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## **FACULTY MENTOR**

Bill Lin

## **PROJECT TITLE**

Model Heterogeneity in Federated Learning

## **PROJECT DESCRIPTION**

Federated Learning is a paradigm in which a federate of clients jointly trains a model with its local datasets. This project will explore the paradigm in which the clients can vary significantly, from IoT devices to smartphones, to laptops, to servers, each with vastly different computing power. This project develops techniques to tackle this problem, possibly allowing different clients to use different net architectures.

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

## **INTERNS NEEDED**

2 Students

## **PREREQUISITES**

- Machine learning background
- Strong programming skills and experience with PyTorch or Tensorflow



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## **FACULTY MENTOR**

Bill Lin

## **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 can 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.

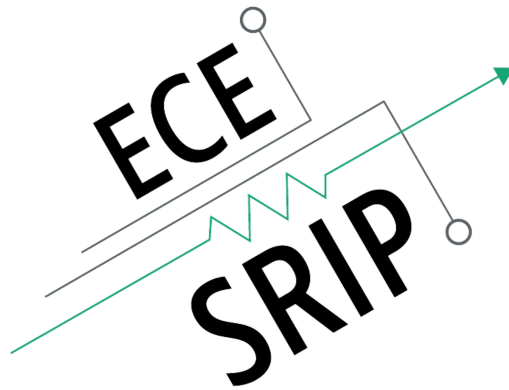
This project can accommodate both remote and in-person students.

## **INTERNS NEEDED**

2 Students

## **PREREQUISITES**

- Machine learning background
- Strong programming skills and experience with PyTorch or Tensorflow



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## **FACULTY MENTOR**

Bill Lin

## **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.

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

## **INTERNS NEEDED**

2 Students

## **PREREQUISITES**

- Have a strong background in computer engineering
- Good programming skills