Agile Trajectory Generation for Tensile Perching with Aerial Robots

- Generate trajectories for the aerial robot to perch on the tree branch using a tethered perching mechanism with a pendulum like structure.

Progress Update

- Dedicate more time over the next week.

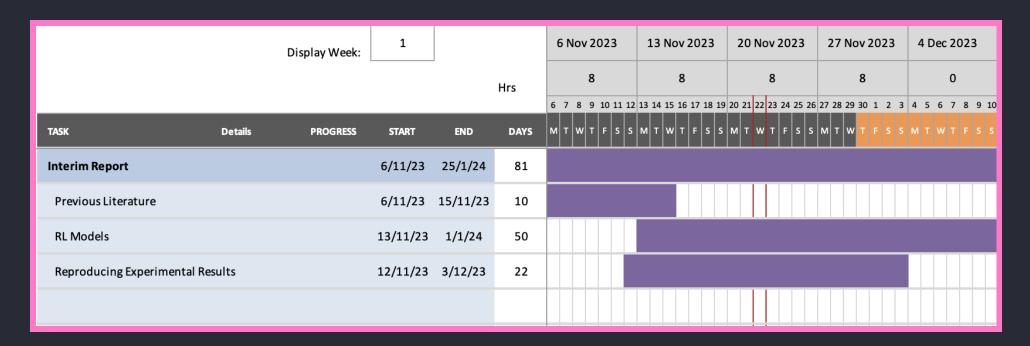- Aim to have the enviornment set to be able run previous work.

Practical

- Successfully have the environment running. Have 2 versions:
  - VM: Set up a vm to have previous year experiments running.
  - Docker: Containerised version. Can run a particular trajectory and return the flight information.

Meeting with Tian

- System involving a drone, with a payload attached via a tether.
  - Payload has 2 blades allowing it to move.
  - Current attaching motion involves flying the 2 sections in opposite directions over a branch.
- Complexity in piloting due to the complicated pendulum motion.
- Currently hard even for experienced pilots.
- Potential for Reinforcment Learning to be used.

General Plans

- Achieved planned aim around reproducing practical results.
- Want to focus towards literature around demonstration reinforcment learning.

TASK	Details	PROGRESS	START	END	DAYS
Interim Report			6/11/23	25/1/24	81
Previous Literature			6/11/23	15/11/23	10
RL Models			13/11/23	1/1/24	50
Reproducing Experimental Results			12/11/23	3/12/23	22

Display Week: 1

Gantt chart weeks: 6 Nov 2023, 13 Nov 2023, 20 Nov 2023, 27 Nov 2023, 4 Dec 2023

Plans Until Next

- Literature
  - Alan Slatter Thesis
  - `Autonomous Unmanned Aerial Vehicle Navigation using Reinforcement Learning: A Systematic Review (2022)`
    - Review paper presented last week. Following this up with reading relevant research papers from this review focussing towards Demonstration Reinforcement Learning.
  - `Tethered Unmanned Aerial Vehicles—A Systematic Review (Aug 2023)`
    - A very recent review, not focussed on Reinformcent Learning in particular. But does review several papers involving RL.

- Practical
  - Investigate potential for simulation environments for pendulum like structures.

Questions

- What data can be collected during demonstration flight.
    - Sensors on drones
    - Images/Cameras

Feedback