# **BOTAO HE**

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#### EDUCATION

University of Maryland, College Park, U.S.

08/2022 - Now

Ph.D. student in Computer Science.

Nanjing Institute of Technology, Nanjing, China

09/2018 - 07/2022

B.Eng. in Robot Engineering, School of Automation.

**COLLABORATION & CO-ADVISE** 

Carnegie Mellon University, Advised by Dr. Ji Zhang

05/2023 - Now

Zhejiang University, Advised by Prof. Fei Gao

01/2020 - 08/2022

**RESEARCH INTERESTS** 

Interactive Perception & Learning & Motion Planning for Manipulation and Navigation.

#### **SELECTED PUBLICATION**

Full publication list can be found on [Google Scholar]

- Yu Chen, **Botao He**, Yuemin Mao, Arthur Jakobsson, Jeffrey Ke, Yiannis Aloimonos, Guanya Shi, Howie Choset, Jiayuan Mao, Jeffrey Ichnowski. "Adversarial Game-Theoretic Algorithm for Dexterous Grasp Synthesis". Under Review. [Video]
- **Botao He\***, Amir Hossein Shahidzadeh\*, Yu Chen\*, Jiayi Wu, Tianrui Guan, Guofei Chen, Howie Choset, Dinesh Manocha, Glen Chou, Cornelia Fermuller and Yiannis Aloimonos. "NAVMOE: Hybrid Model- and Learning-based Traversability Estimation for Local Navigation via Mixture of Experts". Under Review. [Pre-print]
- Botao He, Ze Wang, Yuan Zhou, Jingxi Chen, Chahat Deep Singh, Haojia Li, Yuman Gao, Kaiwei Wang, Yanjun Cao, Chao Xu, Yiannis Aloimonos, Fei Gao, and Cornelia Fermuller. "Microsaccade-inspired Event Camera for Robotics", Science Robotics. [Website] [Paper] [Pre-print] [Video] [Code]
- **Botao He\***, Guofei Chen\*, Wenshan Wang, Ji Zhang, Cornelia Fermuller, Yiannis Aloimonos. "*Interactive-FAR: Interactive, Fast and Adaptable Routing for Navigation Among Movable Obstacles in Complex Unknown Environments*". IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS), 2024. [Website] [Paper] [Code]
- **Botao He**, Guofei Chen, Cornelia Fermuller, Yiannis Aloimonos, Ji Zhang. "Air-FAR: Fast and Adaptable Routing for Aerial Navigation in Large-scale Complex Unknown Environments.". IEEE International Conference on Robotics and Automation (ICRA 2025) [Website] [Pre-print] [Code]
- Qianhao Wang\*, **Botao He**\*, Zhiren Xun and Fei Gao. "GPA-Teleoperation: Gaze Enhanced Perception-aware Safe Assistive Aerial Teleoperation" IEEE Robotics and Automation Letters (RA-L) and IEEE International Conference on Robotics and Automation (ICRA 2022). [Paper] [Video] [Code]
- Botao He\*, Haojia Li\*, Siyuan Wu, Dong Wang, Zhiwei Zhang, Qianli Dong, Chao Xu, and Fei Gao. "FAST-Dynamic-Vision: Detection and Tracking Dynamic Objects with Event and Depth Sensing" IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2021). [Paper] [Video] [Code]

#### **WORK EXPERIENCE**

#### Honda Research Institute USA. Research Intern

05/2025 - 08/2025

#### Advised by Dr. David Isele

- Robust motion prediction via Mixture of LoRA Experts.
- Proposed an unified end-to-end trainable framework that fuses model- and learning-based experts for better cross-domain generalization.

#### **Zhang Lab**, Carnegie Mellon University

05/2023 - Now

#### Advised by Dr. Ji Zhang

Interactive Navigation.

- Proposed a solution for interactive navigation in cluttered unknown environments, focusing on fast and adaptable navigation with environmental interactions.
- Designed a directed visibility graph that encodes the interaction strategies and accelerates path finding.
- Designed an interaction strategy that adapts to movable obstacles' online physics property estimation.

#### Ground/Aerial Autonomy Simulator. [Website]

- Proposed a fully autonomy stack for developing ground/aerial autonomous navigation systems and later on deploying to real robots with minor sim-to-real gap. Can be quickly deployed and tested in 10 minutes.
- Designed 29 multi-scale scenes with different complexity, supports Gazebo/Unity with multiple sensor setups.

#### Perception and Robotics Group, University of Maryland

09/2022 - Now

### Advised by Prof. Yiannis Aloimonos and Dr. Cornelia Fermuller

Microsaccade-inspired Event Camera for Robotics (Co-advised by Prof. Fei Gao)

- Proposed a new hardware design to make the event camera see static background even when it is static.
- Designed a new algorithm to transform the new data format to the same domain of standard event camera, making the proposed system a plug-in-and-use solution with existing event-based perception algorithms.

### Active Perception for Navigation

• Designed a distance-field and corresponding planner that combine the view-point guidance with other navigation constraints into an optimization-based planning framework for improving human pose estimation.

# FAST (Field Autonomous System & compuTing) Lab, Zhejiang University

01/2020 - 08/2022

#### Advised by Prof. Fei Gao

- Advanced Pilot Assistance System (APAS): Designed a gaze-enhanced APAS considering topological intent consistency and perception awareness. Make drone operation easy for everyone.
- Event-based Active Perception: Proposed a perception system for UAVs to dodge fast-moving objects with low latency and high precision.
- Whole-body Motion Planning for UAVs: Proposed a full-body, optimization-based, yaw-considered real-time motion planning framework for aerial robots.

#### All-terrain Vehicle Lab, NJIT

10/2018 - 12/2019

Captain of team NJIT.

• Developed three robot systems: Challenge Arena Fighting Robot, Electromagnetic Throw System, Lightweight quadruped robot.

#### **SERVICE**

#### **Reviewer:**

IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2024, 2025

IEEE Transactions on Intelligent Transportation Systems (TITS), 2024, 2025

Robotics and Automation Letters (RA-L), 2022, 2024, 2025

Frontiers in Robotics and AI, 2023, 2024

IEEE Intl. Conf. on Robotics and Automation (ICRA), 2024, 2025

IEEE/RSJ Intl. Conf. on Intelligent Robots and Systems (IROS), 2024, 2025

CVPR Workshop, 2023

The Visual Computer, 2023, 2024

**Editor:** NeuroPAC

# **HONORS & AWARDS**

NeuroPAC Fellowship, NeuroPAC, 2023, 2024

Dean's Fellowship, UMD, 2022-2023

# **SKILLS**

**Programming:** C/C++, Python, Keil-C, Matlab, Git.

Robotics: ROS, Unity, Airsim, Gazebo, Adams, IoT chips(STM32, Arduino).

Hardware: SolidWorks, machining, circuit design.