Curriculum Vitae

LEI TAI

CONTACT INFORMATION

CYT2014
Robotics Institute, HKUST
Clear Water Bay, Hong Kong

Email: ltai@ust.hk
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EDUCATION

Hong Kong University of Science and Technology, Hong Kong SAR, China P.R.

Ph.D. candidate in Electronic & Computer Engineering. Sept. 2014 - present

- Research Interests: *Mobile Robotics, Deep Learning, Deep Reinforcement Learning*
- Advisor: Prof. Ming Liu

University of Freiburg, Germany

Visiting Scholar in Autonomous Intelligent Systems Lab Mar. 2017 - Jan. 2018

- Advisor: Prof. Dr. Wolfram Burgard

Harbin Institute of Technology , Harbin, China P.R.

M.S. in Engineering. Sep. 2012 - Jun. 2014

- GPA: 81.20/100 (Top 30%).

B.S. in Engineering. Sep. 2008 - Jun. 2012

- GPA: 88.17/100, (Top 10%).

WORKING AND RESEARCH EXPERIENCE

Research in sensorimotor learning RAM Lab Aug. 2015 - present

- Sensorimotor learning for both indoor and outdoor robot navigation.
- Improve autonomous driving through human gaze learning.
- 3D point cloud perception including detection and segmentation.

Research in deep RL for robotics AIS Lab Mar. 2017 - Jan. 2018

- Generalized deep reinforcement learning with external memory and prediction ability.
- Socially compliant navigation in crowded environment.
- Visual domain adaptation for learning-based visual control policies.

Algorithm R&D Intern Xiangji Keji (MLOG), Beijing June. 2015 - Aug. 2015

- Nowcast precipitation prediction through radar echo images with deep learning.
- Optical flow estimation and motion tracking of the radar images for Tian Qi Jia.

PUBLICATIONS

Journals

1. Jingwei Zhang*, **Lei Tai***, Peng Yun, Yufeng Xiong, Ming Liu, Joschka Boedecker, Wolfram Burgard, "VR Goggles for Robots: Real-to-sim Domain Adaptation for Visual Control". (* indicates equal contribution). *IEEE Robotics and Automation Letters (RA-L)*, 2019.

2. Peng Yun, **Lei Tai**, Yuan Wang, Ming Liu, "Focal Loss in 3D Object Detection", *IEEE Robotics and Automation Letters (RA-L)*, 2019.

3. **Lei Tai**, Shaohua Li, Ming Liu, "Autonomous Exploration of Mobile Robots through Deep Neural Networks", *International Journal of Advanced Robotic Systems (IJARS)*, 2017.

4. **Lei Tai**, Ming Liu, "Mobile Robots Exploration through CNN-based Reinforcement Learning", *Robotics and Biomimetics*, 2016.

Conferences

1. Congcong Liu, Yuying Chen, **Lei Tai**, Haoyang Ye, Ming Liu, Bertram Shi, "A Gaze Model Improves Autonomous Driving", *ACM Symposium on Eye Tracking Research & Applications (ETRA)*, June 25-28, Denver, USA, 2019.
2. **Lei Tai**, Jingwei Zhang, Ming Liu, Wolfram Burgard, "Socially-compliant Navigation through Raw Depth Inputs with Generative Adversarial Imitation Learning", *International Conference on Robotics and Automation (ICRA)*, May 21-25, Brisbane, Australia, 2018.
3. Oleksii Zhelo, Jingwei Zhang, **Lei Tai**, Ming Liu, Wolfram Burgard, "Curiosity-driven Exploration for Mapless Navigation with Deep Reinforcement Learning", *International Conference on Robotics and Automation (ICRA) Workshop*, May 21-25, Brisbane, Australia, 2018.
4. **Lei Tai**, Giuseppe Paolo, and Ming Liu, "Virtual-to-real Deep Reinforcement Learning: Continuous Control of Mobile Robots for Mapless Navigation, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Vancuver, Canada, 2017.
5. **Lei Tai**, Haoyang Ye, Qiong Ye, Ming Liu, "PCA-aided Fully Convolutional Networks for Semantic Segmentation of Multi-channel fMRI", *International Conference on Advanced Robotics (ICAR)*, Hong Kong, China, 2017.
6. **Lei Tai**, Shaohua Li, and Ming Liu, "A Deep-Network Solution Towards Model-less Obstacle Avoidence", *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Daejeon, Korea, 2016.
7. **Lei Tai**, Ming Liu, "A Robot Exploration Strategy Based on Q-learning Network", *IEEE International Conference on Real-time Computing and Robotics (RCAR)*, Angkor Wat, Cambodia, June 6-10, 2016.

Preprint Publications

1. Yuying Chen, Congcong Liu, **Lei Tai**, Ming Liu, Bertram Shi "Gaze Training by Modulated Dropout Improves Imitation Learning".
2. Ting Sun, **Lei Tai**, Zhihan Gao, Ming Liu, Dit-Yan Yeung "Fully Using Classifiers for Weakly Supervised Semantic Segmentation with Modified Cues".
3. **Lei Tai**, Peng Yun, Yuying Chen, Congcong Liu, Haoyang Ye, Ming Liu "End-to-end Driving Deploying through Uncertainty-Aware Imitation Learning and Stochastic Visual Domain Adaptation".
4. Jingwei Zhang, **Lei Tai**, Joschka Boedecker, Wolfram Burgard, Ming Liu, "Neural SLAM: Learning to Explore with External Memory".
5. **Lei Tai***, Jingwei Zhang*, Ming Liu, Joschka Boedecker, Wolfram Burgard, "A Survey of Deep Network Solutions for Learning Control in Robotics: From Reinforcement to Imitation". (* indicates equal contribution).
6. **Lei Tai**, Ming Liu, "Towards cognitive exploration through deep reinforcement learning for mobile robots".

Awards

Paper Awards

- ICAR Best Student Paper Award, Hong Kong — July 2017

Contest Awards

- 5th in 2016 Cybathlon Powered Wheelchair Race, Zurich, Switzerland — Oct 2016
- Runner-up of 2014 ABU Robocon, Zoucheng, China — June 2014
- Best Technology of 2012 ABU Robocon, Harbin, China — June 2012
- Honorable Mention of Mathematical Contest in Modeling — Mar 2011

Teaching Experience

Teaching Assistant — Spring 2019
ELEC 1010: Electronic and Information Technology
Instructor: Prof. Kei May Lau
ECE Department, Hong Kong University of Science and Technology

Teaching Assistant — Fall 2018
ELEC 1010: Electronic and Information Technology
Instructor: Prof. George Jie Yuan
ECE Department, Hong Kong University of Science and Technology

Teaching Assistant — Spring 2015
ELEC 3200: System Modeling, Analysis and Control
Instructor: Prof. Ling Shi
ECE Department, Hong Kong University of Science and Technology

Academic Activities

Referee Services

- *Autonomous Robots (AURO).*
- *IEEE Transactions on Neural Networks and Learning Systems (NNLS).*
- *IEEE Robotics and Automation Letters (RA-L).*
- *International Journal of Advanced Robotic Systems, (IJARS).*
- *International Conference on Robotics and Automation (ICRA)*, 2017-2019.
- *International Conference on Intelligent Robots and Systems (IROS)*, 2016-2019.
- *Neural Information Processing Systems (NeurIPS) Workshop*, 2018.
- *Asian Control Conference (ASCC)*, 2017.
- *International Conference on Computer Vision System (ICVS)*, 2017.
- *International Conference on Real-time Computing and Robotics (RCAR)*, 2016.

Conference Services

- Program Committee Member of *International Conference on Computer Vision Systems (ICVS)*, Aug, 2017.
- Program Committee Member of *International Conference on Real-time Computing and Robotics (RCAR)*, June, 2016.

Conference Presentations

- ETRA 2019, Denver, USA
- ICRA 2019, Montreal, Canada
- ICRA 2018, Brisbane, Australia
- IROS 2017, Vancouver, Canada
- IROS 2016, Daejeon, Korea
- RCAR 2016, Angkor Wat, Cambodia

Professional Skills

Programming

- Experienced in Python, C++; Familiar with Matlab

Frameworks

- Deep Learning: PyTorch, TensorFlow
- Robotics: ROS, V-REP, Gazebo

Language Skills

TOEFL-IBT

- Reading (28), Listening (28), Speaking (20), Writing (25), Total (101). Mar. 2013

GRE

- Verbal (540), Quantitative (800), Analytical Writing (3.5). Oct. 2010