

박태하 · Tae Ha (Jeff) Park

STANFORD UNIVERSITY 항공우주공학부 박사과정

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학력

Stanford University

항공우주공학 박사 | 지도교수: Dr. Simone D'Amico

Stanford, CA
2018/04 - 2024/06

- 제목: Robust Machine Learning for Vision-Based Navigation about Non-Cooperative Resident Space Objects
- AA279A: Space Mechanics 조교 (2019, 2021, 2022)

Stanford University

항공우주공학 석사

Stanford, CA
2017/09 - 2020/04

- 딥러닝, 컴퓨터 비전, 위성군(群) 항행 및 최적화에 대한 연구 진행

Harvey Mudd College (HMC)

공학 학사

Claremont, CA
2013/08 - 2017/05

- High Distinction 졸업 (GPA: 3.81/4.0)
- Tau Beta Pi Engineering Honors Society 멤버
- De Pietro Fellow in Civil Engineering

경력

Infinite Orbits SAS

컴퓨터 비전, 유도, 항법 및 제어 인턴

Toulouse, France
2022/06 - 2022/08

- Unreal Engine 5와 C++를 이용한 우주공간내 인공위성 랑데부 simulator와 scene 렌더링 툴을 개발, 이를 이용한 단안 카메라 (monocular camera) 기반 알려진 비협조 위성의 자세 추정 및 추적을 위한 합성곱 신경망을 학습 및 검증

Space Rendezvous Laboratory (SLAB), Stanford University

박사연구원 | 지도교수: Dr. Simone D'Amico

Stanford, CA
2019/01 - 2024/06

- SLAB 소재 Testbed for Rendezvous and Optical Navigation (TRON) 시설을 개발 및 calibrate, 이를 통해 우주와 같은 빛 환경하에서 mockup 위성 모델과의 랑데부 및 근접 운용을 물리적으로 simulate, 그리고 카메라와 mockup 모델 사이의 정확한 상대자세정보 또한 실시간으로 획득 [C3]
- OpenGL 및 Unreal Engine 등의 renderer와 TRON을 통한 차세대 오픈소스 벤치마크 데이터셋을 (e.g., SPEED+, SHIRT, SPE3R) 개발, 이를 이용해 알려진 표적 위성의 합성 (synthetic) 이미지와 우주 이미지 사이의 domain gap에 중점을 둔 합성곱 신경망 모델과 무향 칼만 필터 기반 항행 알고리즘을 개발, 학습 및 검증 [C1, C4, C6, C8, C9, D2-D5, J2, J3, J5]
- On-orbit servicing 및 잔해제거 등 지속 가능한 우주 개발을 목표로 한 우주에서의 시각 기반 랑데부 및 근접운용—Rendezvous and Proximity Operations (RPO)—을 위한 딥러닝 모델과 항행 알고리즘을 개발 [C5-C7, C10, J4-J6]
- 미상의 우주물체의 2차원 이미지로부터의 3차원 형상 복원 및 자세 추정을 위한 딥러닝 모델 개발 [C8]

논문목록

📄 arXiv/공식 논문/관련 웹 링크 📄 GitHub 📄 논문 PDF 링크 📄 관련 영상

저널

[J6] Robust Multi-Task Learning and Online Refinement for Spacecraft Pose Estimation across Domain Gap

T. H. Park, S. D'Amico

Advances in Space Research (2024). 📄 📄

[J5] Adaptive Neural-Network-Based Unscented Kalman Filter for Robust Pose Tracking of Noncooperative Spacecraft

T. H. Park, S. D'Amico

Journal of Guidance, Control, and Dynamics (2023). 📄

[J4] Leveraging Neural Network Uncertainty in Adaptive Unscented Kalman Filter for Spacecraft Pose Estimation

L. Pasqualetto Cassinis, T. H. Park, N. Stacey et al.

Advances in Space Research (2023). 📄

[J3] Satellite Pose Estimation Competition 2021: Results and Analyses

T. H. Park, M. Märten, M. Jawaid et al.

Acta Astronautica (2023). [🔗](#)

[J2] Satellite Pose Estimation Challenge: Dataset, Competition Design and Results

M. Kisantal, S. Sharma, **T. H. Park** et al.

IEEE Transactions on Aerospace and Electronic Systems (2020). [🔗](#) <**M. BARRY CARLTON AWARD**>

[J1] Improved Modal Convergence Using the Assumed Modes Method for Rods Carrying Various Lumped Elements

P. D. Cha, **T. H. Park**

International Journal of Mechanical Engineering Education (2018). [🔗](#)

학회

[C10] Online Supervised Training of Spaceborne Vision during Proximity Operations using Adaptive Kalman Filtering

T. H. Park, S. D'Amico

2024 IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan (2024). [🔗](#)

[C9] SPEED-UE-Cube: A Machine Learning Dataset for Autonomous, Vision-Based Spacecraft Navigation

Z. Ahmed, **T. H. Park**, A. Bhattacharjee et al.

46th AAS Guidance, Navigation and Control Conference, Breckenridge, Colorado, February 2-7 (2024). [📄](#) [🔄](#)

[C8] Rapid Abstraction of Spacecraft 3D Structure from Single 2D Image

T. H. Park, S. D'Amico

2024 AIAA SciTech Forum (2024). [🔗](#) [🔗](#) (Correction) [🔄](#)

[C7] Adaptive End-to-End Architecture for Autonomous Spacecraft Navigation and Control During Rendezvous and Proximity Operations

J. Kruger, T. Guffanti, **T. H. Park** et al.

2024 AIAA SciTech Forum (2024). [🔗](#)

[C6] Adaptive Neural Network-based Unscented Kalman Filter for Spacecraft Pose Tracking at Rendezvous

T. H. Park, S. D'Amico

2022 AAS/AIAA Astrodynamics Specialist Conference, Charlotte, North Carolina, August 7-11 (2022). [📄](#)

[C5] Robust Multi-Task Learning and Online Refinement for Spacecraft Pose Estimation across Domain Gap

T. H. Park, S. D'Amico

11th International Workshop on Satellite Constellations & Formation Flying, Milano, Italy, June 7-10 (2022). [📄](#)

[C4] SPEED+: Next-Generation Dataset for Spacecraft Pose Estimation across Domain Gap

T. H. Park, M. Märtens, G. Lecuyer et al.

2022 IEEE Aerospace Conference (2022). [🔗](#) [🔄](#) [📺](#)

[C3] Robotic Testbed for Rendezvous and Optical Navigation: Multi-Source Calibration and Machine Learning Use Cases

T. H. Park, J. Bosse, S. D'Amico

2021 AAS/AIAA Astrodynamics Specialist Conference, Virtual, August 8 - 12 (2021). [📄](#)

[C2] Generative Model for Spacecraft Image Synthesis using Limited Dataset

T. H. Park, S. D'Amico

2020 AAS/AIAA Astrodynamics Specialist Conference, South Lake Tahoe, California, August 9 - 13 (2020). [📄](#)

[C1] Towards Robust Learning-Based Pose Estimation of Noncooperative Spacecraft

T. H. Park, S. Sharma, S. D'Amico

2019 AAS/AIAA Astrodynamics Specialist Conference, Portland, Maine, August 11 - 15 (2019). [📄](#) <**BEST PAPER AWARD**>

데이터셋

[D5] Spacecraft Pose Estimation Dataset of a 3U CubeSat using Unreal Engine (SPEED-UE-Cube)

T. H. Park, Z. Ahmed, A. Bhattacharjee et al.

Stanford Digital Repository (2024). [🔗](#)

[D4] SPE3R: Synthetic Dataset for Satellite Pose Estimation and 3D Reconstruction

T. H. Park, S. D'Amico

Stanford Digital Repository (2024).

[D3] SHIRT: Satellite Hardware-In-the-loop Rendezvous Trajectories Dataset

T. H. Park, S. D'Amico

Stanford Digital Repository (2022). [↗](#)

[D2] Next Generation Spacecraft Pose Estimation Dataset (SPEED+)

T. H. Park, M. Märtens, G. Lecuyer et al.

Stanford Digital Repository (2021).

[D1] Spacecraft Pose Estimation Dataset (SPEED)

S. Sharma, T. H. Park, S. D'Amico

Stanford Digital Repository (2019). [▶](#)

학위논문

[T1] Robust machine learning for vision-based navigation about non-cooperative resident space objects

T. H. Park

Ph.D. Thesis, Stanford University (2024). [↗](#)

활동

공동주최자 Kelvins Satellite Pose Estimation Competition (2021) [↗](#)

AI4Space (CVPR workshop) (2024) [↗](#)

리뷰어 Acta Astronautica (1건)

Advances in Space Research (3건)

Astrodynamics (1건)

IEEE Transactions on Aerospace and Electronic Systems (3건)

Journal of Aerospace Information Systems (3건)

Journal of Guidance, Control, Dynamics (2건)

Journal of Spacecraft and Rockets (2건)

숙련기술

프로그래밍 MATLAB/Simulink, Python, C/C++, CUDA, \LaTeX

딥러닝 PyTorch (Python & C++), ONNXRuntime, TensorRT, MATLAB Deep Learning Toolbox™

라이브러리 OpenCV, PyTorch3D, OpenMP, CVX/CVXPY

렌더링 OpenGL, Unreal Engine

언어 영어 · 일본어 (JLPT N1 - 2023/12) · 프랑스어 (conversational)

수상경력

2024 **2020 M. Barry Carlton Award**, IEEE Aerospace and Electronics System Society

2019 **Best Paper Award**, 2019 AAS/AIAA Astrodynamics Specialist Conference

Portland, ME

2015 **Tau Beta Pi Engineering Honors Society**, HMC

Claremont, CA

2015 **De Pietro Fellowship in Civil Engineering**, HMC

Claremont, CA

2013 **Harvey S. Mudd Merits**, HMC

Claremont, CA

2013-17 **Dean's List**, HMC

Claremont, CA