Xipeng WANG

Research Scientist
SLAM, Automated driving
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[Github] [Blog] [Thesis] [Scholar]

BACKGROUND

Xipeng Wang received his PhD from University of Michigan in 2019 for his work in robust and efficient robot localization and mapping. He advisor was Edwin Olson (Professor, CEO of May Mobility). During his time as a PhD student in APRIL lab, he developed several open source localization and mapping algorithm (AprilSAM, FLAG, MOSS) applied on ground robots served for transportation or exploration purposes.

WORK EXPERIENCE

MAY 2019 - Present
Toyota Research Institute (Full-time)

SLAM Team

- Major contribution in developing distributed mapping algorithm and tile-based localization algorithm.
- Major contribution in building high-definition map for L4 self-driving vehicles at Summer 2020 Olympics.
- Leading the efforts in Toyota Safety Sense(TSS) based mapping and localization.
- Leading the efforts in lifetime long map update. This involves developing map verification algorithms and change detection algorithms.
- Research exploration in deep-learning based change detection and long term vision-based localization.

SEPTEMBER 2018 - DECEMBER 2018
Nvidia (Intern)

Vision-based Localization Team

- Uncertainty estimation monocular camera based localization.

PHD PROJECTS

ZIPPY(UPS)	Autonomous low-speed electric vehicle for mail delivery
CYBERSEES(NSF)	Long-term localization of autonomous ground robots at solid waste landfills
SQUADMATE(DARPA)	Heterogeneous robotic system for localization on the battlefield
SMARTCARTS(UofM)	Autonomous low-speed electric shuttle on campus

Open Source Project

AprilSAM	A fast pose-graph optimization algorithm (C)
FLAG	A feature-based localization algorithm using floor plan as a map (C)
MOSS	Map optimization for size and saliency (C)
M3RSM	A many-to-many multi-resolution scan matching (C++)
M3RSM-GPU	A GPU based scan matching (C++ & Cuda)
raspberryX	A C library/Wiki for building robot fun projects using RaspberryPi (C)

Publications

My research has been supported by the Ford NGV, Toyota Research Institute, DARPA, NSF

[0] Xipeng Wang, Ryan J. Marcotte, and Edwin Olson. "Global Localization from a Floor Plan". IROS, 2019

[1] Ryan J. Marcotte, Xipeng Wang, and Edwin Olson. "Optimizing Multi-Robot Communication under Bandwidth Constraints". Autonomous Robots

[2] Xipeng Wang, Ryan J. Marcotte, Gonzalo Ferrer and Edwin Olson. "AprilSAM: Real-time Smoothing and Mapping". In ICRA, 2018

[3] Ryan J. Marcotte, Xipeng Wang, and Edwin Olson. "AprilFEC: Real-Time Channel Estimation and Adaptive Forward Error Correction". In RSS Workshop on Robot Communication in the Wild, 2017

[4] Xipeng Wang, Steve Vozar, and Edwin Olson. "FLAG: Feature-based Localization between Air and Ground". In ICRA, 2017

[5] Xipeng Wang, Yi L. Murphey and Dev S. Kochhar. "MTS-DeepNet for Lane Change Prediction". In IJCNN, 2016

[6] Xipeng Wang, Yuan Ma, Junru Di, Yi L. Murphey, Shiqi Qiu, Johannes Kristinsson, Jason Meyer, Finn Tseng, and Timothy Feldkamp. " Building Efficient Probability Transition Matrix Using Machine Learning from Big Data for Personalized Route Prediction". In INNS-BigData, 2015

[7] Xipeng Wang, Jungme Park, Yi L. Murphey, Johannes Kristinsson, Ming Kuang, and Tony Phillips. "Intelligent Trip Modeling on Ramps using Ramp Classification and nowledge Base". In IJCNN 2015

[8] Chen Fang, Xipeng Wang, Yi L. Murphey, David Weber, and Perry MacNeille. "Specific humidity forecasting using recurrent Neural Network". In IJCNN, 2014

[9] Yinghao,Huang, Xipeng Wang, Yi L. Murphey. "Text Categorization Using Topic Model and Ontology Networks". In DMIN14, 2014

Education

University of Michigan
Ph.D. Computer Science & Engineering
Thesis: High Availability Mapping and Localization
Advisor: Edwin B. Olson, Ph.D

University of Michigan
M.S. Computer Engineering
Thesis: Deep Learning On Multivariate Time Series Pattern Classification
Advisor: Yi L. Murphey, Ph.D

Xi'an Jiao Tong University
B.S. Information Engineering
GPA: 90/100, Rank: 2/183
Thesis: Low Cost Thermal Imaging System