development:** React, Node.js, Flutter, Flask, Android Studio, Postman, Dialogflow, Figma, Firebase
- **Cloud, DevOps & Big Data:** Google Cloud Platform, Modal, Docker, Hadoop, Spark, Cassandra, Kafka, ArangoDB