Mengxiong Liu

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Education

Carnegie Mellon University Aug. 2018 - Dec. 2019
M.S. IN MACHINE LEARNING. GPA 4.0/4.0

University of Illinois-Urbana Champaign Aug. 2014 - May 2018
B.S. IN COMPUTER SCIENCE. GPA 3.90/4.0

Experience

Research Scientist at 1X Jul. 2024 - Now
· Develop scalable and expressive locomotion systems for humanoid robots with reinforcement learning.
· Develop robust and scalable embodied foundation models using imitation learning.

Machine Learning Engineer at Nuro Jan. 2020 - Jun. 2024
· Lead the effort on scalable machine learning based planning and prediction systems to generate safe and feasible trajectories for autonomous driving.
· Designed an LLM-based interactive driving explanation system within a cross-functional team of five. Enhanced the Mistral 7B model by integrating multi-modality input capabilities, including text, context map and embeddings from a pretrained motion planning encoder.
· Spearheaded the development of a diffusion-based imitation learning planner.
· Architected from the ground up a transformer-based imitation learning motion planner. The model processes multi-modal inputs—such as vectorized context maps, dynamic object motions, and occupancy grids—to generate accurate, multi-mode motion plans with a VQ-VAE like decoder.
· Within a three-member team, developed a simulation-based driving system that significantly expedited collecting on-policy failure recovery data. Continuously improved the data management and quality control (QC) workflows.
· Designed and developed an automated model analysis tool aimed at streamlining the debugging process in model development. This tool facilitates the rapid identification and resolution of model performance issues.
· Continuously improved the model training workflow, including migrating from native TensorFlow to Keras. Collaborated with the ML infrastructure team to accelerate model training on TPUs and implement large-batch multi-worker training, among other enhancements.
· Continuously enhanced the onboard model integration with both upstream and downstream pipelines, focusing on improvements in feature integration, reproducibility, and debuggability.

Machine Learning Engineer Intern at Apple May. 2019 - Aug. 2019
· Worked with NLBT team to improve end to end neural belief tracking system for Siri.
· Proposed an entity copying mechanism from user utterances by jointly representing user utterance and entity candidates as a DAG. Apply Relational-GCN and Lattice-LSTM on joint representation.
· Proposed a sub tree copying mechanism for sequence to tree translation in NLBT. Improve overall performance on certain domains and locale with Tree-LSTM decoder.

Publications

Graph Clustering with Embedding Propagation
Carl Yang, Mengxiong Liu, etc., in Proc. 2020 IEEE Int. Conf. on Big Data (IEEE BigData'20)

Similarity Modeling on Heterogeneous Networks via Automatic Path Discovery
Carl Yang, Mengxiong Liu, etc., in Proc. of 2018 European Conf. on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECMLPKDD'18)

Node, Motif and Subgraph: Leveraging Network Functional Blocks Through Structural Convolution
Carl Yang, Mengxiong Liu, etc., in Proc. of 2018 IEEE/ACM Int. Conf. on Social Networks Analysis and Mining (ASONAM'18)

Spatiotemporal Activity Modeling Under Data Scarcity
Chao Zhang, Mengxiong Liu, etc., in Proc. of 2018 AAAI Conf. on Artificial Intelligence (AAAI'18)

Urbanity: A system for interactive exploration of urban dynamics from streaming human sensing data
Mengxiong Liu, Zhengchao Liu, etc., in Proc. of 2017 ACM on Conference on Information and Knowledge Management (CIKM)