

Aneesh Komanduri

CONTACT INFORMATION

✉ akomandu@uark.edu

🌐 akomand.github.io/

🐙 github.com/akomand

RESEARCH INTERESTS

My research interests generally lie in the areas of causal inference, representation learning, and generative modeling, with applications in trustworthy and robust machine learning. I am also interested in exploring applications of causal generative models in domains such as healthcare.

EDUCATION

University of Arkansas

Fayetteville, Arkansas

Ph.D., Computer Science

2021 - 2026

- **Advisor:** Dr. Xintao Wu

M.S., Computer Science, GPA: 4.0

2021 - 2024

- **Relevant Courses:** Statistical Methods, Regression Analysis, Machine Learning, Deep Learning, Computer Vision, Natural Language Processing, Advanced Information Retrieval, AI Ethics

B.S., Computer Science/Engineering & Applied Mathematics

2017 - 2021

- Graduated *Summa Cum Laude*

SKILLS

- Languages: Python, C/C++, Java, Javascript, SQL
- ML Frameworks: PyTorch, Tensorflow, scikit-learn, Pyro
- Machine Learning: Large Language Models, Diffusion Probabilistic Models, Parameter Efficient Fine-tuning (e.g., LoRA), Variational Autoencoders, Normalizing Flows, Causality
- Technologies: Flask, Django, AWS, Databricks, Postgres, Apache Spark, ReactJS
- Applications: \LaTeX , Jupyter Notebook, VSCode, PyCharm, Git, RStudio, MATLAB

RESEARCH EXPERIENCE

Social Awareness & Intelligent Learning Lab (SAIL)

Fayetteville, Arkansas

Graduate Research Assistant

Oct 2021 - Present

- Proposed theory and learning frameworks toward identifiable causal representation learning in the label-supervised setting using VAE and flow-based models
- Currently working on counterfactual generation via diffusion-based causal representation learning, applications of causal generative models in fairness-aware learning, and causality in large-scale generative models such as large language models (LLMs) and pre-trained diffusion models

Data Science & Artificial Intelligence Lab

Fayetteville, Arkansas

Undergraduate Research Assistant

Aug 2019 - May 2021

- Research focused on graph representation learning and using Bayesian methods to account for uncertainty in noisy graph data to improve node classification
- Designed and developed a cyber-argumentation discourse-based platform and utilized natural language processing and knowledge graph-based models for user opinion modeling

PEER-REVIEWED PUBLICATIONS

Aneesh Komanduri. “Toward Causal Generative Modeling: From Representation to Generation.” *Proceedings of AAAI Conference on Artificial Intelligence (AAAI)*. 2025. (Doctoral Consortium)

Aneesh Komanduri, Chen Zhao, Feng Chen, and Xintao Wu. “Causal Diffusion Autoencoders: Toward Counterfactual Generation via Diffusion Probabilistic Models.” *Proceedings of 27th European Conference on Artificial Intelligence (ECAI)*. 2024.

Aneesh Komanduri, Yongkai Wu, Feng Chen, and Xintao Wu. “Learning Causally Disentangled Representations via the Principle of Independent Causal Mechanisms.” *Proceedings of the 33rd International Joint Conference on Artificial Intelligence (IJCAI)*, 2024.

Aneesh Komanduri, Xintao Wu, Yongkai Wu, and Feng Chen. “From Identifiable Causal Representations to Controllable Counterfactual Generation: A Survey on Causal Generative Modeling.” *Transactions on Machine Learning Research (TMLR)*. 2024.

Aneesh Komanduri, Yongkai Wu, Wen Huang, Feng Chen, and Xintao Wu. “SCM-VAE: Learning Identifiable Causal Representations via Structural Knowledge.” *IEEE International Conference on Big Data (BigData)*, 2022.

Aneesh Komanduri and Justin Zhan, “Neighborhood Random Walk Graph Sampling for Regularized Bayesian Graph Convolutional Neural Networks.” *IEEE International Conference on Machine Learning and Applications (ICMLA)*, 2021.

HONORS AND AWARDS	1st Place Graduate Student Poster (NSF DART 2024 Annual Conference)	Sep. 2024
	Doctoral Academy Fellowship	2021-2025
	Congressional Letter for STEM Outreach, U.S. House of Representatives	July 2021
	Lawrence Jessor Toll, Jr. Endowed Scholarship	2020-2021
	Silas Hunt Distinguished Scholarship	2017-2021

SERVICE	Conference Reviewer: NeurIPS’24, LoG’24, ICLR’25, IEEE ICMLA’24 Journal Reviewer: TMLR, DMLR, IJDSA Workshop Reviewer: CaLM@NeurIPS’24, SPIGM@ICML’24
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TEACHING & MENTORSHIP EXPERIENCE	UNITE, Army Educational Outreach Program (AEOP) Fayetteville, Arkansas <i>Lead Research Mentor</i> (https://github.com/akomand/AEOP_Research_2021) 2020, 2021
	<ul style="list-style-type: none"> • Guided High School students from underrepresented communities with research in data science • Created lesson plans to teach data/text preprocessing, classification/regression, word embeddings, entity extraction, topic modeling, language models, transformers, implementations in Python, deep learning pipeline in PyTorch, and applications in question answering • Assisted students in the development of a machine learning research paper and helped students present research to be evaluated by the Department of Defense education initiative

University of Arkansas <i>Teaching Assistant</i>	Fayetteville, Arkansas Jan 2020 - Dec 2020
<ul style="list-style-type: none"> • Courses: CSCE 2004 (Programming Foundations I) and CSCE 3193 (Programming Paradigms) • Taught two lab sections weekly for a total of over 45 computer science & engineering students and held office hours for over 200 students • Created, debugged, graded, and provided feedback on object-oriented and functional programming assignments (C++/Java/Python) and exams and held office hours for 200+ students 	

INDUSTRY EXPERIENCE	Phillips 66 Bartlesville, Oklahoma <i>Digital Security and Cloud Engineering Intern</i>	May 2020 - Aug 2020
	<ul style="list-style-type: none"> • Developed infrastructure as code templates with Terraform and built CI/CD pipelines for the creation of resources such as SQL Servers, Blob Storages, Key Vaults, and Firewall rules for Azure Data Factory in a production environment • Automated the process of keeping inventory on cloud instance security group rules for accounts throughout the company by creating a Python script to pull data using the Dome9 REST API 	