Yu Yao

https://moonblvd.github.io/brianyao_hugo/

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Education

University of Michigan — Ann Arbor, MI, USA
- *Ph.D. in Robotics; Advisor: Prof. Ella Atkins* — *Jan 2016 – Present*
- *M.S. in Robotics; GPA: 3.77* — *Sep 2015 – Apr 2017*

Beijing Institute of Technology — Beijing, China
- *B.Eng. in Aerospace Engineering; Major GPA: 3.90* — *Sep 2011 – Jun 2015*

Research

Autonomous Vehicle in Challenging Scenario - Perception and Decision Making

Video Anomaly Detection and Anomaly Recording — *Jan 2017 – Present*
- **Traffic Anomaly Detection**: Developed an unsupervised deep-learning algorithm for traffic anomaly detection in first-person videos based on future object localization. Proposed a large-scale traffic accident video dataset (A3D) to serve extensive research. Investigating spatial-temporal modeling of heterogeneous sensor data.
- **Interaction Modelling and Prediction**: Investigating deep graph generation algorithms for unsupervised scene and object interaction modelling. Incorporating deep Bayesian approaches to video scene understanding and relation prediction. Developing spatio-temporal relation modelling methods for autonomous driving scenarios.
- **Smart Black Box**: Developed an intelligent automotive event data recording pipeline. Combined anomaly detection and compression to optimize the trade-off between on-board storage and data value.

Game-theoretic Modeling of Multi-vehicle Interaction — *Sep 2018 – Present*
- **Game-theoretic Modeling**: Developed a novel pair-wise leader-follower modeling of multi-vehicle interaction in uncontrolled, parameterized intersections. Extensively modelled pedestrians-vehicle interactions.
- **Decision Making**: Investigating continuous space decision making based on deep reinforcement learning.

Computer Vision for Unmanned Aerial Vehicles (UAV) Urban Landing — *Dec 2018 – Present*
- **Real-time semantic segmentation**: Trained and comparatively evaluated state-of-the-art image semantic segmentation models in high-fidelity urban simulation. Built up hardware-in-loop testing for real-time semantic segmentation on Nvidia Jetson TX2.
- **Sensor fusion and real-time landing**: Investigating efficient LiDAR-camera fusion approach to realize real-time path planning and decision making for emergency landing.

Work Experience

Honda Research Institute USA, Inc. — *June 2018 – Sep 2018*

Computer Vision Research Intern
- Developed a deep-learning based algorithm for predicting future vehicle location in egocentric video.
- Prepared an egocentric view intersection dataset and benchmarks for trajectory prediction and related tasks.

Toyota Research Institute, Inc. — *June 2019 – Sep 2019*

Computer Vision Research Intern
- Developing a deep learning pipeline for monocular 3D object detection by geometric and temporal modeling.
- Pursuing for top level publications as well as module deployment in TRI's object perception pipeline.

Publications

1. **Yao Y**, Xu M, Wang Y, Crandall DJ, Atkins EM. Unsupervised Traffic Accident Detection in First-Person Videos. *In Intelligent Robots and Systems (IROS), 2019 IEEE Conference.* (Under review)
2. Castagno JD, **Yao Y**, Atkins EM. Realtime Rooftop Landing Site Identification and Selection in Urban City Simulation. *In Intelligent Robots and Systems (IROS), 2019 IEEE Conference.* (Under review)
3. **Yao Y**, Xu M, Choi C, Crandall DJ, Atkins EM, Dariush B. Egocentric Vision-based Future Vehicle Localization for Intelligent Driving Assistance Systems. *In Robotics and Automation (ICRA), 2019 IEEE Conference.*
4. **Yao Y**, Atkins EM. The Smart Black Box: A Value-Driven High-Bandwidth Automotive Event Data Recorder. *IEEE Transactions on Intelligent transportation systems.* (Under review)
5. **Yao Y**, Atkins EM. The Smart Black Box: A Value-Driven Automotive Event Data Recorder. *In Intelligent Transportation Systems (ITSC), 2018 IEEE 21th International Conference*

Skills

PyTorch, TensorFlow, Keras, Caffe, Python, C, C++, MATLAB, OpenCV, PCL, SQLite, SpatiaLite, LCM, ROS, Git, AutoCAD, SolidWorks.