FACULTY MENTOR
Pamela Cosman

PROJECT TITLE
Analysis of Visual Attention

PROJECT DESCRIPTION
This study aims to analyze and compare visual attention in the context of both machine vision and human vision. We plan to study the impact of using human-guided attention for downstream computer vision tasks like image compression and image captioning. Some in-person participation will be needed for collecting eye-tracking data, but otherwise, this can be remote.
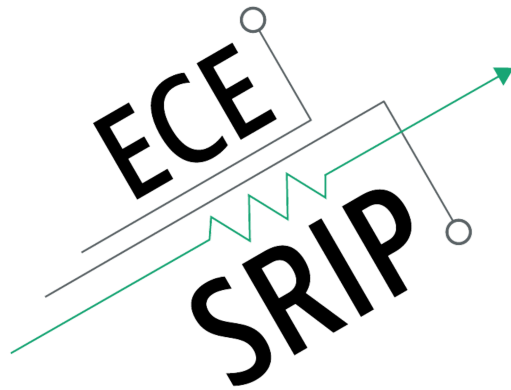
This project will be in person.

INTERNS NEEDED
2 Students (MS preferred, although could have a BS student depending on experience)

PREREQUISITES
- Python, PyTorch, machine learning

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PROJECT TITLE
Write Coach

PROJECT DESCRIPTION
In the workplace, individuals with autism and their managers sometimes struggle to communicate. This project aims to support both sides in their written communication (e.g., email, Discord, Slack). Easier tasks involve detecting when email doesn't start or end with suitable salutations, when language from a manager is non-specific (e.g., whole, some) and prompting specific statements (each, every, percent), or using full date specificity. Hard tasks involve detecting metaphors and idioms and prompting more literal phrasing. Students on this project will work with interns who are in the annual Neurodiversity in Tech summer internship program that brings young adults on the autism spectrum to campus for an internship focused on creating educational games.
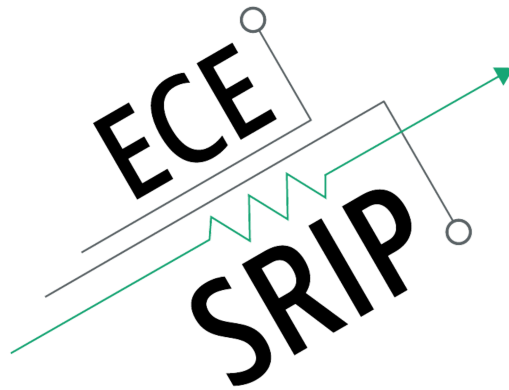
This project can accommodate both remote and in-person students.

INTERNS NEEDED
2 Students

PREREQUISITES
- Some coursework or background in computational linguistics or NLP

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PROJECT TITLE

VR Job Interview Simulation and Coaching

PROJECT DESCRIPTION

This project aims to analyze the gaze and head orientation behavior of people with autism in a virtual job interview setting. We are investigating behavioral differences between neurodivergent and neurotypical individuals and developing tools for immersive situational practice. Our initial work focused on analyzing gaze (virtual eye contact), and our next focus is on incorporating a machine learning-based head rotation analysis tool and providing near real-time VR behavioral feedback.
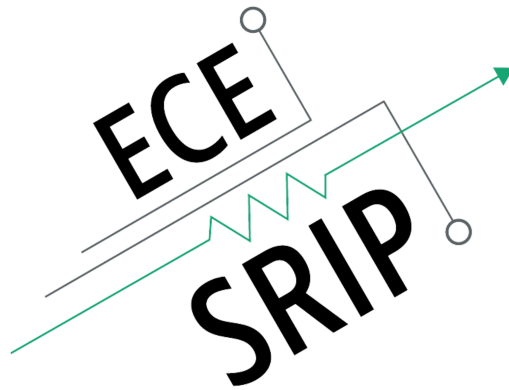
This project can accommodate both remote and in-person students.

INTERNS NEEDED

2 Students

PREREQUISITES

- Experience in learning models such as NNs, CNNs, or LSTMs, and design tools like Blender would help.

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PROJECT TITLE

Compression and Cooperative Perception of Point Clouds

PROJECT DESCRIPTION

Autonomous driving requires multiple agents (vehicles, roadside units..) to collaborate and share sensor data to make better driving decisions. To transmit a large amount of sensor data over a wireless channel, we have to compress the raw data while still being able to extract useful information from the compressed data. This project aims to develop LiDAR point cloud compression and sharing algorithms suitable for low-latency communication and adaptive to fluctuating bandwidth while maintaining good task performance on 3D perception tasks such as object detection.
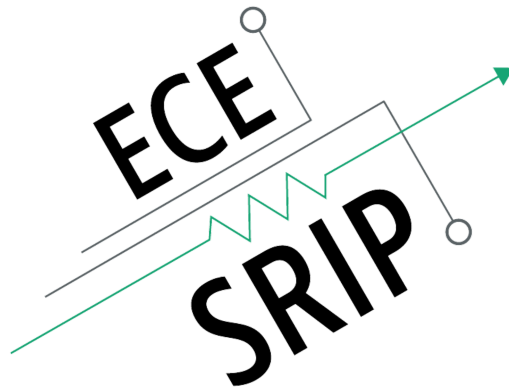
This project can accommodate both remote and in-person students.

INTERNS NEEDED

1 Student

PREREQUISITES

- Python (required)
- Pytorch (preferred)

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PROJECT TITLE

Machine Learning Based Automated Behavioral Coaching for People with ASD

PROJECT DESCRIPTION

This project aims to develop an automated behavioral coaching system using a sequential machine learning model (such as an RNN or an LSTM) on our dataset (including LiDAR, video, and audio) of individuals with autism spectrum disorder (ASD) taking part in 3-person conversations.   We aim to use our head orientation estimation model along with labels from a real personal coach to develop the coaching model.

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

INTERNS NEEDED

1 Student

PREREQUISITES

- Python and machine learning experience are required, and familiarity with NNs, RNNs, and LSTMs is a plus.