



AAE1001 Introduction to Artificial Intelligence and Data Analytics in Aerospace and Aviation Engineering

Week 12 (Conclusion of the project)

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Why coding/programing is important for Aviation Engineering (specially after COVID-19)?

What are challenges to make this happen?

<https://dronelife.com/>

Infrastructure inspection

- Parcel Delivery

Infrastructure inspection

- building and bridge defects, etc.

Search and Rescue (SAR)

- disaster prevention and rescue,

Smart transportation

- traffic monitoring management
- air quality monitoring



Department of
Aeronautical and Aviation Engineering
航空及民航工程學系



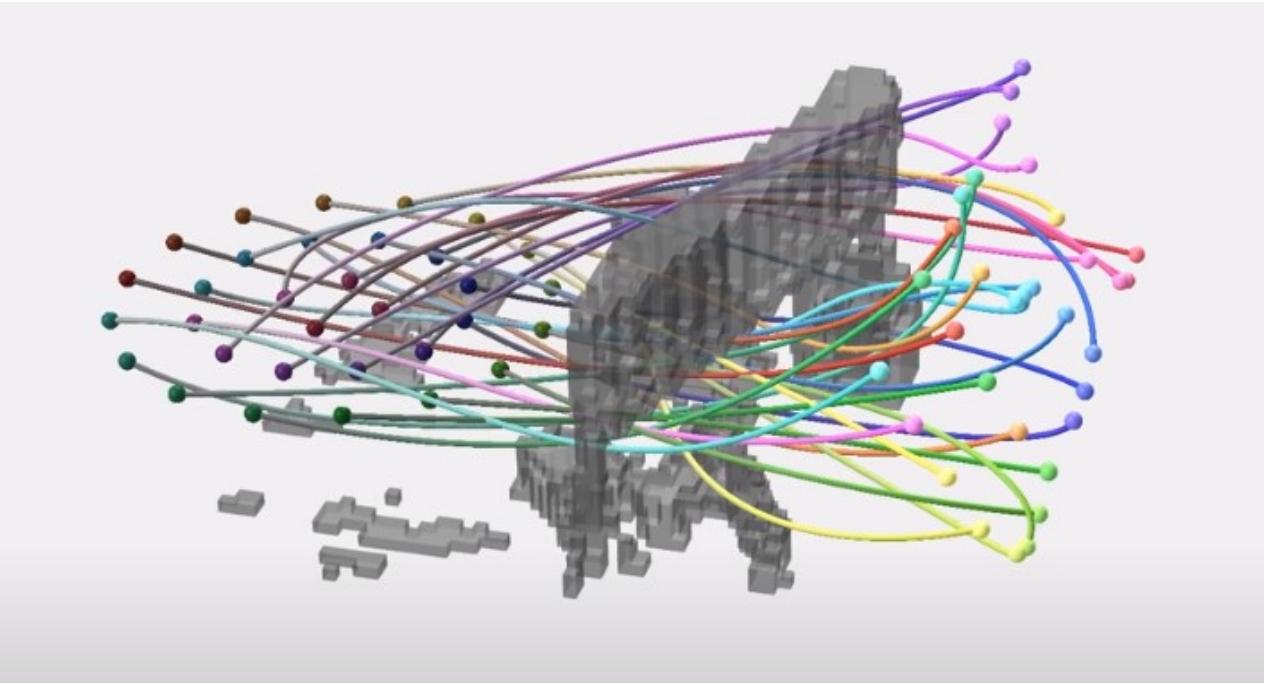
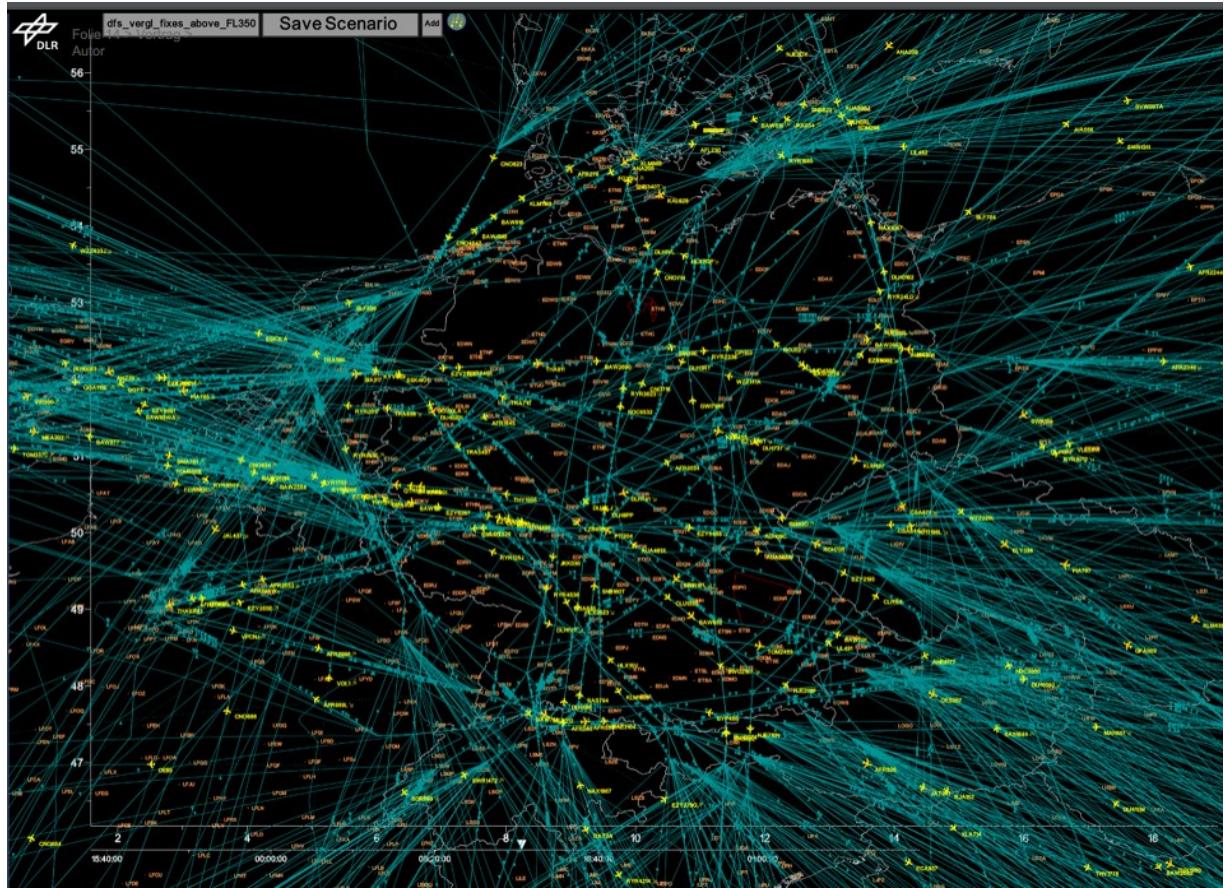
THE HONG KONG
POLYTECHNIC UNIVERSITY
香港理工大學

Crowded Airspace in Cities





Challenges - Collaborative Path Planning

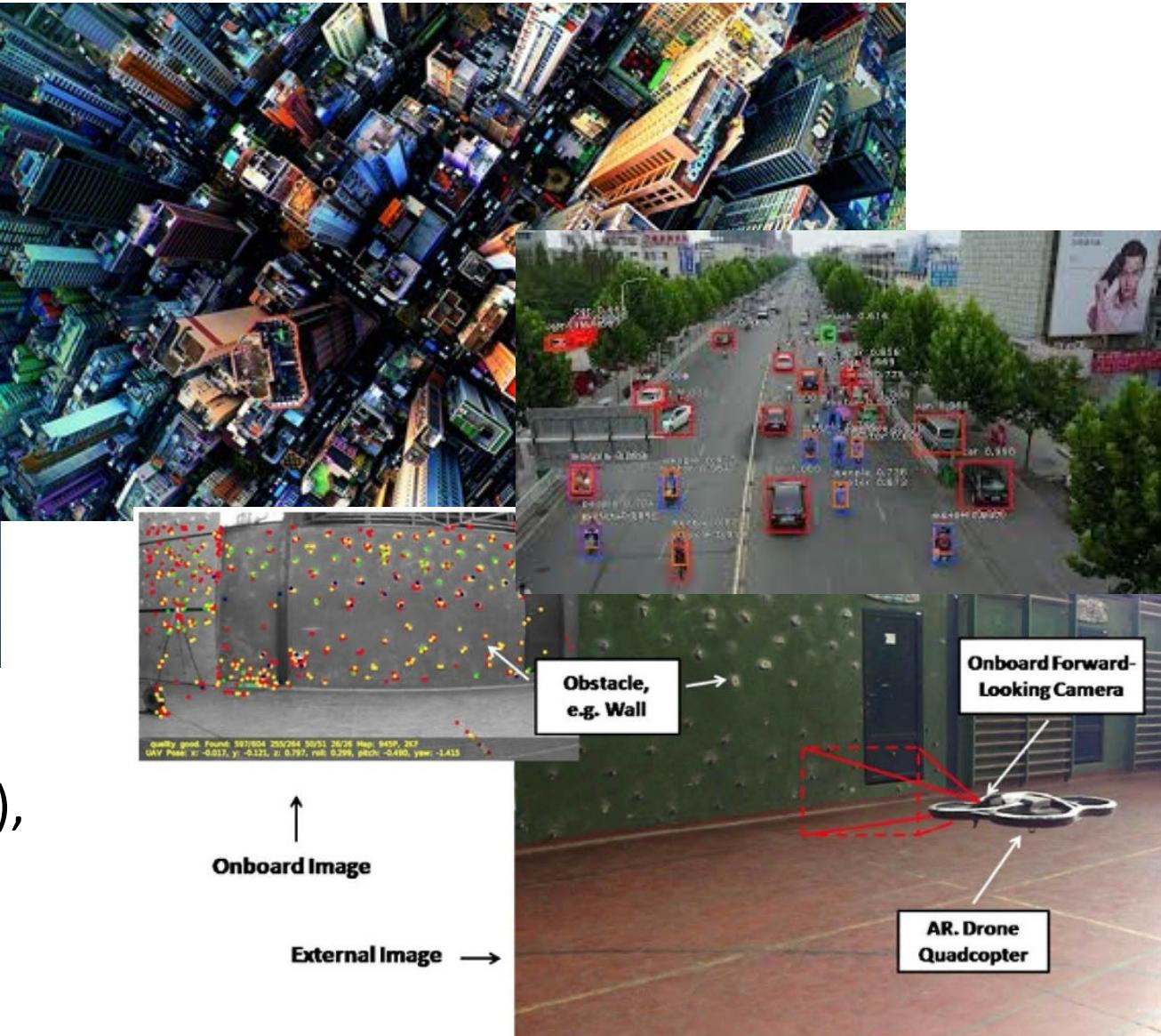


<https://www.youtube.com/watch?v=7Kla9FlmbRc>

Keywords: Path planning, traffic control, SWARM collaboration, IoT, Connect vehicles, and Smart Cities



Challenges – Collision Avoidance



Keywords: Perception by AI (deep learning),
image processing, estimation and
optimization



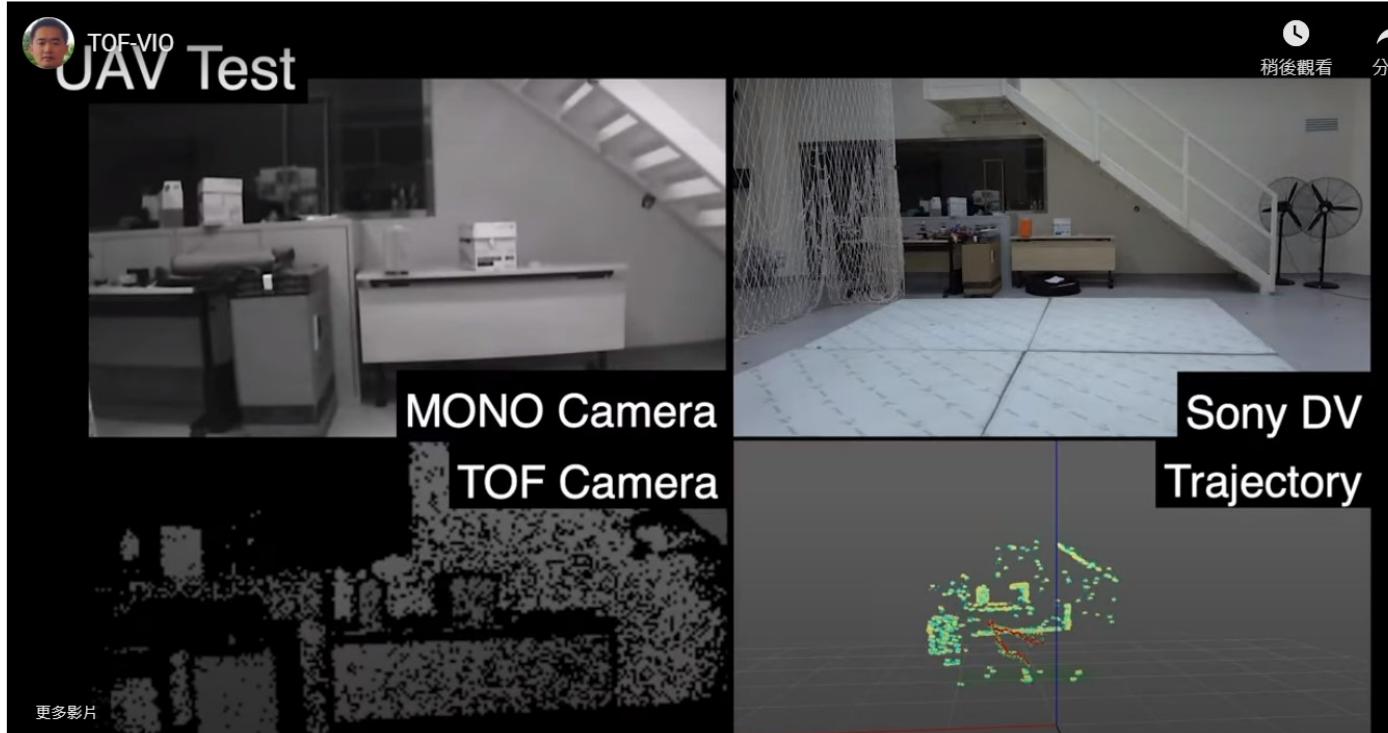
Challenges – Navigation in Challenged Environments

Challenge in GNSS Positioning



Visual Navigation

Time of Flight Visual Inertial Odometry (ToF-VIO)



<https://www.polyu.edu.hk/researchgrp/cywen/index.php/en/mav-uav/perception-slam.html>

Keywords: GNSS, inertial navigation system, visual positioning, simultaneous localization and mapping (SLAM), sensor fusion, filtering.



Integrity and Safety



Keywords:

Airworthiness, Reliability, Compliance (regulation-wise)
Statistics and modelling (mathematics-wise)



Most of the sample open-source codes can be found in GitHub



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About 860,000 results (0.64 seconds)

github.com › AtsushiSakai › PythonRobotics

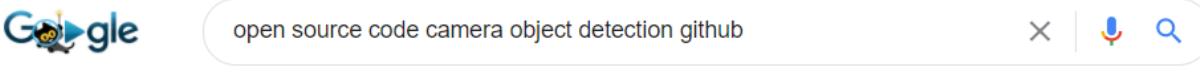
[AtsushiSakai/PythonRobotics: Python sample codes ... - GitHub](#)

This is a **Python code** collection of robotics algorithms, especially for autonomous navigation.

Features: Easy to read for understanding each **algorithm's** basic idea.

[README.md](#) | [Issues 4](#) | [AtsushiSakai/PythonRobotics](#) | [Pull requests](#)

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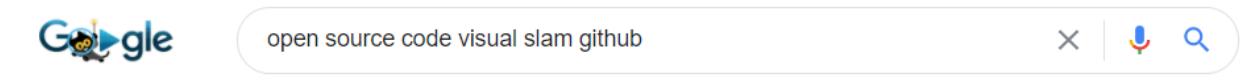
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github.com › CiscoDevNet › Object-detection-via-Mera...

[CiscoDevNet/Object-detection-via-Meraki-Camera ... - GitHub](#)

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github.com › xdspacelab › openvslam

[OpenVSLAM: A Versatile Visual SLAM Framework - GitHub](#)

OpenVSLAM is a monocular, stereo, and RGBD **visual SLAM** system. ... Citation. OpenVSLAM won first place at ACM Multimedia 2019 **Open Source Software** ...

[Xdspacelab/openvslam](#) | [openvslam/CMakeLists.txt](#) at ... | [Pull requests 16](#) | [Actions](#)



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github.com › mnielsen › neural-networks-and-deep-lea...

[mnielsen/neural-networks-and-deep-learning: Code ... - GitHub](#)

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To do list in your 4 years...

1. To initiate one hand-on project (by coding or manufacturing) related to your passion.
 - Manufacturing an UAV, Enabling autonomous function of an UAV, etc
2. To find news and articles (by hashtag or club in social networks) that related to your interests.
 - Accumulating your domain knowledge and expand your network with someone who have similar passion to you.
3. To find the issues/problems (in your network, village, city, nation, area and the world) you cared and try to find solutions to these challenges.



(Video) AI and Data Science in Aviation

<https://www.youtube.com/watch?v=D8NIYPtPgwA>

- 1:18 - Revenue management and route planning
- 3:36 - In-flight sales and food supply
- 5:03 - Fuel consumption optimization
- 6:36 - Boarding and checking bags with facial recognition
- 8:33 - Preparing a plane for the next flight



Final To do list in this project

1. Finish as much tasks (using Python) as you can
2. Write a report to introduce your project and reflect what you have learned (in the form of GitHub homepage)
3. Prepare a face-to-face presentation to share and communication your ideas and projects
4. Submit the peer evaluation form individually