

CHENGGUANG XU

815 Columbus Ave, Boston, MA 02120

☎ 617-407-6168 ✉ xu.cheng@northeastern.edu Homepage Google Scholar

EDUCATION

- **Northeastern University** Boston, MA, USA
• *Ph.D. candidate in Computer Science* Sep 2018 - Dec 2024 (expected)
Advisors: Prof. Lawson L.S. Wong, Prof. Christopher Amato
- **Nankai University** Tianjin, China
• *M.S. in Control Science and Engineering* Sep 2015 - July 2018
Advisors: Prof. Han Zhang, Prof. Feng Duan
- **Nankai University** Tianjin, China
• *B.E. in Automation* Sep 2010 - July 2014
Advisor: Prof. Feng Duan

SCHOLARLY INTERESTS

Computer Vision, Deep Reinforcement Learning, Foundation Models (i.e., LLMs and VLMs), Cross-modality Learning (i.e., vision and language), Navigation System, Robotics.

PUBLICATIONS

- Robot Navigation in Unseen Environments using Coarse Maps.
Chengguang Xu, Lawson L.S. Wong, Christopher Amato. IEEE International Conference on Robotics and Automation (*ICRA*), May 2024.
- Vision and Language Navigation in the Real World via Online Visual Language Mapping.
Chengguang Xu, Hieu T. Nguyen, Christopher Amato, Lawson L.S. Wong. In the Workshop of the Foundation Models for Decision Making Workshop @ (*NeurIPS*), Dec 2023.
- Learning to Navigate in Unseen Environments using 2-D Rough Maps.
Chengguang Xu, Lawson L.S. Wong, Christopher Amato. In the Workshop of the 5th Multi-disciplinary Conference on Reinforcement Learning and Decision Making (*RLDM*), June 2022.
- Hierarchical Robot Navigation in Novel Environments using Rough 2-D Maps.
Chengguang Xu, Christopher Amato, Lawson L.S. Wong. In the Proceedings of the Conference on Robot Learning (*CoRL*), November 2020.
- Deep Supervised Summarization: Algorithm and Application to Learning Instructions.
Chengguang Xu, Ehsan Elhamifar. In the Proceedings of the Conference on Neural Information Processing Systems (*NeurIPS*), November 2019.
- Design and Performance Evaluation of a Simple Semi-Physical Human-Vehicle Collaborative Driving Simulation System.
Wenyu Li, Feng Duan, **Chengguang Xu**. In the IEEE Access, March 2019.

RESEARCH EXPERIENCE

- **Learning Cross-modality Instruction-and-Map Encoder Representation:** This *ongoing* project aims to learn a cross-modality encoder representation from transformers through pre-training. The goal is to ground complex human instructions in natural language to the metric-semantic feature maps of real-world scenes. (*Python, Pytorch, Hugging Face Transformers library, Habitat Matterport3D simulator, ROS*)
- **Visual Navigation in Unseen Houses using Coarse Maps:** Proposed a navigation framework utilizing 2-D hand-drawn maps for visual navigation in unseen houses. (*Python, Pytorch, Habitat Lab simulator*). Published at **ICRA-24**
- **Visual-and-language Navigation (VLN) in Real World:** Developed a zero-shot navigation framework for Vision-and-Language Navigation (VLN) in real-world scenarios using foundation models (LLMs and VLMs). Deployed on an Interbotix LoCoBot WX250. (*Python, Pytorch, ROS Noetic*). Published at Foundation Models for Decision Making Workshop @ **NeurIPS-23**
- **Hierarchical Visual Navigation using Deep Reinforcement Learning:** Introduced a hierarchical visual navigation framework, combining deep generative models (i.e., Variational Autoencoders) for high-level planning and image goal-conditioned DQN policy for low-level control. (*Python, Pytorch, Deep Mind Lab simulator*). Published at **CoRL-20**.
- **Deep Video Summarization:** Designed a triple loss to solve the supervised video summarization task based on the theory of facility location problem. (*Python, Pytorch*). Published at **NeurIPS-19**

SKILLS

- **Programming languages:** Python, C++
- **Deep Learning Frameworks:** Pytorch, Hugging Face Transformers
- **Computer Systems:** Linux, Robot Operating System (ROS)