

UNDERGRADUATE SUMMER RESEARCH PROGRAM PROPOSAL

- Project title: **Supporting Deep Learning Based Autonomous Driving Applications in Rural Areas**
- Faculty advisor: **Xinghui Zhao**
- Project description

Advances in cloud and edge computing have provided necessary infrastructures to support autonomous driving in metropolitan and urban areas. However, it is extremely challenging to deploy safe and reliable autonomous vehicles in rural areas due to various factors, such as communication infrastructure and road conditions. In this project, we address these challenges by designing and developing a road detection framework for supporting deep learning based autonomous driving applications in rural areas. We will also investigate optimization techniques for running these applications on resource-constrained edge devices.
- Deliverables
 - A comprehensive study on challenges and opportunities on rural autonomous driving
 - A report on available open-source datasets for rural autonomous driving
 - Design and implementation of a deep learning model on road detection
 - Performance evaluation and optimization
 - A final report on the findings and a possible publication (by working with graduate students in my group)
- Time requirements
 - Duration: \$16.00 per hour for 200 hours
 - Student time: Flexible Mon-Fri, 8am-5pm, May 16 thru Aug 5, 200 hours in total.
- Constraints
 - None.
- Required skills and knowledge
 - Strong programming skills
 - Technical writing skills
 - Basic knowledge about data analytics, machine learning and remote sensing.
 - Proficient in Python.
- Preferred qualifications
 - Prior experiences with machine learning libraries (e.g. scikit-learn, TensorFlow, PyTorch) are preferred
 - Experiences with edge devices (jetson nano, coral etc.) are preferred