



FACULTY MENTOR

Bill Lin

PROJECT TITLE

Acceleration Strategies for Deep Generative Models

PROJECT DESCRIPTION

This project is joint with Prof. Yatish Turakhia.

Generative AI has shown unprecedented capabilities in recent years, ranging from natural language interactions that resemble human conversations to breakthrough artificial intelligence platforms for drug discovery. However, these models are very expensive and slow to run. There is still an urgent need to develop faster ‘sampling’ (the process used to generate samples, such as images or text) techniques for generative AI that maintain high sample quality. In this project, the student(s) will work closely with the PI and other lab members and collaborators to:

1. Explore and develop novel acceleration ideas for generative AI applications.
2. Compare and benchmark the performance against existing methods.
3. Co-author papers based on this work to be published in top-tier machine learning conferences and journals.

This project can accommodate both remote and in-person students.

INTERNS NEEDED

➤ 2+

PREREQUISITES

➤ Python programming, Basic Machine Learning and Statistics



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PROJECT TITLE

Explainable Machine Learning

PROJECT DESCRIPTION

In machine learning applications like healthcare and criminal justice, where human lives may be deeply impacted, creating inherently interpretable machine learning models that provide human-understandable explanations is critically important. While traditional decision rule and decision tree models are generally considered explainable, traditional approaches tend to only provide limited predictive performance. This project will explore new directions in developing explainable ML models via neural network training and logic minimization that will significantly outperform traditional approaches while retaining the ability to provide explanations that can be easily understood by humans.

1. Explore and develop novel ideas for explainable ML.
2. Compare and benchmark against existing methods.
3. Co-author papers based on this work to be published in top-tier conferences and journals.

This project can accommodate both remote and in-person students.

INTERNS NEEDED

➤ 2

PREREQUISITES

- Machine learning background
- Strong programming skills
- Experience with PyTorch or Tensorflow



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PROJECT TITLE

Multi-Core Processor Architecture

PROJECT DESCRIPTION

Multi-core heterogeneous processors like those found in modern smartphones are everywhere. These processors contain many cores with a variety of functions, ranging from multiple application processing cores to graphics processing cores, specialized video codecs, 5G modem cores, WiFi modem cores, dedicated security cores, and, more recently, specialized deep learning accelerators for artificial intelligence. These diverse cores place enormous demands on the underlying computing platform, including limited memory and on-chip communication resources. This project will explore new directions in developing architectures that will provide improved performance and energy efficiency.

1. Explore and develop novel ideas for multi-core processor architectures.
2. Compare against existing approaches.
3. Co-author papers based on this work to be published in top-tier conferences and journals.

This project can accommodate both remote and in-person students.

INTERNS NEEDED

➤ 2

PREREQUISITES

➤ Have a strong background in computer engineering and good programming skills.