AAE2004 Introduction to Aviation Systems
AAE
Design of Path Planning Algorithm for Aircraft Operation

Week 8 (Introduction to the project)

Dr. Li-Ta Hsu, Dr. Guohao Zhang, and Dr. Weisong Wen
Assisted by
Miss Hiu Yi HO (Queenie), Miss Yan Tung LEUNG (Nikki),
Mr Hoi Fung NG (Ivan) and Mr Feng HUANG (Darren)

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)

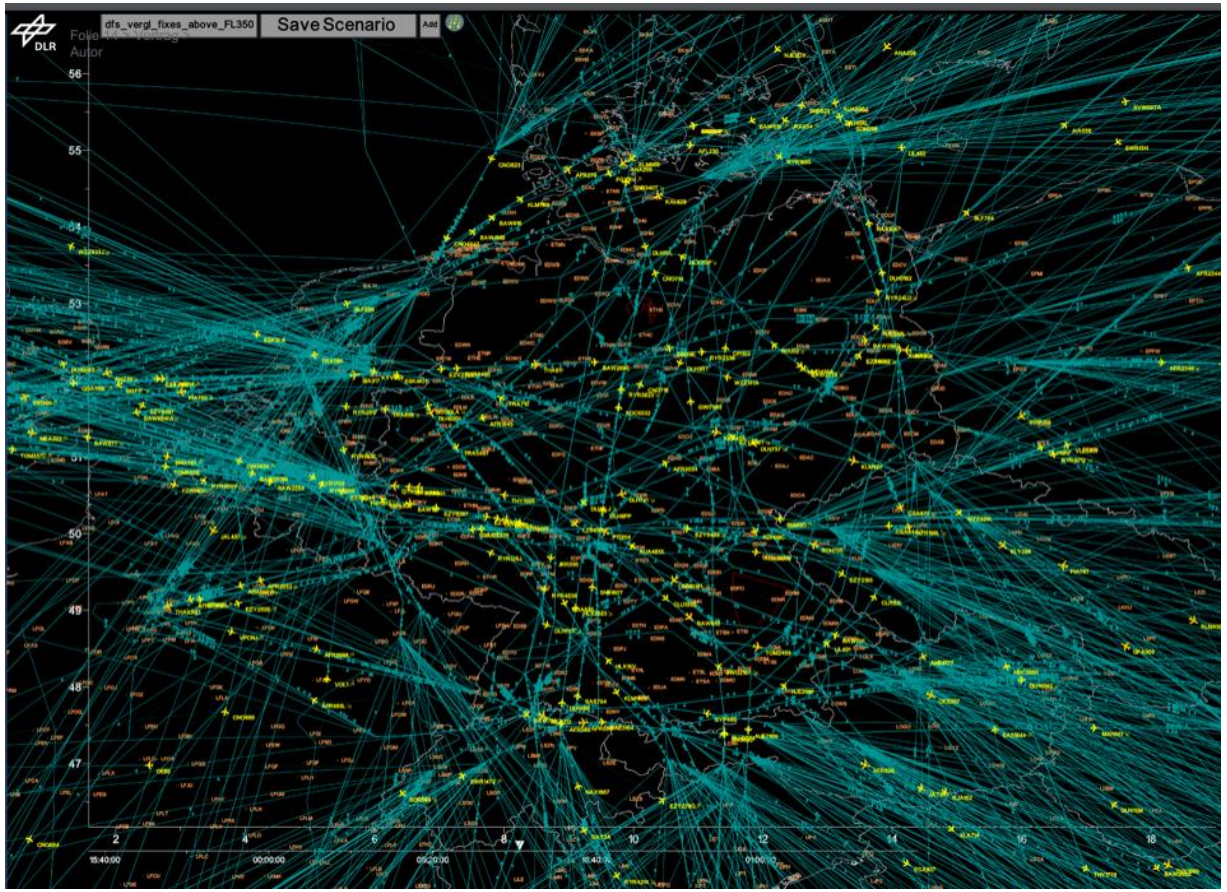
- disaster prevention and rescue,

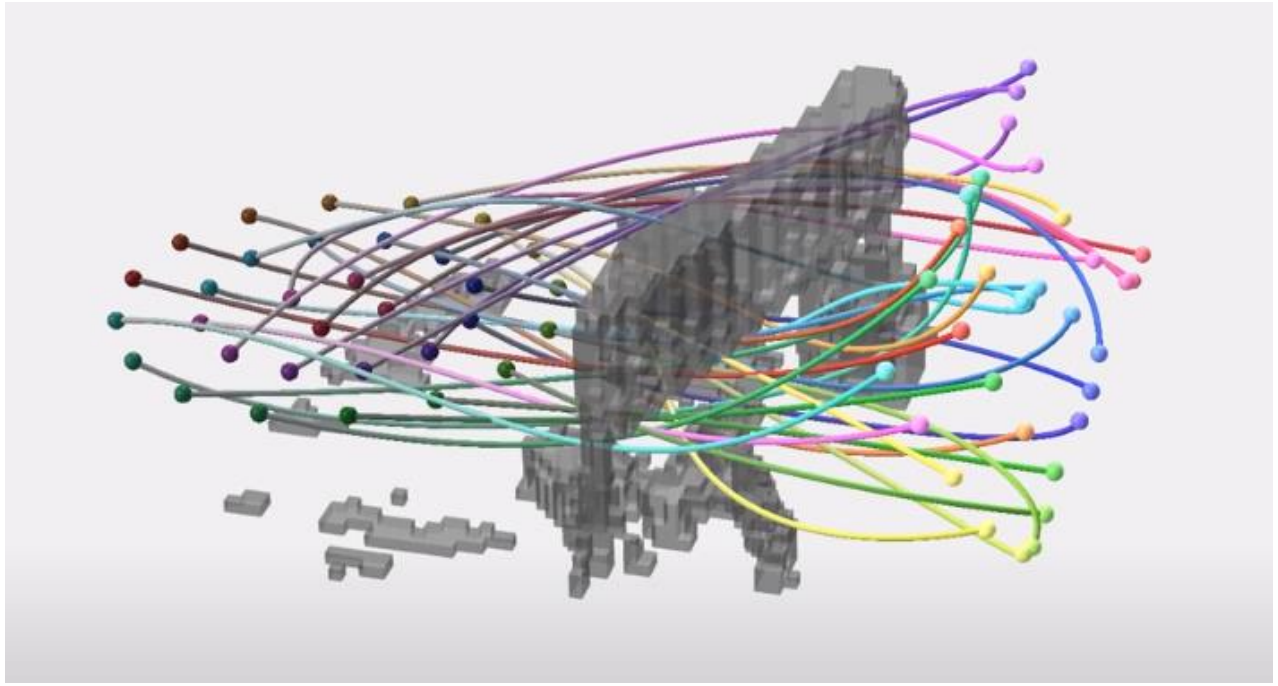
Smart transportation

- traffic monitoring management
- air quality monitoring

Crowded Airspace in Cities

Challenges - Collaborative Path Planning

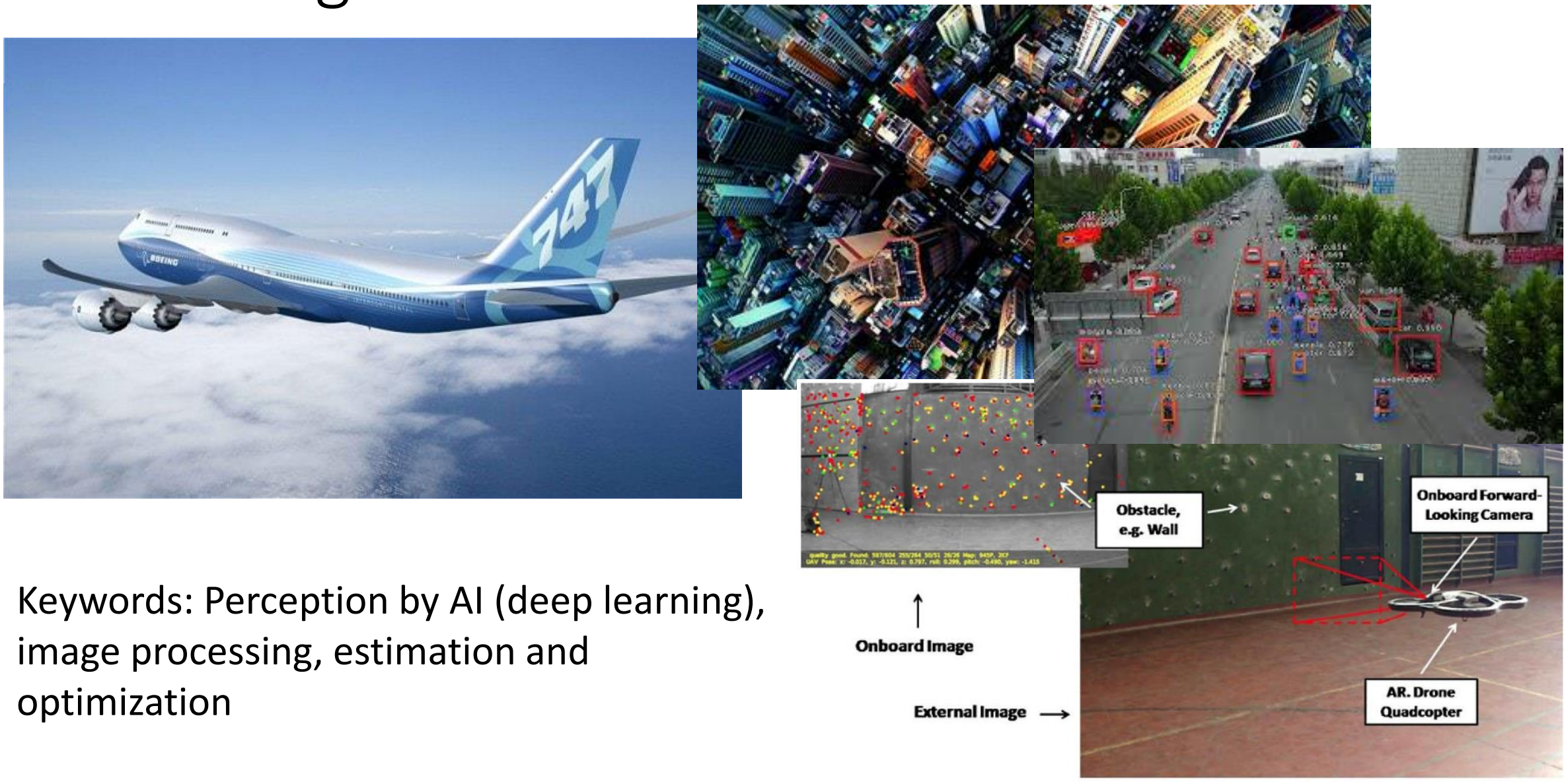




https://www.youtube.com/watch?v=7KIa9FlmbRc

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

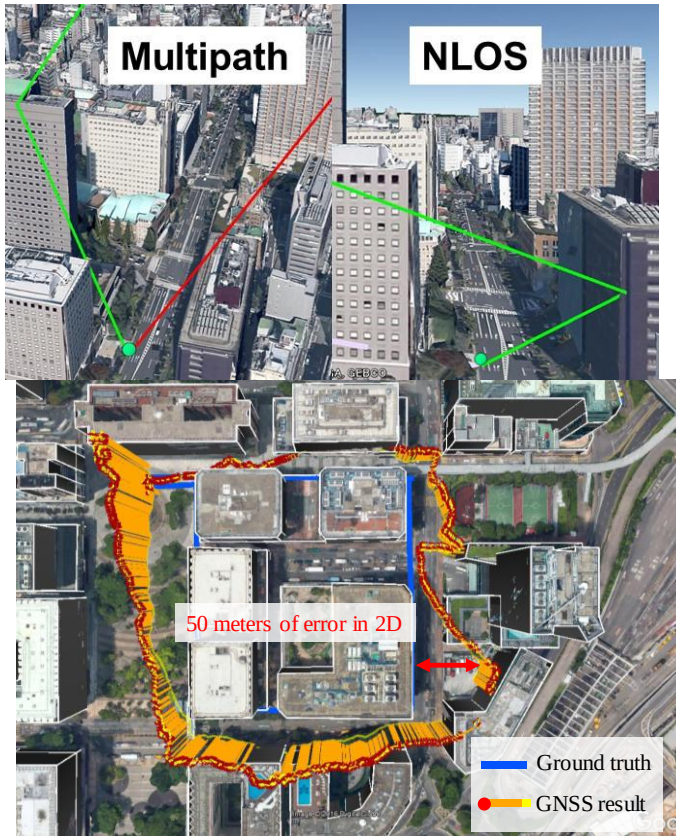
Challenges – Collision Avoidance



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

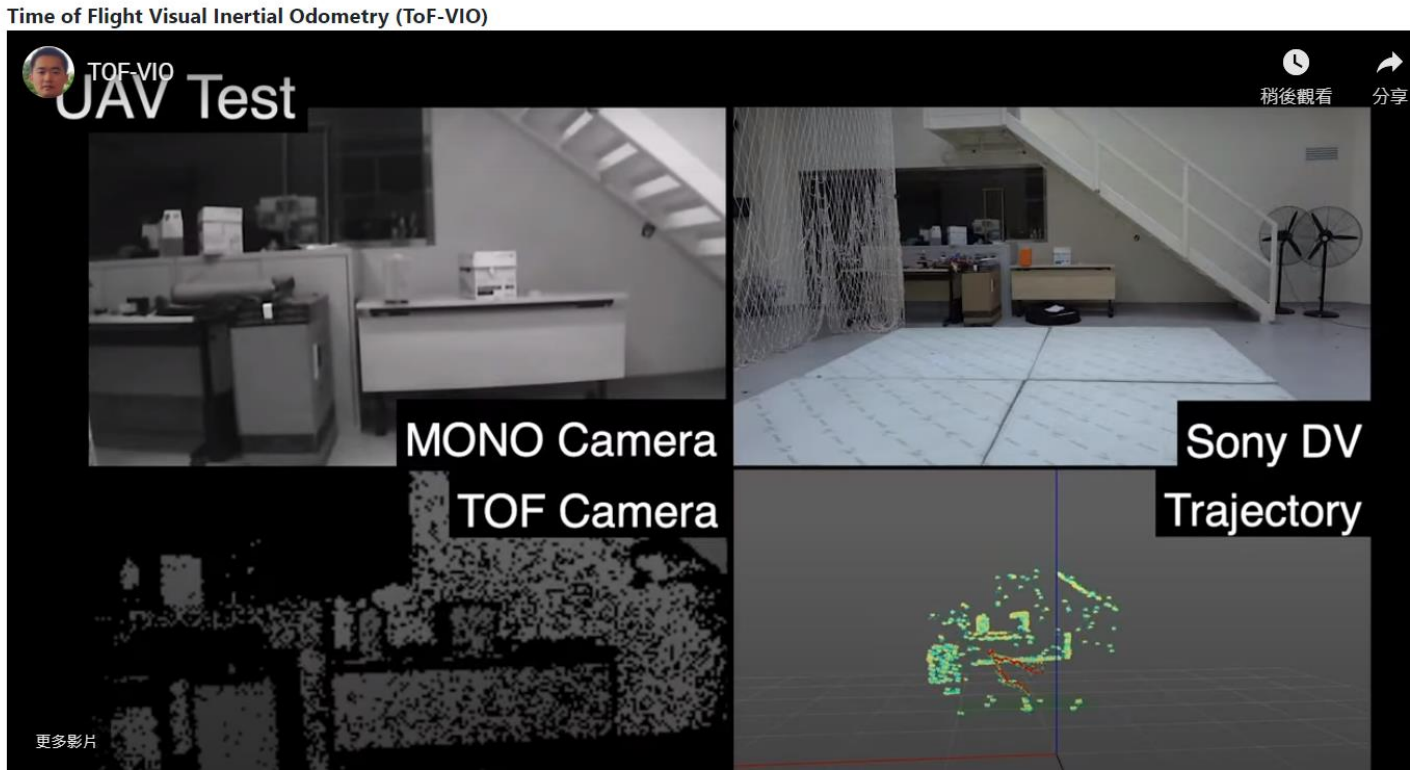
Challenges – Navigation in Challenged Environments

Challenge in GNSS Positioning



Visual Navigation

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

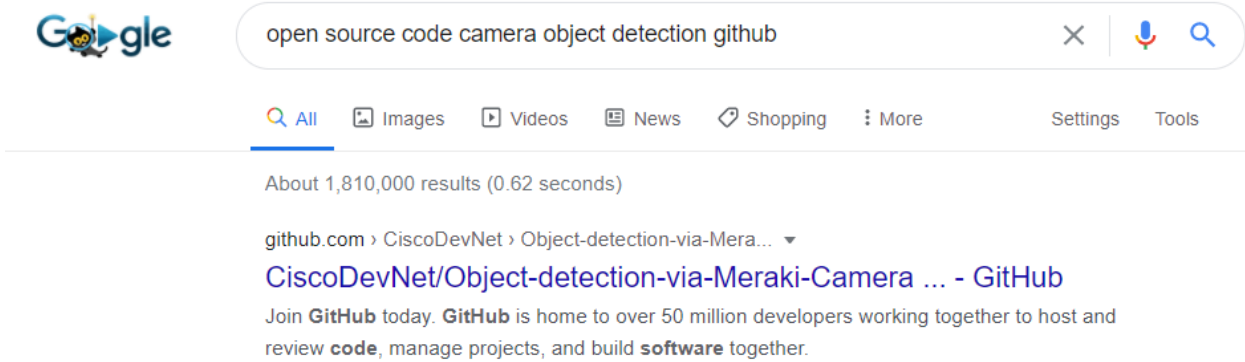


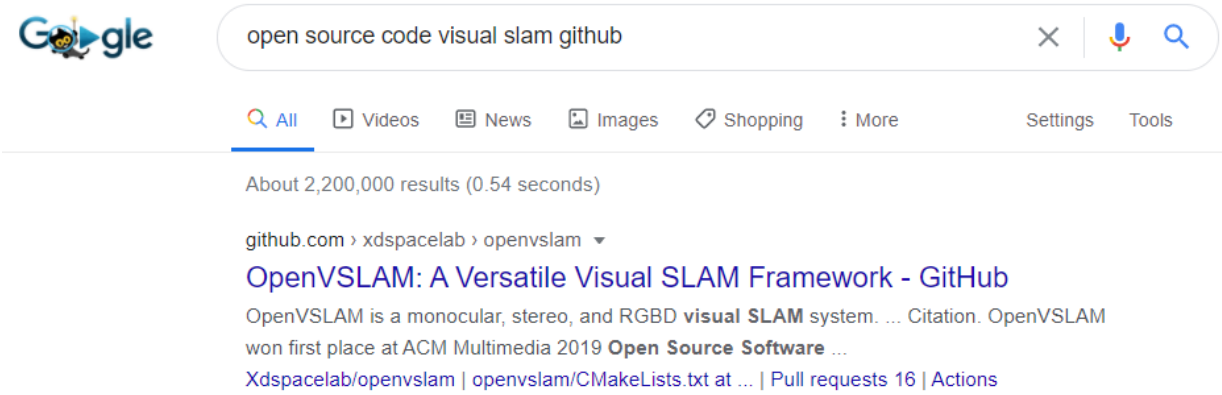
Keywords: GNSS, inertial navigation system, visual positioning, simultaneous localization and mapping (SLAM), sensor fusion, filtering.

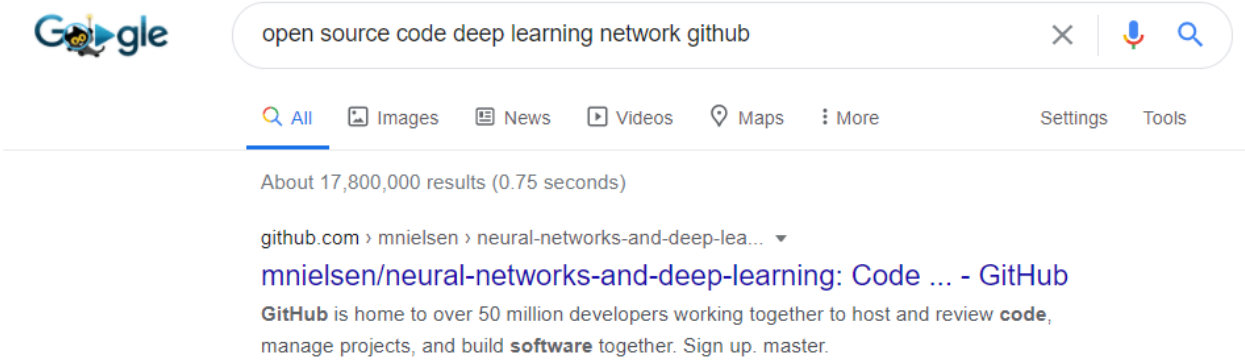
Integrity and Safety

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

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







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.

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Application Cycle

- Call for application: around March
- Application period: March - April
- Result announcement: early June

https://www.polyu.edu.hk/en/gs/ug-research/uris/about-uris/
https://www.polyu.edu.hk/en/gs/ug-research/uris/application-for-uris/

What URIS Students say?

TAI Cheuk Yiu (Year 3)
School of Optometry

Through research studies, hypothetical ideas might come to life. By participating in URIS, we aspire to identify underlying mechanisms of common visual problems.

It boosts my morale to conduct research work that benefits mankind. I gained valuable experience through URIS to learn and create knowledge.

SU Meiling (Year 3)
Department of Aeronautical and Aviation Engineering

Scan to learn more!

(Video) AI and Data Science in Aviation

- https://www.youtube.com/watch?v=D8NlYPtPgwA
- 1:18 - Revenue Management
- 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

Dialogues and Discussions

Dare to ask and communication is the first step of your success

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
3. Make a video presentation to share and communication your ideas and projects
4. Submit the peer evaluation form individually