Multi-drone simulation with deep q-learning

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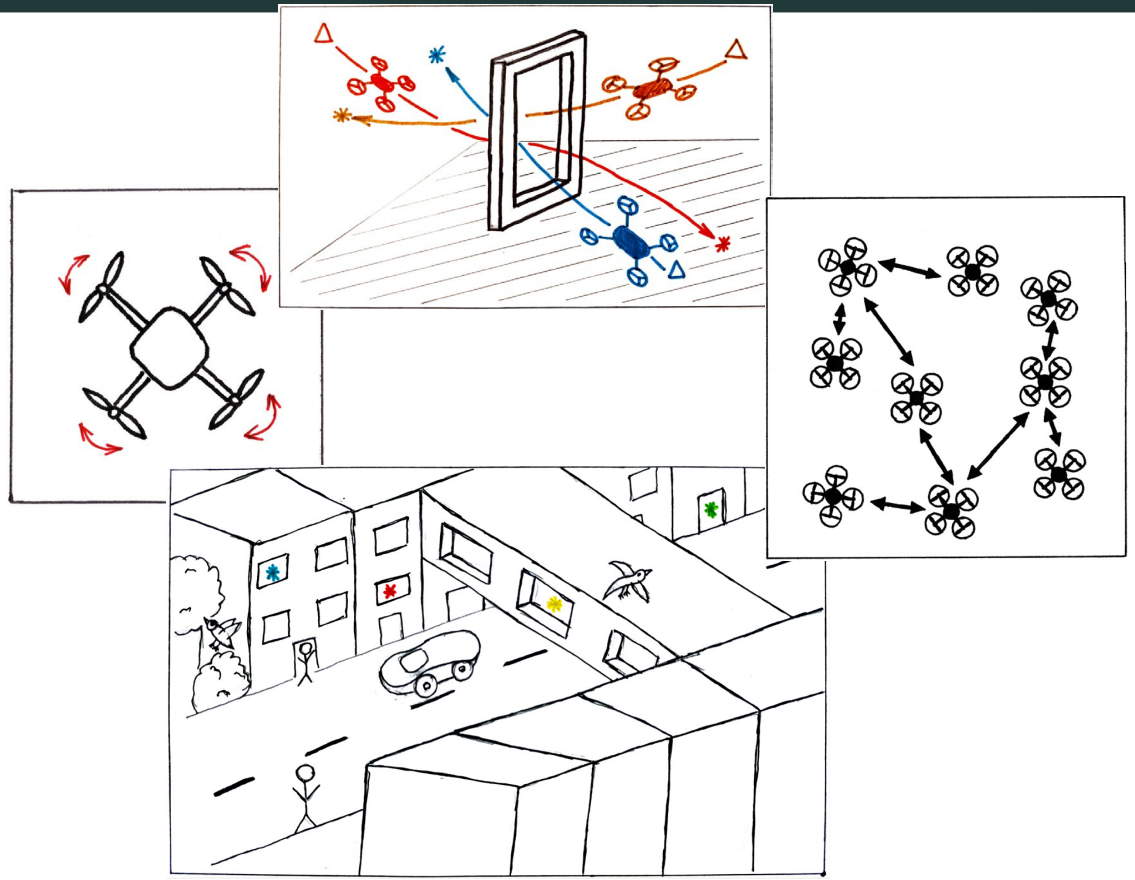
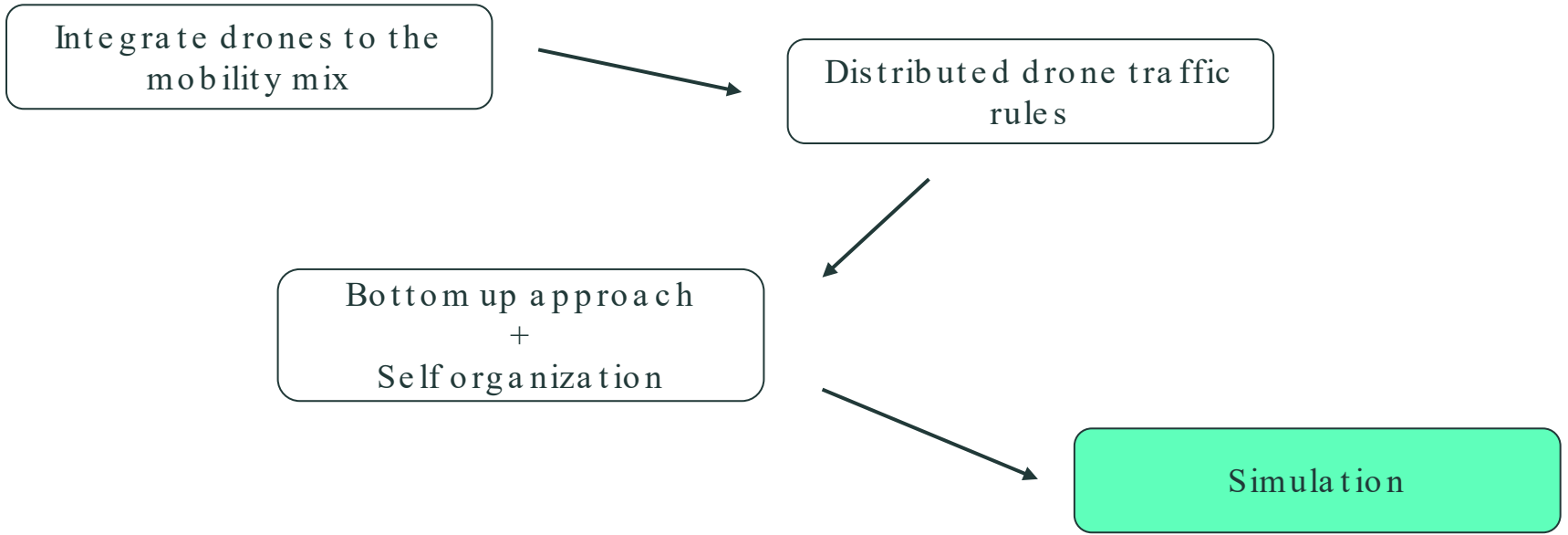
TU Delft

Outline

- Introduction
- Goal
- Approach
- Software setup
- Project outcomes
- Next steps



Drones flying safely in public spaces



Project goal

Can drones fly in a busy area with a clear mission but without hitting each other?

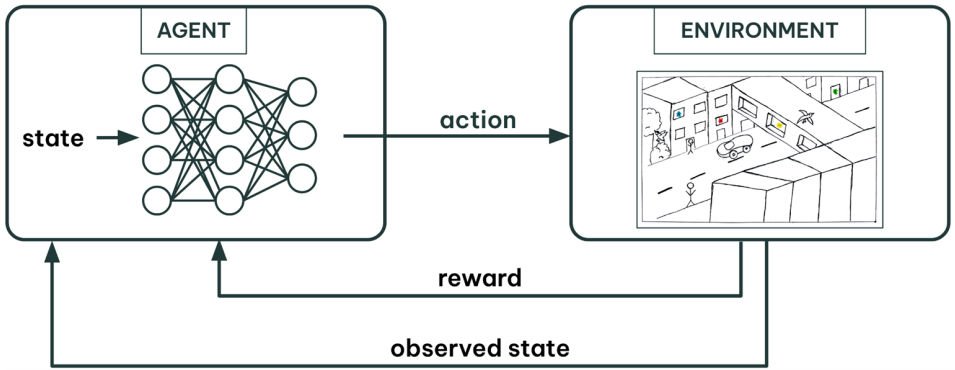
This project is taking the first steps towards drones being able to fly over busy public areas safely .

See how effectively we can use realistic simulations and a selected toolset for this purpose .

*Image by vecstock on Freepik

Project approach

- Reinforcement Learning
- Deep Q-learning

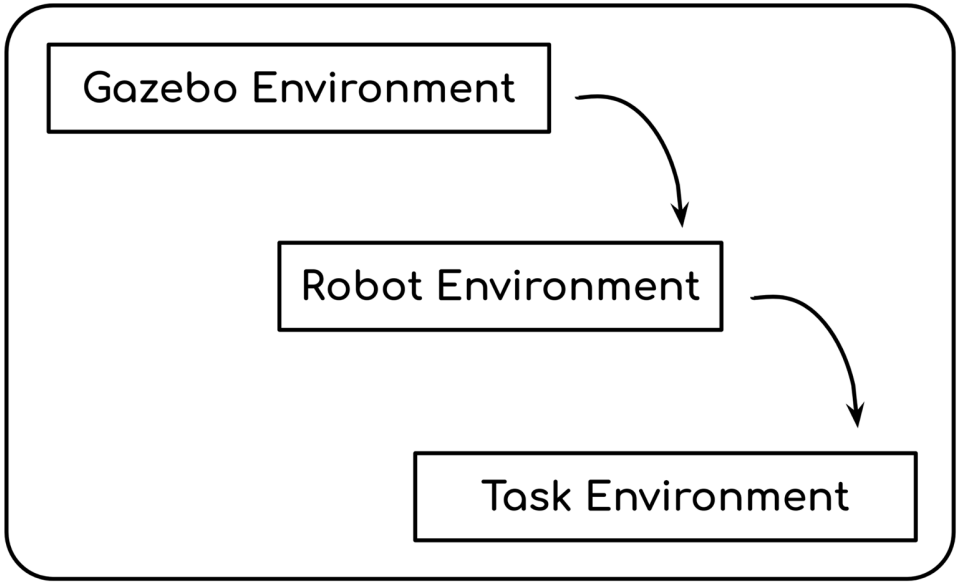


Technologies

- The Construct: openai_ros
- ROS 1/ ROS 2
- Gazebo Classic
- PX4 SITL

- Blender
- PyCharm Community Edition

Software setup



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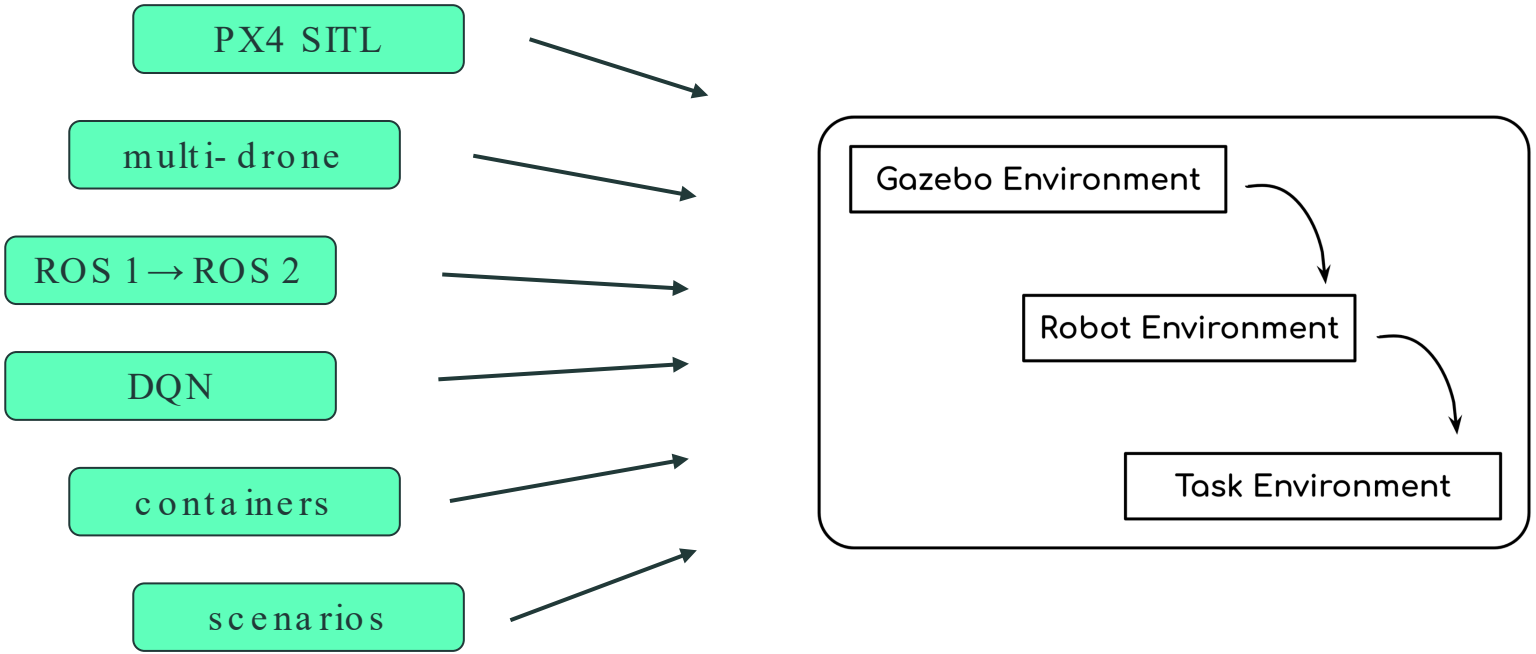

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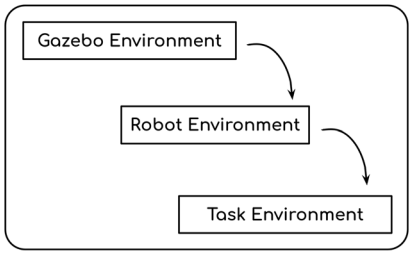
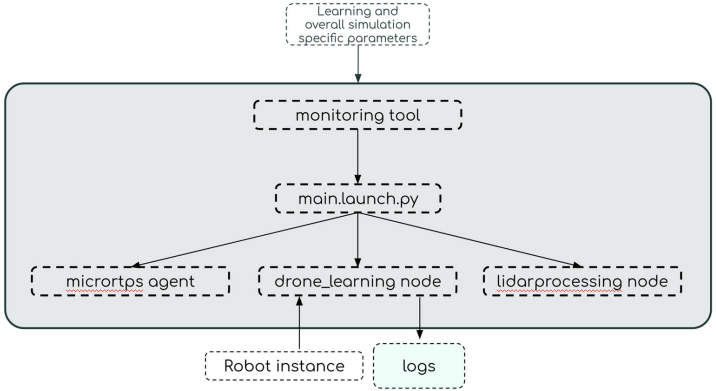
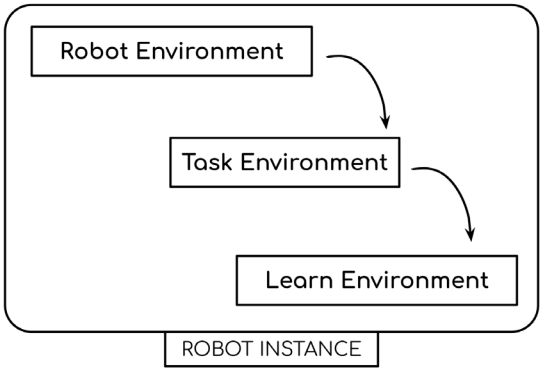
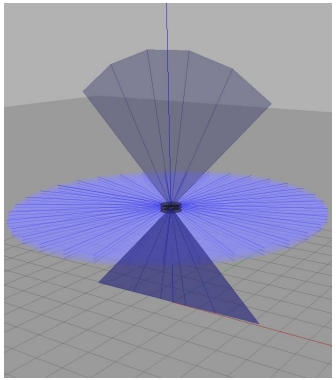
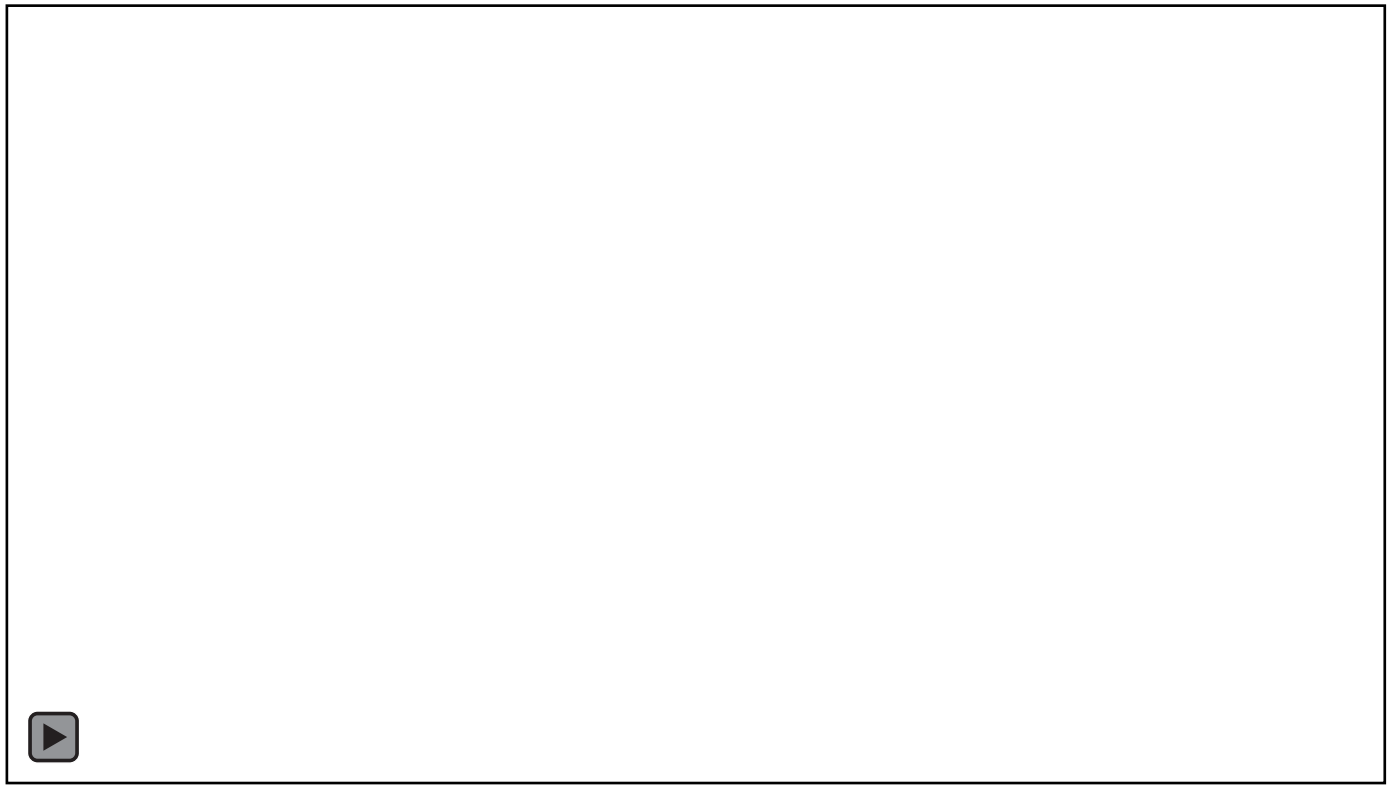




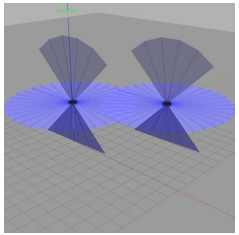
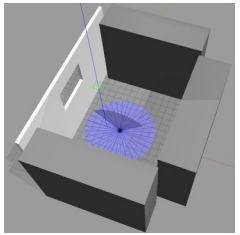
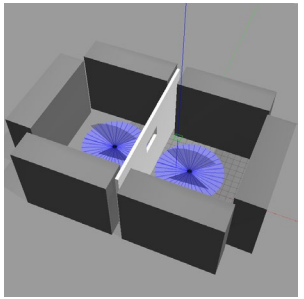
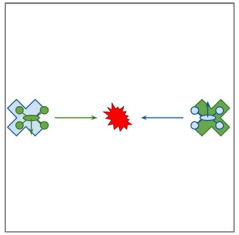
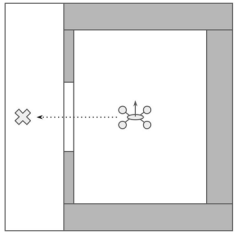
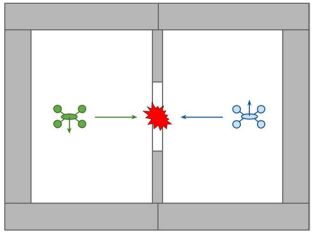
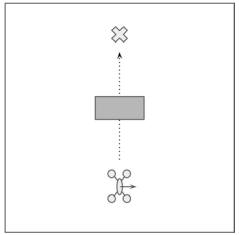
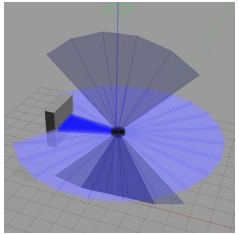
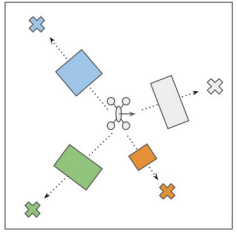






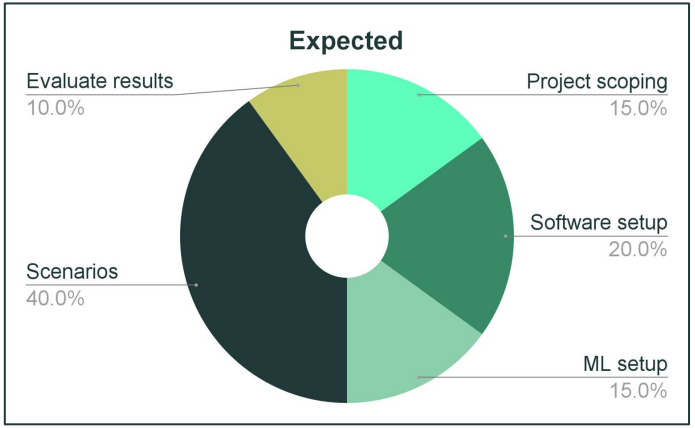
Project outcomes

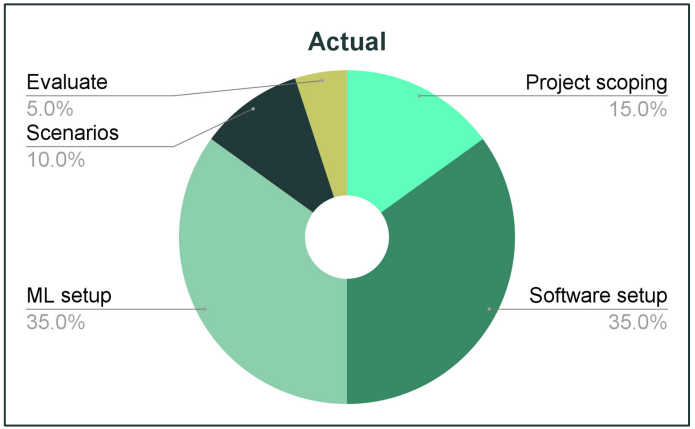
- Scenarios and rules
  - Positive results for simple scenarios
  - Cooperation

Project outcomes

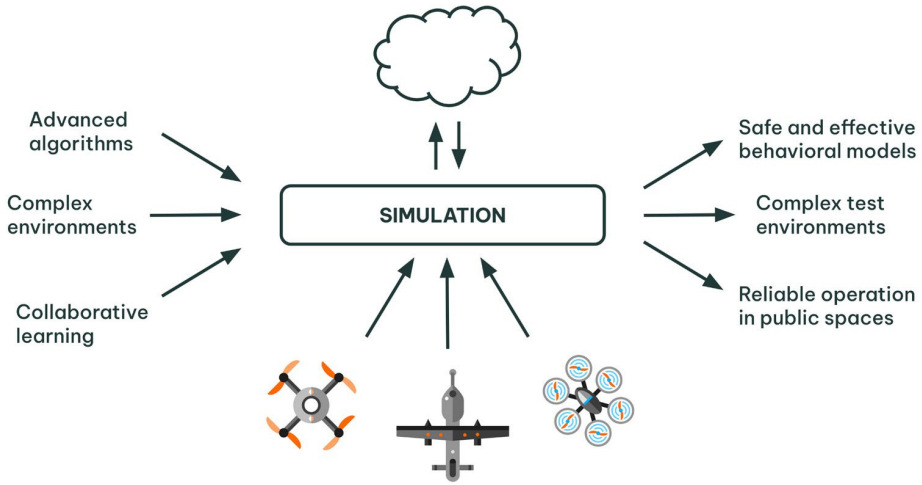
- Benefits
  - Working setup
  - Learnt scenarios
  - Open source
- Difficulties
  - Longer time to set up than expected
  - Low simulation speed
  - Instability





Next steps

- Giving back
- Cloud based infrastructure
- Increase number of drones
- Drones with different configurations
- More complex algorithms
- Variable realism
- More environments



*UAV images by macrovector on Freepik

Thank you!

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Scan me!