CSC4050 CS capstone project information collection

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1. Name*

Guiliang Liu

2. How many students would you like to take?*

5

3. A brief description of the projects the students could work on*

Enhancing Lane Data Construction Through Human-Guided Reinforcement Learning: Our project aims to develop an advanced generative model that synthesizes realistic traffic lanes from actual roadway data. We intend to refine the model's reward functions using human feedback to more accurately reflect human preferences. By continually fine-tuning the generative model with these updated reward functions, we anticipate achieving a high degree of alignment with human expectations. In collaboration with industry partner Meixing Technology, we are committed to pushing the boundaries of intelligent traffic system design.

Advancing Vehicle Trajectory Prediction with Multi-Agent Reinforcement Learning: We are spearheading the development of a sophisticated multi-agent reinforcement learning framework designed to anticipate the movements of vehicles controlled by human drivers in dynamic traffic scenarios. This project pivots around the integration of a generative model, such as a Decision Transformer, into our algorithmic approach. Students will have the opportunity to contribute to the creation of a comprehensive traffic simulation that leverages cutting-edge multi-agent RL techniques. Our initiative includes a strategic partnership with industry heavyweight Baidu Research, and should our progress prove fruitful, we plan to showcase our advancements in international competitions.

4. Requirements (e.g. html or c++ skills)*

Python, Pytorch, Machine Learning, Probability, and statistics.

5. Other comments or suggestions

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