Fangqiang Ding

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Room 3.20, Bayes Centre, 47 Potterrow, Edinburgh, United Kingdom

EDUCATION

University of Edinburgh — Edinburgh, UK
PhD Student in Robotics and Autonomous Systems — *2021/09 - Present*
- Supervisor: *Dr. Chris Xiaoxuan Lu* (Assistant Professor @ School of Informatics)
- Scholarship: EPSRC CDT-RAS PhD Fellowship

Tsinghua University — Beijing, China
Visiting Student — *2020/08 - 2020/09*
- Advisor: *Dr. Geng Lu* (Associate Professor @ Department of Automation)

Tongji University — Shanghai, China
BEng in Mechanical Engineering — *2017/09 - 2021/07*
- GPA: 4.73/5.0 (equivalent to 92.3/100, ranking: 2/130)
- Scholarship: double **National Scholarship** (top **1%**, Year 2017-8 & 2018-9)
- Award: **Academic Stars** in Tongji (top **10** from undergraduates)
- Supervisor: *Dr. Changhong Fu* (Associate Professor @ School of Mechanical Engineering)

RESEARCH INTERESTS

4D Automotive Radar, Autonomous Driving, Mobile Robotics, mmWave-based Sensing, Thermal Vision Intelligence, Embodied AI

RESEARCH EXPERIENCE

MAPS Lab, University of Edinburgh — Edinburgh, UK
PhD Student, Supervisor: Dr. Chris Xiaoxuan Lu — *2021/09 - Present*
- **4D Automotive Radar-enabled Mobile Autonomy**
  - Exploit multi-level 4D radar data representation, e.g., radar tensor and point cloud, to improve the perception redundancy, robustness and efficiency onboard autonomous vehicles.
  - Develop bespoke algorithms to support various 4D radar-based tasks, e.g., moving object detection, segmentation and tracking, 3D occupancy prediction, scene flow estimation and odometry.
- **Privacy-aware Human Behaviour Recognition**
  - Enhance the performance of mmWave-based human sensing tasks, e.g., activity recognition, human parsing and body part tracking by learning scene flow estimation on imaging radar point clouds.
  - Build a complete benchmark for human body reconstruction from different types of mmWave data representations, i.e., ADC samples, radar tensor and radar point cloud.
- **Robust Egocentric Hand Pose and Action Analysis**
  - Investigate using thermal images for first-person two-hand pose estimation and action recognition.
  - Develop a benchmark for the above task and evaluate state-of-the-art RGB(D) image-based methods.

UAV Lab, Tsinghua University — Beijing, China
Visiting Student, Advisor: Dr. Geng Lu — *2020/08 - 2020/09*
- **Monocular UAV Indoor Self-Localization**
  - Apply visual object trackers to UAV indoor self-localization under air-ground robot coordination.

Vision4Robotics Group, Tongji University — Shanghai, China
Research Student, Supervisor: Dr. Changhong Fu — *2019/05 - 2021/06*
- **Efficient and Robust UAV Visual Object Tracking**
  - Present novel algorithms to solve task-specific issues in UAV visual object tracking, such as background distractor, temporal incontinuity, adversarial attack, and darkness, without sacrificing the real-time performance on CPUs by using correlation filter-based approaches.

FEATURED PAPERS (* indicates equal contribution.)

[p1] Zhijun Pan*, **Fangqiang Ding***, Haotao Zhong*, Chris Xiaoxuan Lu. "Moving Object Detection and Tracking with 4D Radar Point Cloud" in submission to ***ICRA***, 2024. [paper]

[p2] **Fangqiang Ding**, Zhen Luo, Peijun Zhao, Chris Xiaoxuan Lu. "milliFlow: Scene Flow Estimation on mmWave Radar Point Cloud for Human Motion Sensing" in submission to ***IMWUT***, 2024. [paper]

[p3] **Fangqiang Ding**, Andras Palffy, Dariu M. Gavrila, Chris Xiaoxuan Lu. "Hidden Gems: 4D Radar Scene Flow Learning Using Cross-Modal Supervision" in ***CVPR***, 2023 (top 10% Highlight). [paper] [code]

[p4] **Fangqiang Ding**, Zhijun Pan, Yimin Deng, Jianning Deng, Chris Xiaoxuan Lu. "Self-Supervised Scene Flow Estimation with 4-D Automotive Radar". IEEE ***RAL*** *with IROS presentation*, 2022. [paper] [code]

[p5] Bowen Li, Changhong Fu, **Fangqiang Ding**, Junjie Ye, Fuling Lin. "All-Day Object Tracking for Unmanned Aerial Vehicle". IEEE ***TMC***, 2022. [paper] [code]

[p6] **Fangqiang Ding**, Changhong Fu, Yiming Li, Jin Jin and Chen Feng. "Automatic Failure Recovery and Re-Initialization for Online UAV Tracking with Joint Scale and Aspect Ratio Optimization" in ***IROS***, 2020. [paper] [code]

[p7] Yiming Li, Changhong Fu, **Fangqiang Ding**, Ziyuan Huang and Geng Lu. "AutoTrack: Towards High-Performance Visual Tracking for UAV with Automatic Spatio-Temporal Regularization" in ***CVPR***, 2020. [paper] [code]

SELECTED AWARDS

ESPRC CDT-RAS PhD Scholarship	*Sept. 2021*
Grand Prize of "Challenge Cup" in Shanghai	*June 2021*
Excellent Graduate of Shanghai (top 2%)	*May 2021*
Academic Stars in Tongji (top 10)	*Nov. 2020*
China National Scholarship (top 1%)	*Sept. 2019*
China National Scholarship (top 1%)	*Sept. 2018*
First Prize of Tongji Mathematics Competition	*June 2018*
First Prize of Shanghai Graphics Design Competition	*May 2018*

ACADEMIC SERVICES

- **Invited Reviewer** for IROS, ICRA, IEEE RA-L, ACM TOSN, IEEE TII, TIV, etc.
- **Teaching Support** for *Introduction to Vision and Robotics* (2021-2024) (University of Edinburgh)
- **Advisor of Bachelor/Master thesis** for Nout Cleef (BSc. 2022), Xuanyu Pan (MSc. 2022), Zhijun Pan (BSc., 2023), Zhen Luo (MRes., 2023), Xinyuan Cui (BEng. 2024), Lawrence Zhu (BSc. 2024)
- **Invited Talk** at NYU AI4CE Lab on mmWave radar scene flow Estimation.