Maya Gambhir

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Education

University of Pennsylvania — Philadelphia, PA
BSE in Artificial Intelligence, GPA: 3.81, Rachleff Scholar — *Aug. 2022 – May 2026*

Research

Conformal Prediction for LLM Reasoning — January 2024 – Present
Rachleff Scholar Research under Professor Surbhi Goel — *Philadelphia, PA*

- Improving LLM performance on reasoning tasks by designing updated qualitative metrics for evaluating segmented LLM outputs
- Iteratively developing a novel scoring mechanism that accounts for dependence between claims, optimizing outputs for correctness and coherence, and applying conformal prediction techniques to obtain correctness guarantees on model outputs
- Presented as a poster at the **2024 NeurIps Statistics For LLMs workshop**

Emotion Prediction for News Data — October 2023 – Present
Penn Computational Social Science Lab — *Philadelphia, PA*

- Applying the ChatGPT API and other machine learning models to do sentiment analysis on news data, iteratively adjusting api calls for effective quote extraction, calculating various error rates
- Providing weekly code updates to advisor, working collaboratively to debug and improve model performance
- Work presented at **2024 International Conference for Computational Social Science**

Knowledge Areas

Machine Learning
Foundational knowledge of ML, with focuses on LLM inference and optimization

- Implementing and optimizing pre-trained versions of linear/logistic regression, decision trees, KMeans Clustering, standard neural networks, CNNs, RNNs, and Transformers
- Linearly parameterized models, least-squares model fitting via regression, linear and polynomial fit, AR models, validation, model selection and feature engineering and cross-validation

Mathematics and Theory
Concentrating in theoretical ML concepts; advanced calculus and linear algebra

- Sensitivity analysis and solving constrained and multi-objective least-squares problems by hand and with Python
- Appyling probability, calculus and linear algebra techniques to prove machine learning theorems such as the representer theorem, uniform convergence and convergence of stochastic gradient descent

Work Experience

Software Engineering Intern — June 2023 – August 2023
Munich Re — *New York City, NY*

- Led the development of a new React-based front end for an insurance estimation API for internal and external use
- Completed detailed documenting on all aspects of the code base and implemented rigorous testing

Projects

Movie Review Sentiment Analysis — 2023

- Data preproccessing using PCA, WordNetLemmatizer and TfidfVectorizer, Adaboost with logistic regression/decision trees
- Implemented standard neural network with pytorch, visualized outcomes for both with varied hyperparameters and layers

CIFAR-10 Image classification — 2023

- Training SoftMax regression and CNN in PyTorch using Cross Entropy Loss/Adam optimizer
- Implementing dataset shifts with rotation and grayscaling, visualized outcomes for both with varied hyperparameters and layers