Xiaohan Fei

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Education

University of California, Los Angeles — Sept. 2014 - Sept. 2019
Ph.D. in Computer Science
Research Group: UCLA Vision Lab (http://vision.ucla.edu)
GPA: 3.88/4.0
Thesis: Inertial-aided Visual Perception of Geometry and Semantics
Advisor: Prof. Stefano Soatto

Zhejiang University — Sept. 2010 - June 2014
B.Eng. in Information and Communication Engineering
Minor: Advanced honor Class of Engineering Education (ACEE), Chu-Kechen College
GPA: 3.98/4.0(92.35/100)
Thesis: Wide-baseline feature matching for panoramic images
Thesis advisor: Prof. Zhiyu Xiang

Research Interests

My research interests lie in the intersection of computer vision, robotics, and machine learning. I develop algorithms, models, and systems to enable robots to see and understand the surrounding physical world using techniques from optimization, deep learning, and sensor fusion. Specifically, I have been working on (i) Simultaneous Localization and Mapping (SLAM) and Visual-Inertial Odometry (VIO) for robot localization, (ii) depth prediction and completion to assist robot navigation, and (iii) semantic scene understanding to enable high-level robotic tasks. My research resulted in the world's first real-time visual-inertial semantic mapping system demonstrated at CVPR 2016, and a best paper award at ICRA 2019.

Open-source Software

XIVO: a state-of-the-art localization and mapping software, starred by 550+ developers worldwide. For the rest, see my github page: https://github.com/feixh

Research Experience

AWS AI Labs, Bellevue, Washington — April 2022 - Present
Senior Applied Scientist
I lead a team working on visual and multi-sensor localization and mapping and 3-D representation learning. We aim to push the state of the art in the field, and build products atop our research.

AWS AI Labs, Seattle, Washington — April 2020 - March 2022
Applied Scientist
I conducted research in the field of computer vision and machine learning, and developed cloud-based AI services. One of my works was single view physical distance estimation which aimed to use computer vision to help slow down the spread of COVID-19, and resulted in a paper published in ICCV 2021. We are using AI to do good, and I'm very pround of this work.

Facebook Reality Labs, Redmond, Washington — Sept. 2019 - March 2020
Research Scientist
I was a member of the Surreal team led by Dr. Richard Newcombe, and conducted research in computer vision for AR/VR.

NVIDIA Research, Santa Clara, California — Summer 2018
Research Intern
Conducted research in unsupervised learning of structural representation for 3-D objects.

Meta Company, San Mateo, California — Summer 2017
Research Intern
I worked with Dr. Karri Pulli and Dr. Timo Ahonen, and developed a tightly-coupled visual-inertial SLAM system for Meta's 2nd generation Augmented Reality headset. The system I developed is the indispensable core software component that supports all the downstream AR applications.

Awards & Distinctions

2019: **Best Paper Award** in Robot Vision, out of 2900 submissions, at ICRA 2019
2013: **Meritorious Winner** of Mathematical Contest in Modeling (top 15% of 6000 teams worldwide)
2012: **National Scholarship** (the highest honor for undergraduates in China)

Publications

* indicates equal contribution

[1] **X. Fei**, H. Wang, X. Zeng, L. Cheong, J. Tighe. Single View Physical Distance Estimation using Human Pose. In *International Conference on Computer Vision* (ICCV), 2021.

[2] A. Wong, **X. Fei**, B. Hong, and S. Soatto. An Adaptive Framework For Learning Unsupervised Depth Completion. In *IEEE Robotics and Automation Letters* (RA-L), 2021.

[3] A. Wong*, **X. Fei***, and S. Soatto. Unsupervised Depth Completion from Visual-Inertial Odometry. In *International Conference on Robotics and Automation* (ICRA), 2020. Also in *IEEE Robotics and Automation Letters* (RA-L).

[4] **X. Fei**, A. Wong, and S. Soatto. Geo-Supervised Visual Depth Prediction. In *International Conference on Robotics and Automation* (ICRA), 2019. (**Best Paper Award in Robot Vision**) Also in *IEEE Robotics and Automation Letters* (RA-L).

[5] **X. Fei**, S. Soatto. Visual-Inertial Object Detection and Mapping. In *European Conference on Computer Vision* (ECCV), 2018.

[6] J. Dong*, **X. Fei***, and S. Soatto. Visual-Inertial-Semantic Scene Representation for Object Detection. In *Computer Vision and Pattern Recognition* (CVPR), 2017.

[7] **X. Fei**, K. Tsotsos, and S. Soatto. A Simple Hierarchical Pooling Data Structure for Loop Closure. In *European Conference on Computer Vision* (ECCV), 2016.

Professional Services

Reviewer of top computer vision (CVPR, ICCV, ECCV), robotics (ICRA, IROS), and artificial intelligence (AAAI) conferences.

Relevant Coursework

University of California, Los Angeles: Machine Perception (Prof. S. Soatto), Convex Optimization (Prof. L. Vandenberghe), Calculus of Variations (Prof. L. Vese), Vision as Bayesian Inference (Prof. A. Yuille), Applied Probability (Prof. Y. Wu), Theoretical Statistics (Prof. A. Amini), Numerical Analysis (Prof. J. Teran), Machine Learning Algorithm (Prof. M. Sarrafzadeh)
Zhejiang University: Computer Vision (Pof. Z. Xiang), Spectral Analysis of Signals (Prof. X. Gong), Information Theory (Prof. Z. Zhang), Mathematical Modeling (Prof. Q. Yang)

Relevant Skills

Programming Language: Fluent (C++, Python), Make-do (JavaScript), Collecting dust (Android, OpenGL, Matlab)
Software Framework: Deep Learning (PyTorch, TensorFlow), Vision and Robotics (OpenCV, ROS), Math & Optimization (Eigen, Ceres), Web (Flask, Three.js)