

NIKITA RAJANEESH

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EDUCATION

Columbia University (New York, NY)

Sept 2023 - May 2025 (expected)

Advanced Master's Research program (advised by Prof. Richard Zemel)

GPA: 3.91/4.0

Selected Coursework: Deep learning, Computational Learning theory, Continual learning, Datasets in ML, Computational aspects of Robotics

Purdue University (West Lafayette, IN)

Aug 2016 - May 2020

BS in Computer Science & Minor in Mathematics

GPA: 3.82/4.0

Selected Coursework: Randomized Algorithms (*Graduate-level*), Natural Language Processing (*Graduate-level*), Machine Learning, Artificial Intelligence, Analysis of Algorithms, Compilers, Linear Algebra

SKILLS

Languages

Python, Go, C/C++, Java, TypeScript, Scala, SQL, R, MATLAB

Tools

PyTorch, Huggingface, vLLM, Tensorflow, AWS, Docker, Pandas, Spark, Numpy

PUBLICATIONS

Thomas P Zollo, Nikita Rajaneesh, Richard Zemel, Talia B. Gillis, and Emily Black. Towards effective discrimination testing for generative AI. In Fairness, Accountability and Transparency (FAccT), 2025. Full paper: arXiv:2412.21052.

Kent Quanrud and Nikita Rajaneesh. On Equalized Odds in Supervised Learning, for the Special Case of Non-Decreasing Conditional Event Probabilities (2021). Preprint available at: Google drive.¹

EXPERIENCE

Graduate Student Researcher - Columbia University

Sept 2023 - Present

Supervised by Prof. Zemel

New York, NY

- Developed an unsupervised test-time adaptation approach for Multi-modal Large Language Models (MLLMs) by fine-tuning on a weakly supervised auxiliary task, enhancing generalization in label-scarce domains like medicine. Achieved 11.1% relative improvement on MMMU, 5.6% relative improvement on GQA and 2.6% relative improvement on VQA-Rad (medical dataset).
- Leveraging instruction tuning and continual learning methods to train an MLLM to predict an individual's health risk in rural India.
- Investigated the impact of red-teaming variability and multi-turn conversations on fairness rankings, revealing fundamental flaws in widely used AI safety techniques.
- Benchmarked state-of-the-art LLM uncertainty quantification techniques (e.g., semantic uncertainty, eigenscore) in the multi-modal setting, extending their evaluation beyond text-only models.
- Developed a computationally efficient UQ method leveraging image-informed priors, achieving performance comparable to existing LLM-based UQ baselines while reducing computational overhead.
- Developed an algorithm to reconstruct weights of black box CNNs under the guidance of Prof. Hod Lipson.

Software Engineer, AI/ML - Determined AI (HPE company)

Feb 2022 - June 2023

Chicago, IL

¹ Authors in alphabetical order by last name

- Developed software to enable users to customize hyperparameter-tuning with Determined's Deep Learning platform. Designed the software to ensure fault tolerance and distributed computation.
- Developed framework for an adversarial library toolkit that is integrable with deep learning platform.
- Wrote Python SDK and Go API for user management and authentication for model registry.
- Built functionality to delete checkpoints saved during model training.
- Built a tool to enable easy debugging of trials in model experiments.

Software Engineer - Morningstar, Inc.
Chicago, IL

August 2020 - Feb 2022

- Developed software (using vaderSentiment and spaCy) to perform Sentiment Analysis on fund reviews.
- Developed an audit process (with AWS architecture) which collects metadata of tables in the Datalake.
- Worked with AWS lambda, AWS Glue jobs and Spark to parse and write AWS s3 access and cloudtrail logs to parquet files.

Undergraduate Student Researcher - Purdue University
West Lafayette, IN

January 2020 - August 2021
Paper listed above.

- Considered a well studied notion of fairness called equalized odds. Foundational work by Hardt, Price and Srebro [HPS16] considers the problem of taking an existing classifier or a rating system as a black box and deriving another classifier satisfying equalized odds and otherwise minimizing the error.
- Built on [HPS16] and consider the same problem for the special and canonical case of algorithmic scoring systems that exhibit non-decreasing conditional event probabilities.
- Showed that one can derive a universally optimal classifier subject to equalized odds for scoring systems with non-decreasing event probabilities. Moreover, the universally optimal classifier can be obtained by a randomized one-threshold classifier which is simple and explainable to policy makers since it involves only a single threshold for each demographic. Thirdly, the optimal randomized one-threshold classifier can be computed in polynomial time.

Software Engineering Intern - Morningstar, Inc.
Chicago, IL

June 2019 – Aug 2019

- Developed software that will allow users to do analytics on the usage data of the Datalake.
- Developed software that will help users get access to the glue catalog in Datalake by using AWS Glue API and Apache Airflow.

Software Engineering Intern - Jobcase, Inc.
Boston, MA

June 2018 - August 2018

- Developed a “view history” functionality using Java Hibernate in an AngularJS webapp called “Scheduler” to allow a user to record changes to a scheduled process.
- Developed a regular expressions based approach to automatically populate job requirements' fields to reduce job search time for a user. Used Elasticsearch and developed a parsing tool in Java to test and analyze the proposed approach.

PRESENTATIONS

Columbia reading group(s)
Jan 2024 - May 2025

- Led a discussion on the Online Contextualized few-shot learning paper. (Ren et al.)
- Led a discussion on Apple's Multimodal model (MM1) paper.