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.

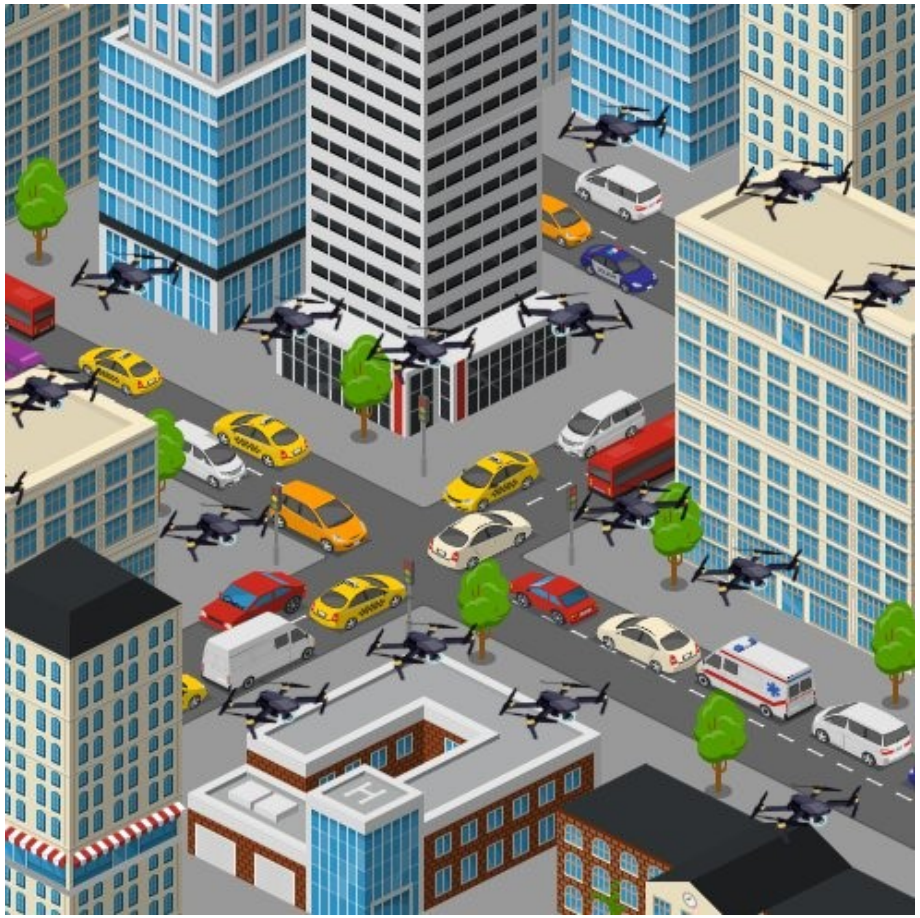
Search and Rescue (SAR)

- disaster prevention and rescue,

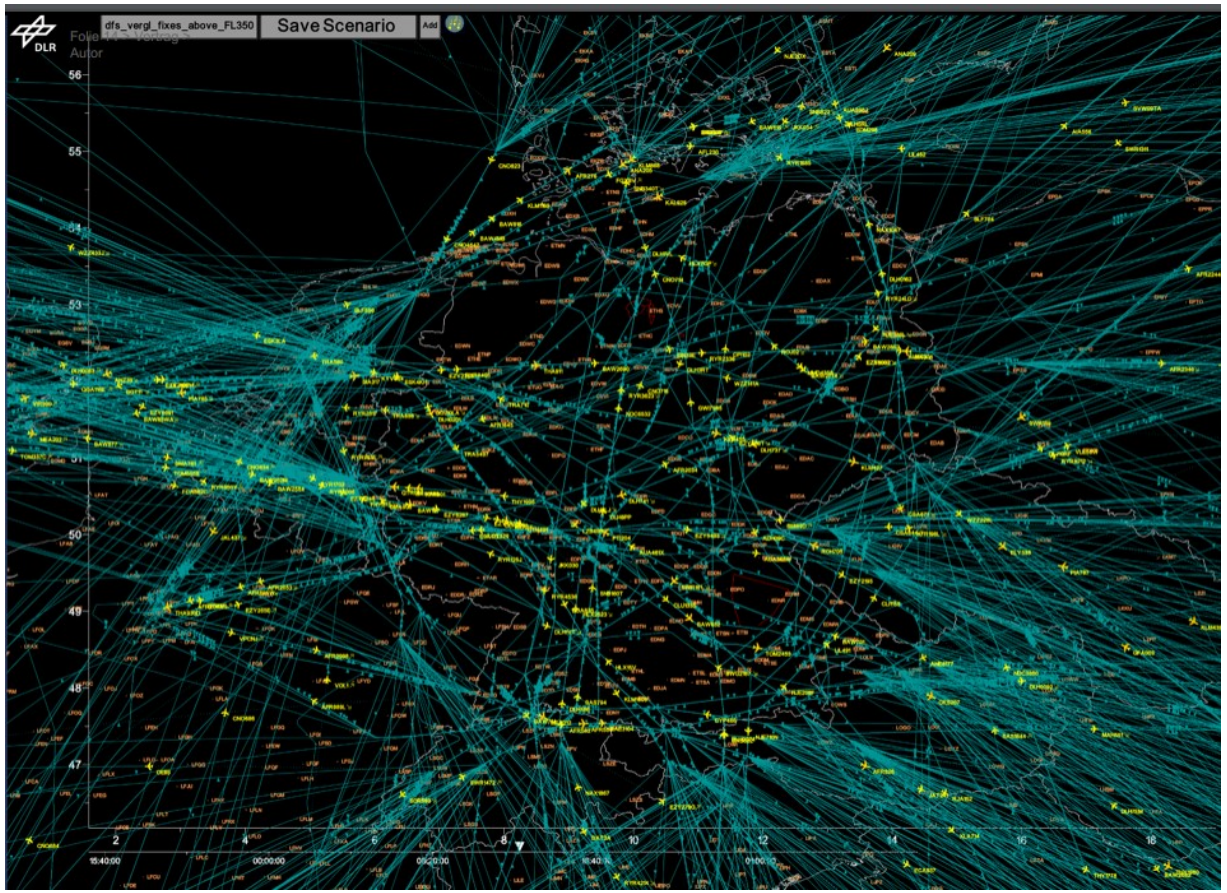
Smart transportation

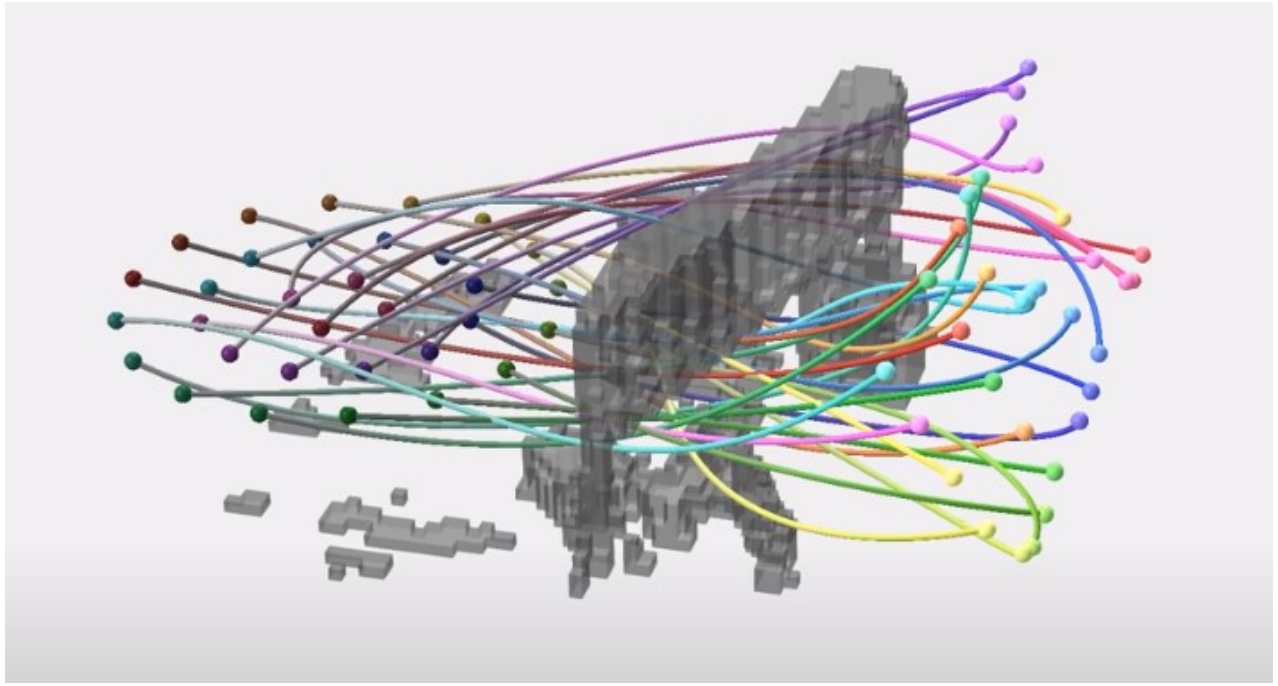
- traffic monitoring management
- air quality monitoring

Crowded Airspace in Cities



Challenges - Collaborative Path Planning

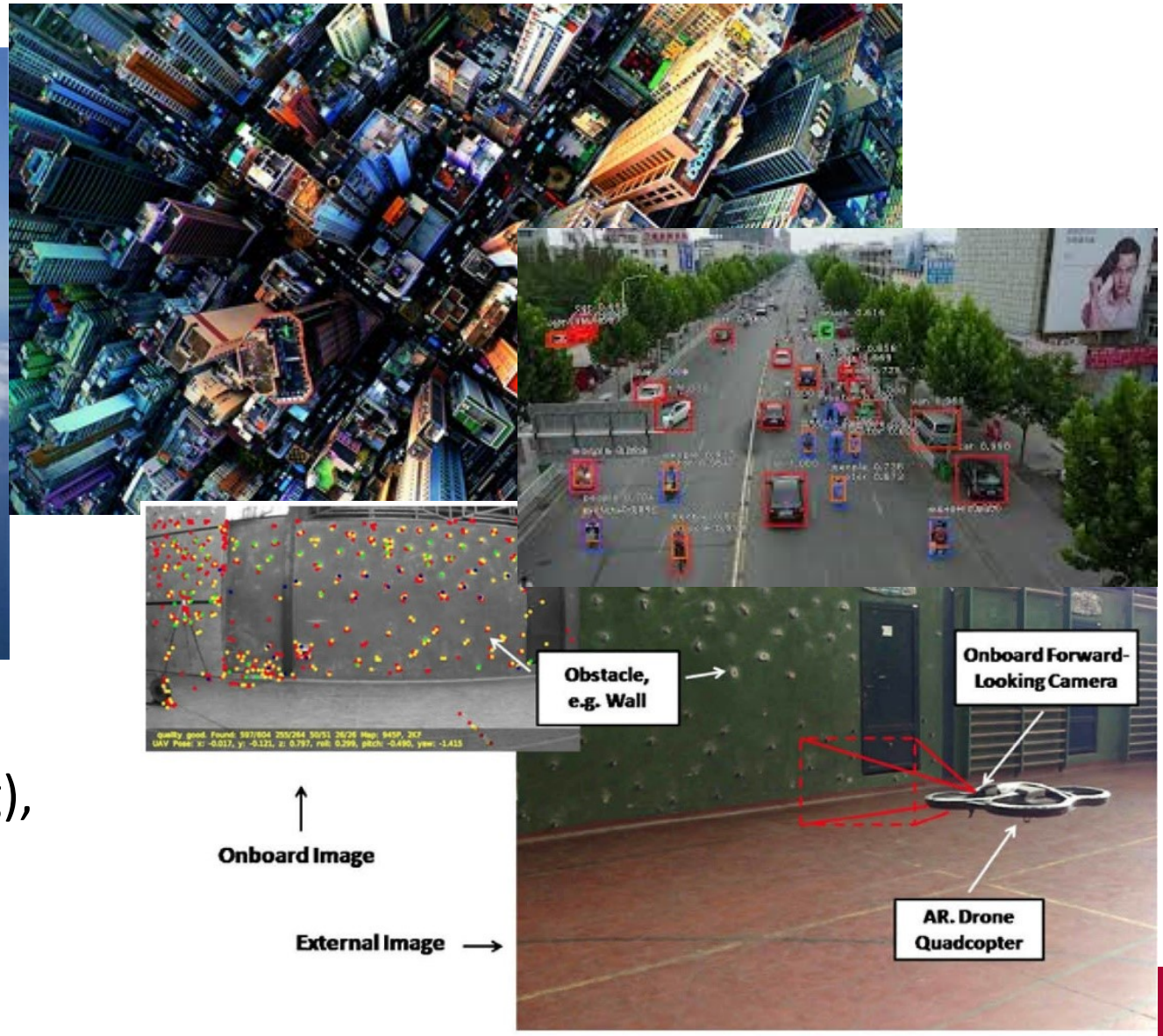




https://www.youtube.com/watch?v=7KIa9FlmbRc

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

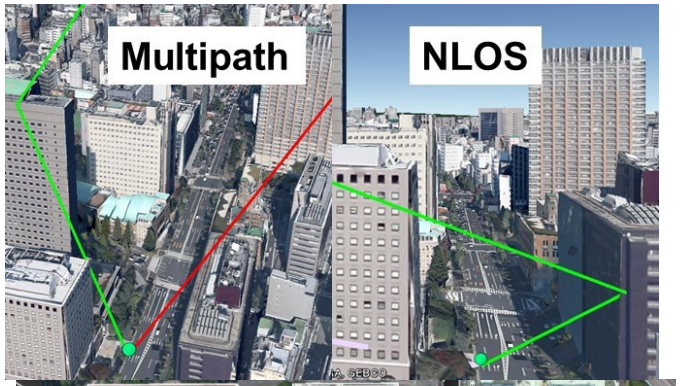
Challenges – Collision Avoidance

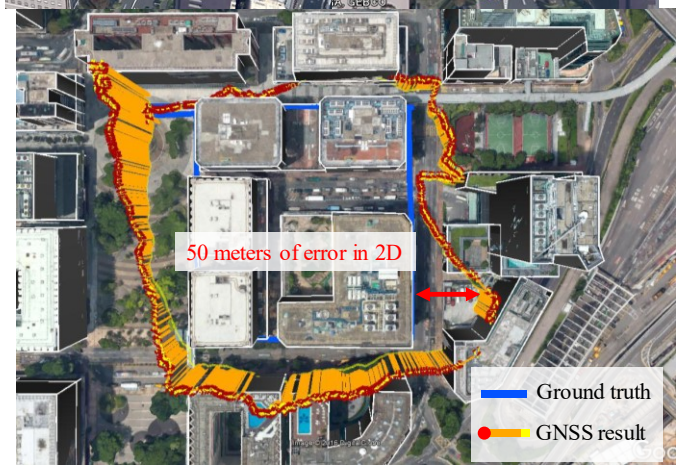


Keywords: Perception by AI (deep learning), image processing, estimation and optimization

Challenges – Navigation in Challenged Environments

Challenge in GNSS Positioning

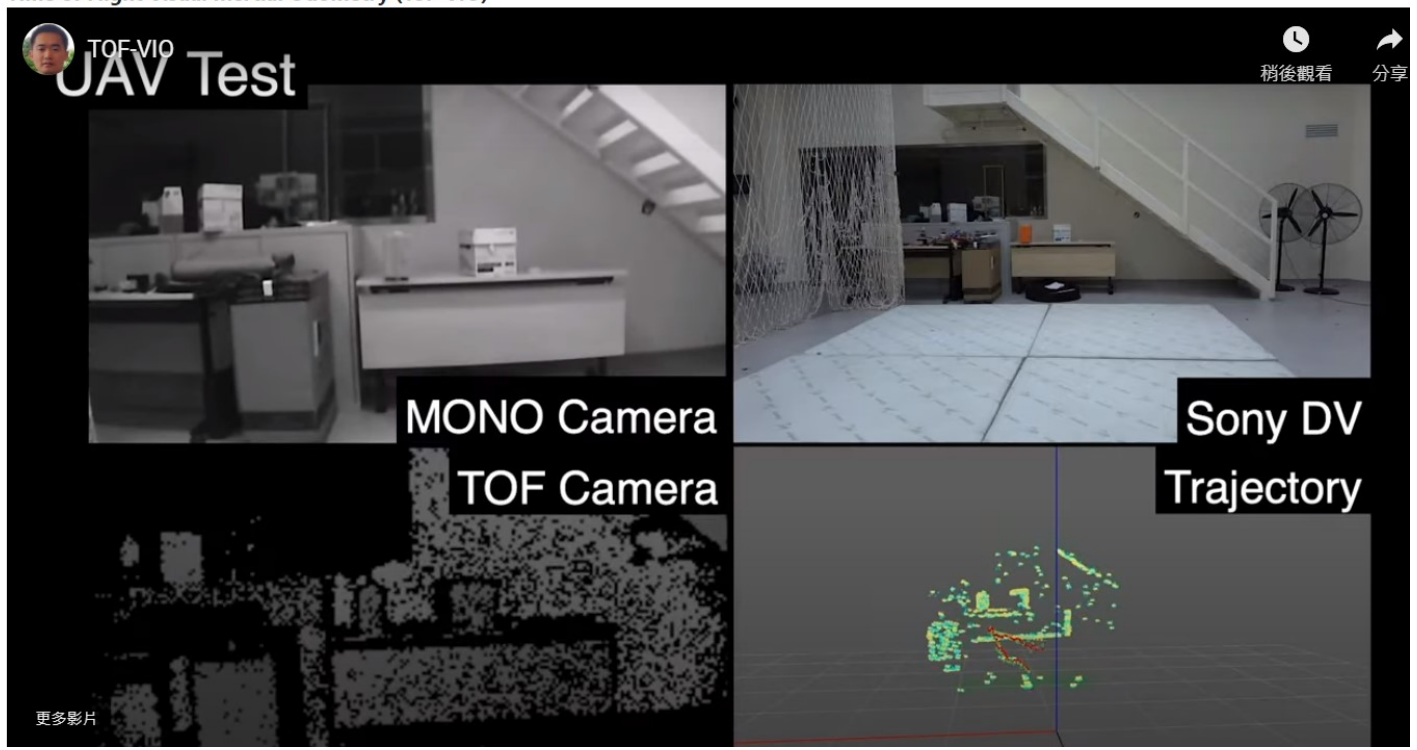




Visual Navigation

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

Time of Flight Visual Inertial Odometry (ToF-VIO)

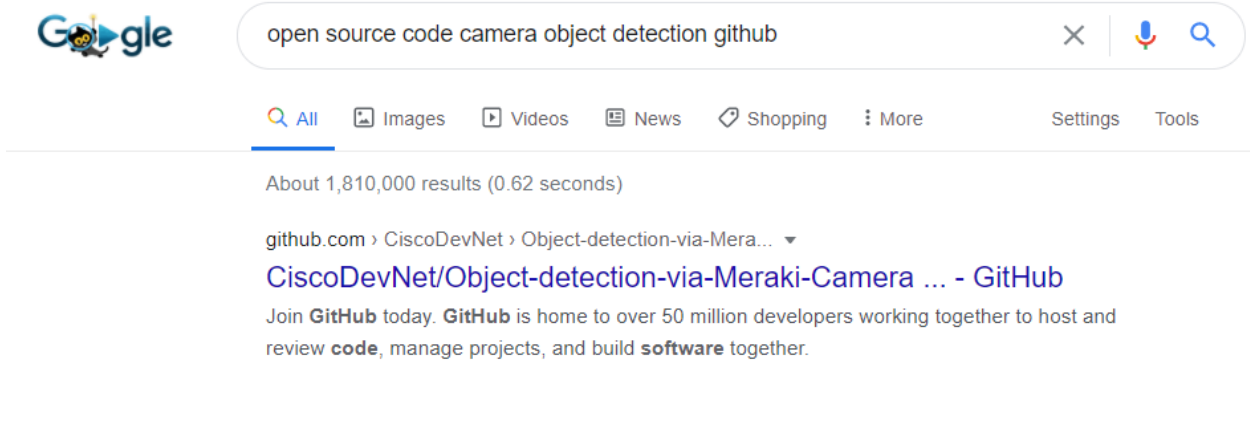


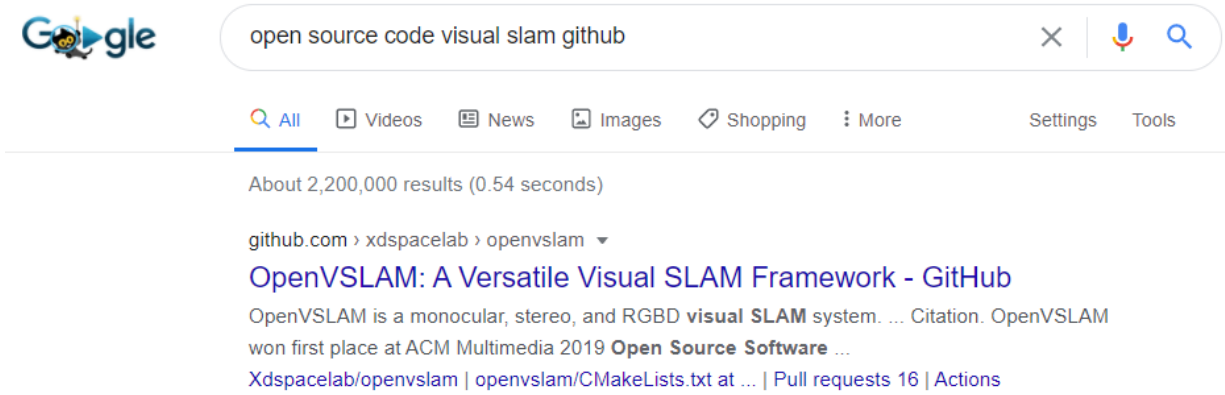
Keywords: GNSS, inertial navigation system, visual positioning, simultaneous localization and mapping (SLAM), sensor fusion, filtering.

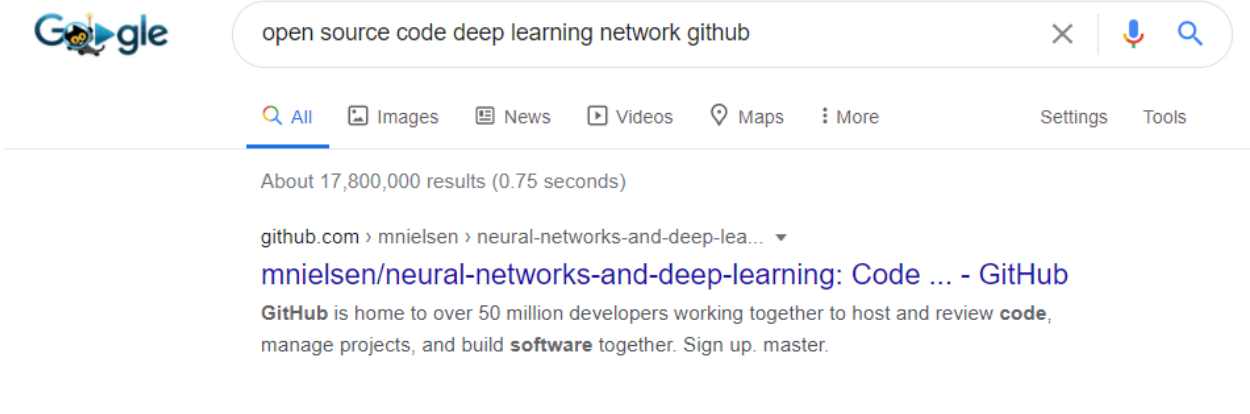
Integrity and Safety

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.

(Video) AI and Data Science in Aviation

https://www.youtube.com/watch?v=D8NlYPtPgwA

- 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