

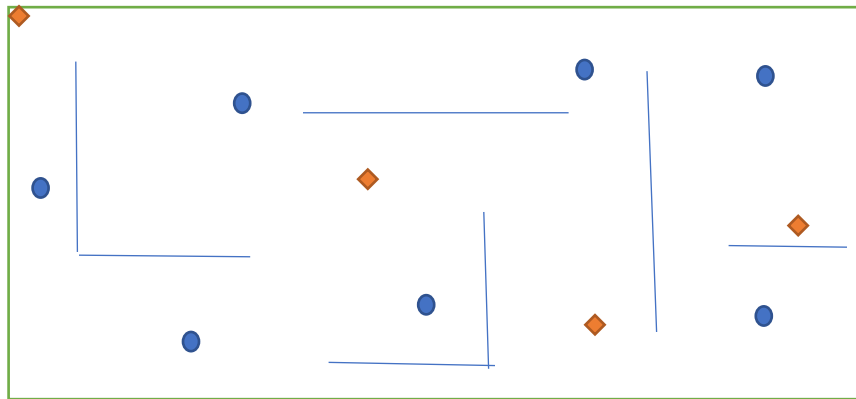
Dynamic Multiagent path planning

During this semester, we have learned multiple path planning algorithms. For instead, we learn path planning based on gradient descent or discrete search such as PRM. However, during the implementation of these algorithms, we did not experience some useful aspects of path planning such as multiagent path searching or agent with dynamic behavior associated with them.

For this final project, I would like to focus on implementing the path searching technics learned in this class to multiple agents in 2d setting. The task will be sectioned into three phases. I am hoping to complete all 3 phases but depending on the difficulty involved in each phase.

Phase 1:

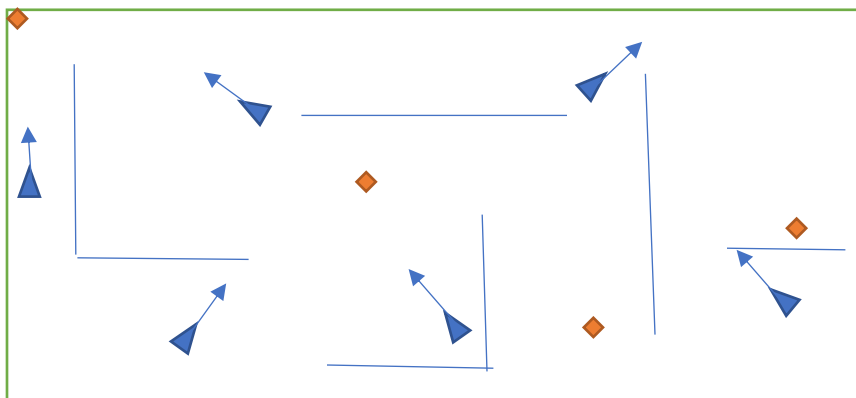
For phase 1, the robots will be depicted with 2d dot. The obstacles in the workspace are the statics wall-like structure. Multiple robots (2d dot) will need to find a path from start to goal. The implementation will follow the coupling approach of a multiagent robot.



Each blue dot represents a robot and the diamond orange shapes are the goal set for an agent. The agent will have to avoid other agents and the walls in the workspace to get to the goal.

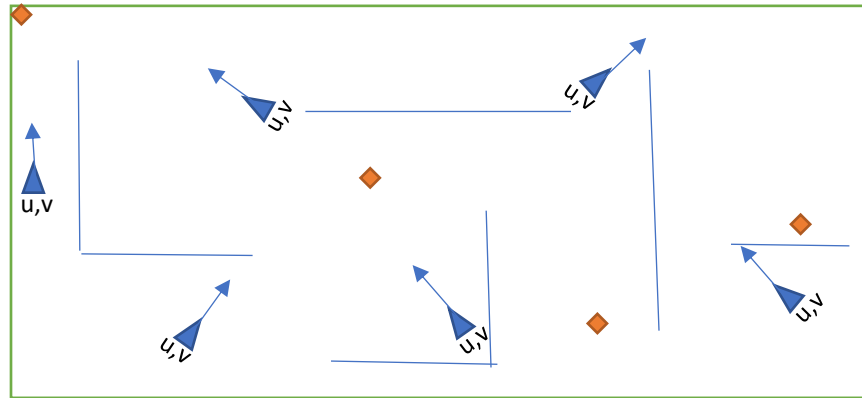
Phase 2:

Replace each dot agents with triangular agents. Now each agent only can move along one axis. That avoids agents from moving sideways.



Phase 3

At this phase, each agent will move according to the controller input. The agent will be controlled by a velocity v and position u . Using control system techniques. I will aim to allow agents to avoid each other by moving at different speeds a collision is possible. For this, each agent can be given a mass, thus requiring different actuator input to gain a specified velocity



U, V are controller input. U is the position of the agent while V is the velocity of the agent

For multipath planning, I have been reading some research documents below.

Recourses:

https://kirilsol.github.io/files/phd_thesis.pdf

<http://robotics.stanford.edu/~mitul/papers/Sliros06.pdf>

<https://arxiv.org/pdf/1802.09099.pdf>