

Hengyue Liang

📍 1400 S 2nd ST, A305,
Minneapolis, 55454
☎ (651)428-3995
✉ liang656@umn.edu
📄 hengyuel.github.io

SUMMARY

- Ph.D. candidate (expected to graduate at Fall 2024) in the Department of Electrical and Computer Engineering, University of Minnesota.
- Research experiences: AI in healthcare (powered by computer vision, image/video analysis), trustworthiness of AI/deep learning models, machine learning, deep learning, computer vision, 3D assets generation and 3D reconstruction.
- Programming language: Python, Matlab (proficient); C++, C, SQL (have experience).

EDUCATION

Ph.D, Electrical and Computer Engineering <i>University of Minnesota, Twin Cities, Minneapolis, MN</i>	Sep. 2018 - Jun. 2024 (expected)
Master of Science, Electrical Engineering <i>Chalmers University of Technology, Göteborg, Sweden</i>	Sep. 2015 — Jun. 2017
Bachelor of Engineering, Electrical Engineering <i>Shanghai Jiao Tong University, Shanghai, China</i>	Sep. 2011 — Jun. 2015

RESEARCH EXPERIENCE

Graduate Research Assistant <i>Advisor: Ju Sun</i>	Dec. 2020 - Present <i>Department of Computer Science and Engineering</i>
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- Trustworthy AI:
 - Robustness (adversarial and natural) with a focus in computer vision.
 - Constrained deep learning problems, contributor of the constraint deep-learning optimization solver **PyGranso** (see <https://ncvx.org/>).
 - Selective classification to approach deployable AI systems for real-world high-stakes applications.
- AI in healthcare (powered by computer vision):
 - Video-based automatic tic (Tourette Syndrome) detection for diagnostic assistants. I am the major contributor of the machine learning algorithm (video analysis and motion detection). This project (with preliminary result delivered) will receive in total 3.5 million US dollars research grant funded by National Institutes of Health (NIH) from 2023 to 2027.
 - Automated hearing report (audiogram) reader (ongoing research, preliminary result has outperformed similar functions in iPhone in our local hospital dataset).

Graduate Research Assistant <i>Advisor: Changhyun Choi</i>	Sep. 2018 - Dec. 2020 <i>Department of Electrical and Computer Engineering</i>
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- Robotics:
 - Robotic (visual) perception and manipulation problems via deep learning/reinforcement learning.

WORK EXPERIENCE

Applied Scientist Intern <i>Mentor: Prateek Singhal</i>	May. 2023 - Sep. 2023 <i>Amazon</i>
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- 3D reconstruction of realistic faces and generating natural 3D talking avatars with realistic look.

- Generating realistic head motions for virtual animated avatar based on audio input. The deliverable has been deployed into Amazon product in virtual conference platform.

Publications

- [1] **Hengyue Liang**, Buyun Liang, Le Peng, Ying Cui, Tim Mitchell and Ju Sun. "Optimization and Optimizers for Adversarial Robustness". In preparation for "International Journal of Computer Vision" (IJCV). Preprint: <https://arxiv.org/abs/2303.13401>.
- [2] Christine Conelea, **Hengyue Liang**, Megan DuBois, Brittany Raab, Mia Kellman, Brianna Wellen, Suma Jacob, Sonya Wang, Ju Sun and Kelvin Lim. "Automated Quantification of Eye Tics using Computer Vision and Deep Learning Techniques". Submitted to "Movement Disorders", the official Journal of Movement Disorder Society (MDS), MDS-23-0240.R1.
- [3] **Hengyue Liang**, Buyun Liang, Ying Cui, Tim Mitchell and Ju Sun. "Implications of Solution Patterns on Adversarial Robustness". Accepted to "Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2023, pp. 2392-2399".
- [4] **Hengyue Liang**, Buyun Liang, Ying Cui, Tim Mitchell and Ju Sun. "Optimization for Robustness Evaluation beyond ℓ_p Metrics". Accepted to "ICASSP 2023-2023 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)". Preprint: <https://arxiv.org/abs/2210.00621>.
- [5] Buyun Liang, Ryan Devera, **Hengyue Liang**, Qizhi He and Ju Sun. "On Optimization and Optimizers in Neural Structural Optimization". In preparation for "Transactions on Machine Learning Research".
- [6] Le Peng, **Hengyue Liang**, Gaoxiang Luo, Taihui Li and Ju Sun. "Rethink Transfer Learning in Medical Image Classification." Project Page: <https://sun-umn.github.io/Transfer-Learning-in-Medical-Imaging/>
- [7] Hengkang Wang, Taihui Li, Zhong Zhuang, Tiancong Chen, **Hengyue Liang** and Ju Sun. "Early stopping for deep image prior". Preprint: <https://arxiv.org/pdf/2112.06074.pdf>
- [8] Taihui Li, Zhong Zhuang, **Hengyue Liang**, Le Peng, Hengkang Wang and Ju Sun. "Self-Validation: Early Stopping for Single-Instance Deep Generative Priors". Paper accepted to British Machine Vision Conference (BMVC), 2022. Project page: <https://sun-umn.github.io/Self-Validation/>
- [9] **Hengyue Liang**, Xibai Lou, Yang Yang, and Changhyun Choi. "Learning Visual Affordances with Target-Orientated Deep Q-Network to Grasp Objects by Harnessing Environmental Fixtures." Paper accepted to "2021 IEEE International Conference on Robotics and Automation (ICRA), DOI: 10.1109/ICRA48506.2021.9561737". Project Page: <https://sites.google.com/umn.edu/ki-dqn/>
- [10] Yang, Yang and Yuanhao, Liu and **Hengyue Liang**, Xibai, Lou and Changhyun Choi. "Attribute-Based Robotic Grasping with One-Grasp Adaptation". Paper accepted to

"2021 IEEE International Conference on Robotics and Automation (ICRA), DOI: 10.1109/ICRA48506.2021.9561139". Project Page: <https://sites.google.com/umn.edu/attributes-grasping>

- [11] Yang, Yang, **Hengyue Liang** and Changhyun Choi. "A deep learning approach to grasping the invisible." Paper accepted to "IEEE Robotics and Automation Letters (RA-L)", Volume: 5, Issue: 2, 2020, pp. 2232-2239, DOI: 10.1109/LRA.2020.2970622". Project Page: <https://sites.google.com/umn.edu/grasping-invisible/>

POSTERS

- Midwest Machine Learning Symposium *May. 2023*
 - Toward trustworthy AI — robustness and beyond
 - When Deep Learning Meets Nontrivial Constraints

HONORS & AWARDS

- Cisco Research Graduate Awardee *Jan. 2022 — Sep. 2022*
- Excellent Master Thesis Award, Department of Electrical Engineering, Chalmers *Jun. 2017*
([Thesis link](#))
- Chalmers ‘Advancez’ Scholarship for international students *Aug. 2015 — Jun. 2017*

Professional Activities & Service

Journal Reviewer

- IEEE Robotics and Automation Letters (RA-L 2020).

Conference Reviewer

- Conference on Neural Information Processing Systems (NeurIPS, 2023)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS, 2020).
- IEEE International Conference on Robotics and Automation (ICRA 2019, 2020, 2021).

Conference Organizer

- Assistant Session Chair for the 2023 SIAM International Conference on Data Mining (SDM23).