

Han WANG

Ph.D. Student @UESTC

📍 Chengdu, China
✉ wang_han@std.uestc.edu.cn
🌐 hwang620.github.io
📞 (+86)17721886513



EDUCATION

McGill University, Computer Science

Master of Science in Computer Science

Montreal, Canada
Expected May 2020

Relevant Coursework: Intelligent Robotics, Reinforcement Learning, Applied Machine Learning

Coursera

Online

Honored Degrees & Long-term Community Contributor

Aug 2015 - Aug 2017

Completed Courses: Neural Network for Machine Learning (UToronto), Robotics: Specialization (UPenn), Machine Learning (Stanford)

Tongji University, School of Software Engineering

Shanghai, China

Bachelor of Engineer, Software Engineering; GPA: 3.89/4.0

Aug 2011 - Aug 2015

Honors and Awards: Outstanding Diploma thesis, National Aspiration Fellowship, Second Class Prize Fellowship, Social Activism Award, IBM Outstanding Contribution Award, Microsoft Imagine Cup, FTC (First Tech Challenge, a Robot Competition Conference) Technician

EXPERIENCE

Mobile Robotics Lab, McGill University

Montreal, Canada
Sep 2017 - Now

Research Assistant, Supervisor: **Gregory Dudek**

- Deep Monocular VO: Designed a semi-supervised monocular depth estimator for video using sparse bundle adjustment in a sliding window, achieved 0.117 (top5) RMSE in NYU v2 and 2.981 (top10) RMSE in Kitti eigen-split. backbone is Unet+CSPN, trained with semi-dense map point tracked by VO, implemented with PyTorch.
- NavGuideNet: A synthesized hierarchical neural network for autonomous navigation in complex environment and variant landscapes (tested in field/underwater environments). Backbone encoder is Resnet18, latent code was concatenated with control signals and decoder is de-convolution network (transposed convolution)
- Deep RL Auto Driving (Sim2Real): Re-implemented CAD2RL in python and extended to multiple policy gradient based backends (A3C+LSTM) in continuous action space, simulator is Microsoft AirSim, tested on RC car and UAV.

iLab Tongji/University of South California

Shanghai, China, Los Angeles, USA
Apr 2015 - Jul 2017

Research Assistant, Supervisor: **Jianwei Lu, Laurent Itti**

- SLAM Fusion: Vision (monocular) LiDar fusion with direct method (jointly optimize optical flow with Sparse Bundle Adjustment on ORB features) extra constraint from LiDar helps eliminating depth from null space.
- Visual SLAM with Saliency: joint optimizing the graph (G2O) with salient voting as extra binary edges.

UCLA

Los Angeles, USA
Jul 2015 - Jan 2016

Research Assistant, Supervisor: **Yi Xing**

- Code Parallelization: optimized their RNA analysis tool, [stable release ([rMATS 3.0.9](#))], binding the large matrix calculations with C11 (SSE/AVX vectorization, Intel) and CUDA (cuBLAS , Nvidia)

PROJECTS

- **Visual SLAM:** Comprehensively re-implemented DSO and annotated with exhaustive explains.
- **Deep Monocular Dense 3D Reconstruction:** Dense 3D reconstruction with monodepth2 initialized Visual Odometry, leveraging traditional photometric consistency, occlusion discrepancy, and local geometrical-smooth assumptions to optimize depth estimation (LM method) and register 3D map point clouds.
- **Abstraction Augmented Deep RL:** Abstract rgb image with Unet shaped network to digest image in latent representation, and learn from latent inputs, average convergence time increased 27.3%, maximum reward (10M iterations) is 1.21 times than baseline model without abstraction augmentation, experiments conducted under self-collected dataset from AirSim simulator ([github](#))
- **Forgetting Model for BP:** Introduced forgetting model for back propagation as in gradient dynamic routine, inspired from forgetting curve, I invented forgetting factor to regulate delta weights updates ([math proof](#))
- **LOAM:** extended LOAM (LiDAR Odometry and Mapping) with co-visibility check, optimized with Ceres optimizer and asynchronous threading

PUBLICATIONS

- Navigation in the Service of Enhanced Pose Estimation, Travis Manderson, **Ran Cheng**, David Meger and Gregory Dudek, **ISER 2018**, [paper](#)
- Vision-Based Autonomous Underwater Swimming in Dense Coral for Combined Collision Avoidance and Target Selection, T. Manderson, **R. Cheng**, D. Meger, G. Dudek, **IROS 2018**, [paper](#)