# ­Project outline

**Proposed structure of dissertation:**

* Introduction + literature review (+Idea and aim)
* Computational Set-up
  + Unity

**Primary reference:**

Juliani et al., 2018.

* + Environment (Inspiration and justification)
  + Increasing complexity (Static obstacles, sensor clouds and pedestrians)
    - **Base Environment-1.0:** 5 static obstacles

Config-file: Default

* + - **Base Environment-1.1:** 5 static obstacles and 2 sensor clouds.

*SC-specifications:* radius: 10, # sensors: 10 per / 20 in total

D*ensity: roughly -50% of empirical in London.*)

Config-file: Default

* + - **Base Environment-1.1.1:** 5 static obstacles and 2 sensor clouds.

*SC-specifications:* radius: 10, # sensors: 10 per / 20 in total

D*ensity: roughly -50% of empirical in London.*

Higher penalty on collision with sensors.

Config-file: Default

* + - **Base Environment-1.2:** 5 static obstacles and 5 moving pedestrians.

D*ensity: roughly -85% of empirical in London.*)

Config-file: Default

* + - **Discuss:** The idea with sensor clouds (justified through the randomness in the movements of pedestrians and the challenge herein – remember to mention the paper about estimating movements of dynamic obstacles)
  + Curriculum learning
* Methodology
  + ***Mathematical methods***
    - ***Q-learning***
    - ***TRPO***
    - ***PPO***

**Primary reference:**

Sutton and Barto, 2018.

**Secondary:**

Schulman et al., 2017.

* + Curriculum learning
* Analysis
  + Choosing parameters & Generalisation
    - Environmental parameters (DI and timescale)
    - Model parameters (Batch/buffer and hidden­\_nodes)
  + Solving the environment and the challenges it proposes.
    - Single agent: single brain
      * Gradient-based methods and loss of experience.
      * Parallelisation and the feedback loop.
    - Single agent: multiple brains
      * Heuristic transitions
      * Truly hierarchical set-up (not supported by Unity yet)
  + The effect of uncertainty in external information
* Results
* Discussion
  + Results
  + Ethics
* Conclusion
* References