Li Ding

Researcher · Engineer · Deep Learning · Computer Vision
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"I have no special talent. I am passionately curious." (Einstein, 1952)

Education

Massachusetts Institute of Technology — *Cambridge, MA*
Graduate Program (Non-Degree) in Electrical Engineering and Computer Science — 2019.9 - present

University of Rochester — *Rochester, NY*
M.S. in Data Science — 2016.6 - 2017.5

Central University of Finance and Economics — *Beijing, China*
B.S. in Statistics — 2012.9 - 2016.6

Experience

Massachusetts Institute of Technology — *Cambridge, MA*
Research Engineer with *Dr. Lex Fridman* — 2017.9 - present
- Work on research projects related to autonomous vehicles and human-centered AI, develop deep learning and computer vision algorithms on external driving scene perception and internal driver state monitoring.
- Support teaching MIT Deep Learning courses (`deeplearning.mit.edu`), help preparing course materials and create coding tutorials (5k+ stars on Github).

University of Rochester — *Rochester, NY*
Research Associate with *Dr. Chenliang Xu* — 2017.5 - 2017.9
- Worked on video sequence modeling for human activity recognition.

VisualDX Inc. — *Rochester, NY*
Software Engineer Intern (Master Degree Practicum) — 2017.3 - 2017.5
- Worked on abnormal user behavior detection using sequence modeling on web requests.

PricewaterhouseCoopers — *Shanghai, China*
Data Scientist Intern — 2016.1 - 2016.4
- Worked on statistical machine learning with large-scale insurance data.

Research

Large-Scale Driving Scene Segmentation
Research project at MIT, funded by Toyota Collaborative Safety Research Center — 2017 - present
- The 3-year project focused on driving scene perception that consists of large-scale data collection and annotation, algorithm development, system prototype deployment, and real-world evaluation.
- Propose a novel deep learning approach to extract spatio-temporal context that helps improve model performance.
- Organize large-scale image annotation process for the datasets, develop methods in semi-automated annotation.
- Develop a novel framework for automatic evaluation and edge case discovery in scene segmentation.

Cognitive Load Estimation with Pupil Movement Detection

Research project at MIT, funded by Veoneer and AHEAD Consortium 2018 - present

- Propose novel deep learning architectures for joint blink, pupil, and eye landmarks detection.
- Develop production-level model for robust real-time pupil detection, organize the development pipeline including data collection, annotation, algorithm development and implementation.
- Propose methods of using dynamic pupil movements to estimate human cognitive load.

Black Betty: MIT Human-Centered Autonomous Vehicle

Research project at MIT, funded by Veoneer 2018 - present

- Work on the development of real-time camera-based perception and control system that enables conditional automation on a full-scale testing vehicle with on-board sensors and computing devices.
- Propose a novel algorithm for detecting and separating highly-overlapped objects, e.g. pedestrians.
- Perform experiments on transfer of control to study shared autonomy between human and machine.

Human Action Recognition in Video Sequences

Research project at Univ. of Rochester, funded by NSF BIGDATA 2017

- Study the action recognition and localization problem with different levels of supervision.
- Propose a novel training algorithm for weakly supervised action localization using only the order of actions.

Publication

Conference & Journal

- L. Fridman, **L. Ding**, B. Jenik, and B. Reimer, "Arguing Machines: Human Supervision of Black Box AI Systems That Make Life-Critical Decisions," in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR): Workshop on Autonomous Driving*, 2019
- L. Fridman, D. E. Brown, M. Glazer, W. Angell, S. Dodd, B. Jenik, J. Terwilliger, A. Patsekin, J. Kindelsberger, **L. Ding**, S. Seaman, A. Mehler, A. Sipperley, A. Pettinato, B. D. Seppelt, L. Angell, B. Mehler, and B. Reimer, "MIT Advanced Vehicle Technology Study: Large-Scale Naturalistic Driving Study of Driver Behavior and Interaction with Automation," *IEEE Access*, vol. 7, pp. 102021–102038, 2019
- **L. Ding** and C. Xu, "Weakly-Supervised Action Segmentation with Iterative Soft Boundary Assignment," in *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018.
- L. Fridman, H. Schmidt, J. Terwilliger, and **L. Ding**, "Human Interaction with Deep Reinforcement Learning Agents in Virtual Reality," in *Advances in Neural Information Processing Systems (NeurIPS): Deep Reinforcement Learning Workshop*, 2018.

Preprint & Report

- **L. Ding** and L. Fridman, "Object as Distribution," *arXiv preprint arXiv:1907.12929*, 2019.
- **L. Ding**, J. Terwilliger, R. Sherony, B. Reimer, and L. Fridman, "Value of Temporal Dynamics Information in Driving Scene Segmentation," *arXiv preprint arXiv:1904.00758*, 2019.
- **L. Ding** and C. Xu, "Tricornet: A Hybrid Temporal Convolutional and Recurrent Network for Video Action Segmentation," *arXiv preprint arXiv:1705.07818*, 2017.

Presentation

2018 IEEE/CVF Conference on Computer Vision and Pattern Recognition — *Salt Lake City, UT*
Poster Presentation — 2018.6
- Introduce and discuss our work about weakly-supervised action recognition.

2017 Annual Poster Session: Center for Integrated Research Computing — *Rochester, NY*
Poster Presentation — 2017.5
- Introduce and discuss our work about action recognition and video modeling.

Services

Reviewer

2018 IEEE Transactions on Circuits and Systems for Video Technology
2018 IEEE Access

Teaching Assistant

2018-19 MIT 6.S094: Deep Learning for Self-Driving Cars
2019 MIT 6.S093: Human-Centered Artificial Intelligence
2019 MIT 6.S091: Deep Reinforcement Learning
2018 MIT 6.S099: Artificial General Intelligence

Honors & Awards

Scholarship

2016 Half-Tuition Scholarship — University of Rochester
2015 Excellent Youth of the Year (top 2%) — Central University of Finance and Economics

Competition

2017 Bronze Medal (107th of 1972, top 6%) — Kaggle - Data Science Bowl (Lung Cancer Detection)
2015 Meritorious Winner (top 5%) — COMAP's Mathematical Contest In Modeling

Skills

Language `Mandarin Chinese` (native), `English` (working proficiency)
Programming `Python` (primary), `C++`, `JavaScript`.
Deep Learning `TensorFlow` (primary), `PyTorch`, `Keras`, `Caffe`.
Others `Bash`, `Git`, LaTeX, `Docker`, `OpenCV`, `FFmpeg`, `ROS`, `TensorFlow.js`, `MySQL`.