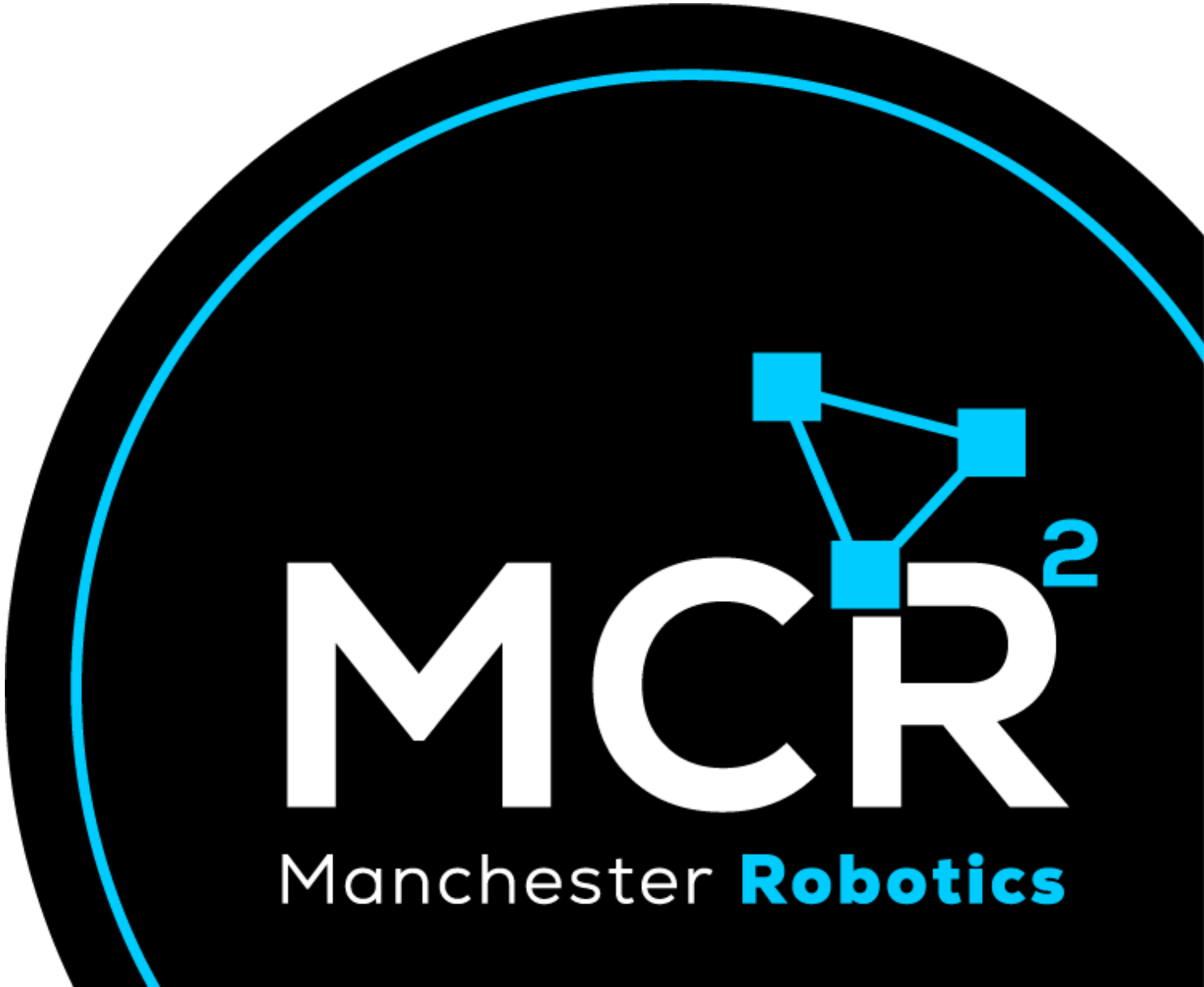
{Learn, Create, Innovate};

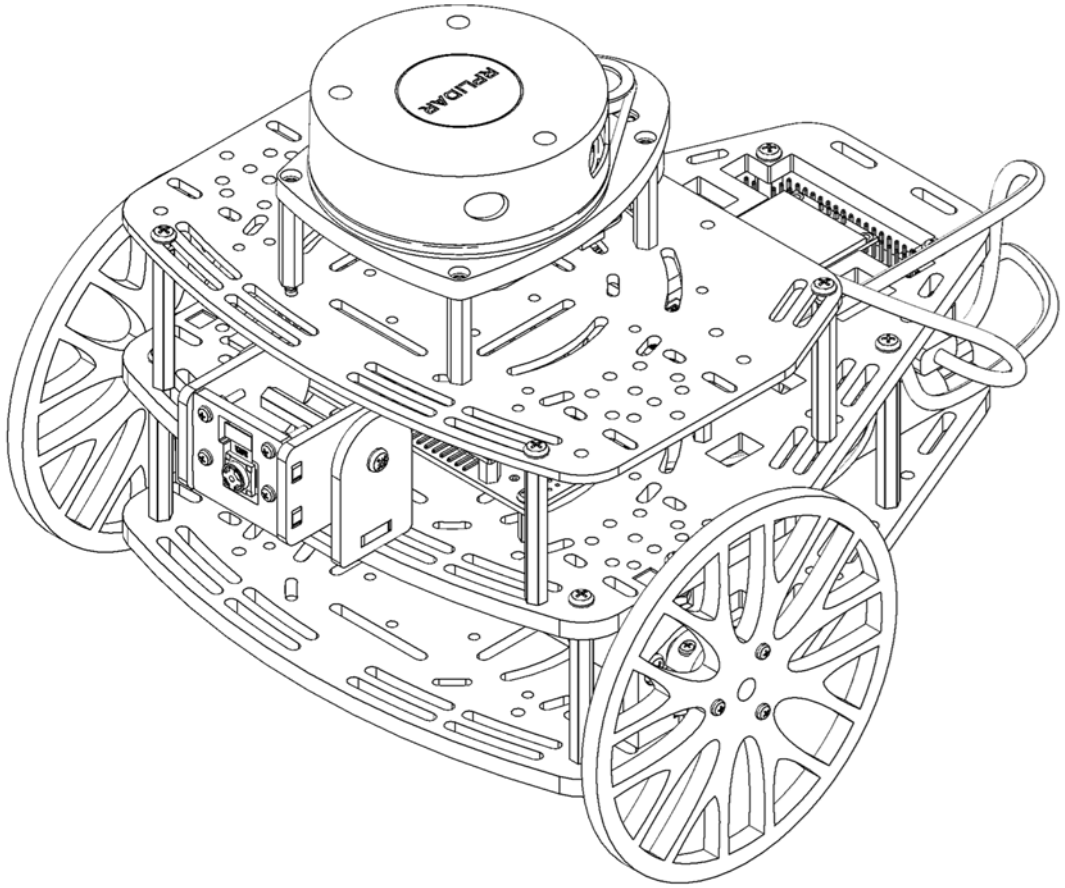
Challenges

Mini challenge 3



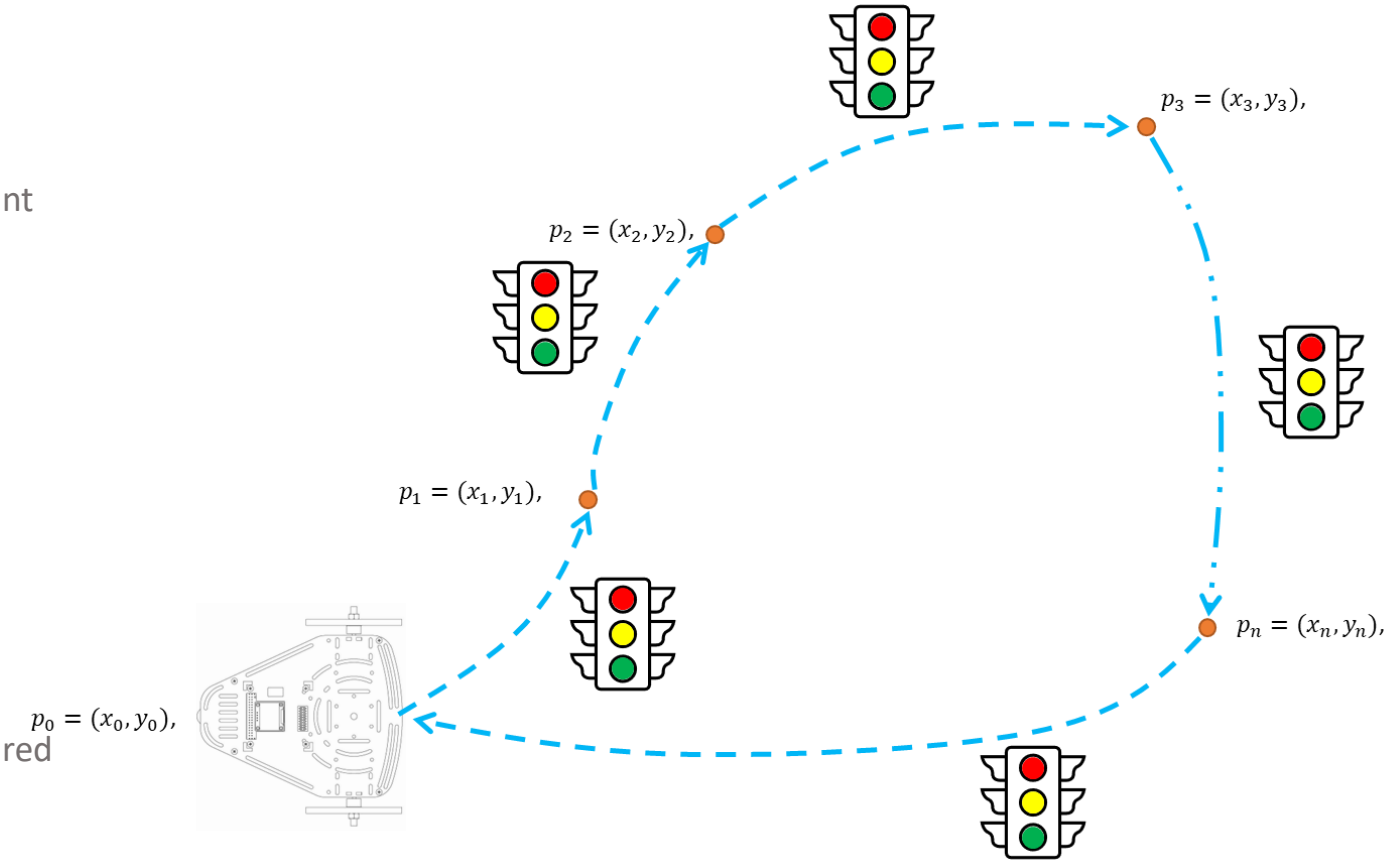
Mini challenge 3: Reactive Navigation

- This challenge is intended for the student to review the concepts introduced in this week.
- This challenge aims to show the behaviour of vision systems in mobile robotics.
- This challenge will be divided in different sections.



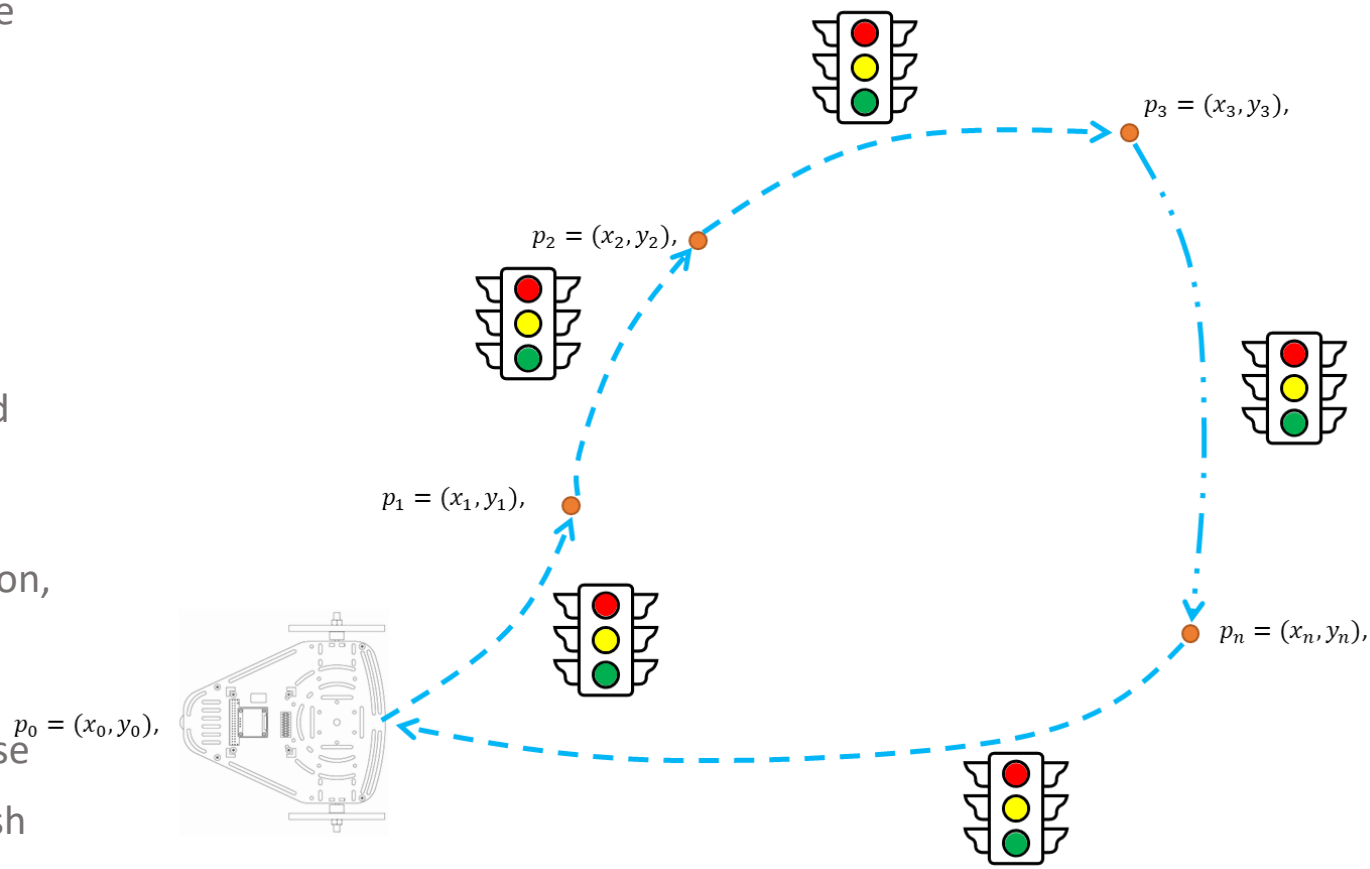
Mini challenge 3

- In this challenge, the student must use and combine the knowledge developed in previous activities.
- Add a decision-making layer to your previously developed point-to-point navigation algorithm, to detect the colour of a “traffic light”.
- The expected behaviour is:
  - Red : Stop until you see a green light.
  - Yellow: Drive slowly, until you see a Red Light to stop.
  - Green: Continue with your Path.
- Note: You must remain stopped until you see a green light (Even if the red light disappears or you are not able to detect it.)



Mini challenge 3

- The vision algorithm and closed loop controller must be **robust.**
  - The student must define what is robustness and implement strategies to achieve it with the controller.
- The vision algorithm and the controller must be tunned properly.
- The controller must take into consideration, perturbation, nonlinearities and noise.
- It is encouraged, but not required, for the student to use a config file or a parameter in the launch file to establish the goal targets such that they can be changed outside the code (not hardcoded).



Rules

- This is challenge **not** a class. The students are encouraged to research, improve tune explain their algorithms by themselves.
- MCR2(Manchester Robotics) Reserves the right to answer a question if it is determined that the questions contains partially or totally an answer.
- The students are welcomed to ask only about the theoretical aspect of the classed.
- No remote control or any other form of human interaction with the simulator or ROS is allowed (except at the start when launching the files).
- It is **forbidden** to use any other internet libraires with the exception of standard libraires or NumPy.
- If in doubt about libraires please ask any teaching assistant.
- Improvements to the algorithms are encouraged and may be used as long as the students provide the reasons and a detailed explanation on the improvements.
- All the students must be respectful towards each other and abide by the previously defined rules.
- Manchester robotics reserves the right to provide any form of grading. Grading and grading methodology are done by the professor in charge of the unit.