

# Qingyang Liu

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## EDUCATION

**Carnegie Mellon University** Pittsburgh, PA  
**Master's in Computational Data Science** | GPA: 4.0/4.33 Aug 2023 – May 2025 (expected)  
Courses: Machine Learning (PhD), Large Language Models, Advanced Cloud Computing, Multimodal ML (current)  
**University of Michigan - Ann Arbor** Ann Arbor, MI  
**B.S. in Data Science (honor) and Economics** | GPA: 3.99/4.0 Sep 2020 – Apr 2023  
Courses: Deep Learning, NLP, Data Structures, Web System, DBMS, Regression Analysis, Theoretical Statistics

## TECHNICAL SKILLS

**Languages:** Python, C/C++ (OOP), R, Java, JavaScript, SQL (Oracle, MySQL, PostgreSQL)  
**Frameworks:** PyTorch, TensorFlow, scikit-learn, Transformers, Pandas, Matplotlib, Seaborn, NLTK, spaCy, PySpark  
**Tools:** AWS, Azure, Agile, Git, Shell, Docker, Kubernetes, CI/CD, NoSQL, Tableau, HTML/CSS, Jupyter Notebook

## PROFESSIONAL EXPERIENCE

**New York Life Insurance** New York, NY  
**Data Scientist Intern** | *Python, PyTorch, SQL* Jun 2024 – Aug 2024

- Initiated a **deep-Q-learning**-based underwriting framework to sequentially acquire costly health-related data and customize mortality risk prediction at individual case level, reducing cost by **47%** with only **0.04** drop in f1 score
- Performed in-depth **EDA** and **feature engineering** on tabular/text data with NLTK and scikit-learn to differentiate feature importance across demographic segments; enhanced **survival analysis** in R for data labeling
- Optimized **ETL** pipeline for querying **1M+** underwriting data on Redshift with **30%** improved efficiency

**NeuLab @ CMU Language Technologies Institute** Pittsburgh, PA  
**Research Engineer** | *Python, PyTorch* Feb 2024 – Current

- Build a unified and scalable Python framework for **LLM** bias and reliability analysis, with composable operations e.g. bias quantification, hallucination analysis, prompting, retrieval-augmented generation (**RAG**)
- Developed example testbeds for toxicity analysis, adapting and integrating 4 detoxification approaches into library

**U-M Statistics Undergraduate Research Program** Ann Arbor, MI  
**Student Researcher** | *Python, R* Jan 2022 – Jul 2022

- Enhanced machine learning fairness by mitigating racial bias in a widely-used health risk prediction algorithm
- Designed an iterative importance re-weighting algorithm based on gradient boosting to reduce fairness violation
- Achieved a robust **6-8%** boost in AUROC score, and **20%** reduction in demographic parity violations, informed a positive social impact on the problematic dataset of **100k+** real patient-year records

**Accenture** Shanghai, CN  
**Strategic Data Science Intern** | *Python* Jun 2021 – Sep 2021

- Provided Proof of Concept (**PoC**) of enhanced ML system design for an energy company, projected **20%** boost in energy distribution efficiency via client segmentation and usage forecasting using XGBoost and LSTM
- Developed a modular Python codebase for interactive **Tableau** dashboards integrated with **Streamlit** to visualize impacts of digitalization on key business metrics, simplifying decision-making for clients and cross-functional teams

## PROJECTS

**Kaggle: Predictive Modeling of Energy Behavior** Jan 2024 - May 2024

- Developed a **time-series** LGBM+DeepTables ensemble model to forecast electricity consumption and production
- Conducted EDA and feature engineering for lag features, ranked top **6%** among 2700+ teams with **bronze** medal

**LLMs for Long Dialogue Summarization** Sep 2023 – Dec 2023

- Enhanced parameter-efficient finetuning on Llama-2 with **QLoRA** and shifted attention window to extend input context length from 4k to **16k**, integrated DeepSpeed ZeRO for efficient distributed training
- Outperformed baselines including zero-shot prompt engineering on GPTs/Llama-2 and task-oriented models like DialogLM and Pegasus, with on average 25% increase in BLEU, 5% in Meteor, and **10%** in BertScore

**Group-Robust Text Toxicity Detection** Feb 2023 – Apr 2023

- Developed a BERT+BiLSTM classifier for toxicity detection on **450k** real online comments, with a two-stage training regime to mitigate spurious correlation with 8 sensitive demographic groups
- Innovated a data balancing technique of up-sampling the error set and down-sampling the non-error set as the input to the second training stage, with a **25%** reduced training time and **4%** increase in worst group accuracy