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 ICLR 2025 Workshop on Building Trust in Language Models and Applications, 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 domain 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 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

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[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. August 2020 - Feb 2022
Chicago, IL

- 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 January 2020 - August 2021
West Lafayette, IN *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. June 2019 – Aug 2019
Chicago, IL

- 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. June 2018 - August 2018
Boston, MA

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