

## Assignment-3

*Released: April 06<sup>th</sup>, 2021**Deadline: April, 22<sup>th</sup>, 2021*

## Instructions

- Submit your code files and a report (or everything as a single jupyter notebook if you wish) as a zip file, named as <TeamName>.zip.
- The report should briefly describe your approach/algorithm used, your final results and any other findings.
- The deadline is April 22th, 23:55. This is a hard deadline and no submissions will be accepted after this.
- Plagiarism detectors will be run on all submissions, so please do not copy. If found, you would be given a straight zero for the assignment.

In this assignment we will use velocity obstacle formulation to perform goal reaching obstacle avoidance (Using the Collision cone / velocity obstacle constraint as discussed in the class). Consider the following situation for the above: A single agent is supposed to reach its goal while avoiding multiple moving obstacles.

You can consider using a cost function in order to arrive at the optimal velocity such that the agent reaches the goal while avoiding the obstacles. You can select your preferred method for solving it: (a) **Optimization** (b) **Sampling**. Do the above for: (a) **Holonomic**

**Note:** Ensure that you show that the agent deviates from its linear path to make sure its actually avoiding the obstacle as shown in Fig. 1

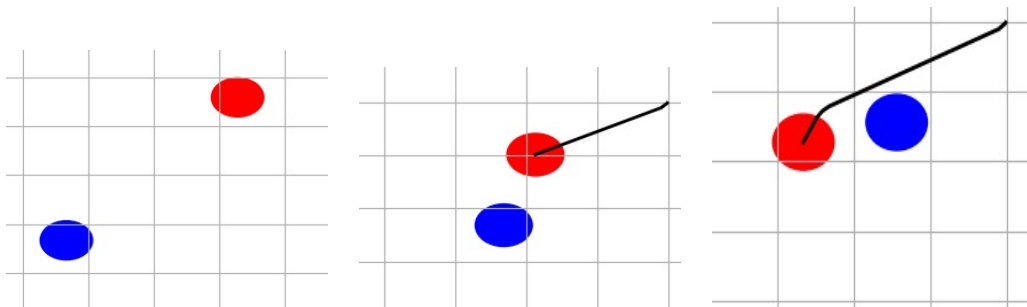


Figure 1: Example of agent avoiding a moving obstacle: **Left:** Initial Config. ; **Middle:** While avoiding ; **Right:** After avoiding. **Do the above for multiple dynamic obstacles.**

## Deliverables:

- You can use Python, MATLAB or whichever language you are comfortable with. Please ensure the code is well written, and we can ask you to explain certain snippets of it during the evaluations.
- A report summarising your understanding of the algorithms and explaining the results.
- Put all these files in a folder <TeamName>, zip it, and submit it on moodle.

Feel free to reach out to the TA's for any queries. All the best, and may the Force be with you.