HENGGANG CUI

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PROFILE

Engineering Manager with 7 years of experience in the auotonomous driving industry.

SKILLS

Languages/Libraries/Tools   Python, PyTorch, C/C++, git, JIRA, LaTex

WORK EXPERIENCE

Motional, Pittsburgh, PA.

Principal Engineer Team Lead, Senior Manager   January, 2021 to *now*
- I lead Motional's Prediction team.
- My team owns the behavior prediction and ego trajectory generation models for Motional's self-driving car. The models use transformer and graph attention architectures to predict the other road users' future behaviors as well as generate future ego trajectories.
- I built the team from scratch into now 16 people, with three TLs and one TLM under me.
- As a Senior Manager, I set technical directions and coach new leaders in the team.

Uber Advanced Technologies Group, Pittsburgh, PA.

Senior Software Engineer, Tech Lead   June, 2017 to January, 2021
- I worked on the production perception and prediction models for Uber ATG's self-driving car. The models detect objects on the road from sensor inputs (including lidar point clouds, camera images, and radar returns) and predict their future behaviors.
- As a tech lead and a pioneer in DL-based behavior prediction, I owned production models and published three first-author papers at IRCA.

EDUCATION

Carnegie Mellon University, Pittsburgh, PA.

Ph.D., Electrical and Computer Engineering (GPA: 3.93)   May, 2017
- Advisor: Greg Ganger
- Research Topic: Distributed large-scale machine learning systems

Tsinghua University, Beijing, China

Bachelor of Science, Electronic Information Science and Technology   July 2012

SELECTED PATENTS

1 Christopher Hazard, Akshay Bhagat, Balarama Raju Buddharaju, Zhongtao Liu, Yunming Shao, Lu Lu, Sammy Omari, and **Henggang Cui**. "Agent Importance Prediction for Autonomous Driving". *US20230294741A1.*

2 Bence Cserna, Juraj Kabzan, Kevin C. Gall, Thomas Kølbæk Jespersen, Gianmarco Alessandro Bernasconi, and **Henggang Cui**. "Methods And Systems For Agent Prioritization". *US20230195129A1.*

3 **Henggang Cui**, Junheng Wang, Sai Bhargav Yalamanchi, Mohana Prasad Sathya Moorthy, Fang-Chieh Chou, and Nemanja Djuric. "Systems and Methods for Training Predictive Models for Autonomous Devices". *US20230021034A1.*

4 Nemanja Djuric, **Henggang Cui**, Thi Duong Nguyen, Fang-Chieh Chou, Tsung-Han Lin, Jeff Schneider, and David McAllister Bradley. "Motion Prediction for Autonomous Devices". *US20200272160A1.*

5 Nemanja Djuric, Vladan Radosavljevic, Thi Duong Nguyen, Tsung-Han Lin, Jeff Schneider, **Henggang Cui**, Fang-Chieh Chou, and Tzu-Kuo Huang. "Object Motion Prediction and Autonomous Vehicle Control". *US20190049970A1.*

SELECTED PUBLICATIONS

1 Sepideh Afshar*, Nachiket Deo*, Akshay Bhagat, Titas Chakraborty, Yunming Shao, Balarama Raju Buddharaju, Adwait Deshpande, **Henggang Cui**. "PBP: Path-based Trajectory Prediction for Autonomous Driving."
In *IEEE International Conference on Robotics and Automation (ICRA)*, 2024.

1 **Henggang Cui***, Hoda Shajari*, Sai Yalamanchi, Nemanja Djuric. "Ellipse Loss for Scene-Compliant Motion Prediction."
In *IEEE International Conference on Robotics and Automation (ICRA)*, 2021.

2 **Henggang Cui**, Fang-Chieh Chou, Jake Charland, Carlos Vallespi-Gonzalez, Nemanja Djuric. "Uncertainty-Aware Vehicle Orientation Estimation for Joint Detection-Prediction Models." In *IEEE International Conference on Intelligent Transportation (ITSC)*, 2021.

3 Nemanja Djuric, **Henggang Cui**, Zhaoen Su, Shangxuan Wu, Huahua Wang, Fang-Chieh Chou, Luisa San Martin, Song Feng, Rui Hu, Yang Xu, Alyssa Dayan, Sidney Zhang, Brian C. Becker, Gregory P. Meyer, Carlos Vallespi-Gonzalez, Carl K. Wellington. "MultiXNet: Multiclass Multistage Multimodal Motion Prediction." In *IEEE Intelligent Transportation Systems (IV)*, 2021.

4 Eason Wang*, **Henggang Cui***, Sai Yalamanchi, Mohana Moorthy, Fang-Chieh Chou, Nemanja Djuric. "Predicting Motion of Vulnerable Road Users using High-Definition Maps and Efficient ConvNets." In *SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2020.

5 Fang-Chieh Chou, Tsung-Han Lin, **Henggang Cui**, Vladan Radosavljevic, Thi Nguyen, Tzu-Kuo Huang, Matthew Niedoba, Jeff Schneider, Nemanja Djuric. "Predicting Motion of Vulnerable Road Users using High-Definition Maps and Efficient ConvNets." In *IEEE Intelligent Transportation Systems (IV)*, 2020.

6 **Henggang Cui**, Thi Nguyen, Fang-Chieh Chou, Tsung-Han Lin, Jeff Schneider, David Bradley, Nemanja Djuric. "Deep Kinematic Models for Kinematically Feasible Vehicle Trajectory Predictions." In *IEEE International Conference on Robotics and Automation (ICRA)*, 2020.

7 Nemanja Djuric, Vladan Radosavljevic, **Henggang Cui**, Thi Nguyen, Fang-Chieh Chou, Tsung-Han Lin, Jeff Schneider. "Uncertainty-aware Short-term Motion Prediction of Traffic Actors for Autonomous Driving." In *IEEE Winter Conference on Applications of Computer Vision (WACV)*, 2020.

8 **Henggang Cui**, Vladan Radosavljevic, Fang-Chieh Chou, Tsung-Han Lin, Thi Nguyen, Tzu-Kuo Huang, Jeff Schneider, Nemanja Djuric. "Multimodal Trajectory Predictions for Autonomous Driving using Deep Convolutional Networks." In *IEEE International Conference on Robotics and Automation (ICRA)*, 2019.

9 **Henggang Cui**, Hao Zhang, Gregory R. Ganger, Phillip B. Gibbons, and Eric P. Xing. "GeePS: Scalable Deep Learning on Distributed GPUs with a GPU-Specialized Parameter Server." In *ACM European Conference on Computer Systems (EuroSys)*, 2016.

10 Aaron Harlap, **Henggang Cui**, Wei Dai, Jinliang Wei, Gregory R. Ganger, Phillip B. Gibbons, Garth A. Gibson, and Eric P. Xing. "Addressing the Straggler Problem for Iterative Convergent Parallel ML." In *ACM Symposium on Cloud Computing (SoCC)*, 2016.

11 **Henggang Cui**, Kimberly Keeton, Indrajit Roy, Krishnamurthy Viswanathan, and Gregory R. Ganger. "Using Data Transformations for Low-latency Time Series Analysis." In *ACM Symposium on Cloud Computing (SoCC)*, 2015.

12 Jinliang Wei, Wei Dai, Aurick Qiao, Qirong Ho, **Henggang Cui**, Gregory R. Ganger, Phillip B. Gibbons, Garth A. Gibson, Eric P. Xing. "Managed Communication and Consistency for Fast Data-Parallel Iterative Analytics." In *ACM Symposium on Cloud Computing (SoCC)*, 2015.

13 **Henggang Cui**, Alexey Tumanov, Jinliang Wei, Lianghong Xu, Wei Dai, Jesse Haber-Kucharsky, Qirong Ho, Gregory R. Ganger, Phillip B. Gibbons, Garth A. Gibson, and Eric P. Xing. "Exploiting Iterative-ness for Parallel ML Computations." In *ACM Symposium on Cloud Computing (SoCC)*, 2014.

14 **Henggang Cui**, James Cipar, Qirong Ho, Jin Kyu Kim, Seunghak Lee, Abhimanu Kumar, Jinliang Wei, Wei Dai, Gregory R. Ganger, Phillip B. Gibbons, Garth A. Gibson, and Eric P. Xing. "Exploiting Bounded Staleness to Speed Up Big Data Analytics." In *USENIX Annual Technical Conference (ATC)*, 2014.

15 Qirong Ho, James Cipar, **Henggang Cui**, Jin Kyu Kim, Seunghak Lee, Phillip B. Gibbons, Garth A. Gibson, Gregory R. Ganger, and Eric P. Xing. "More Effective Distributed ML via a Stale Synchronous Parallel Parameter Server." In *Neural Information Processing Systems (NIPS)*, 2013.

16 Dan Li, **Henggang Cui**, Yan Hu, Yong Xia, and Xin Wang. "Scalable Data Center Multicast using Multi-class Bloom Filter." In *19th IEEE International Conference on Network Protocols (ICNP)*, 2011.