ELEC 5660: Introduction to Aerial Robotics
Project 1: Phase 3

Assigned: 03-10-2017   Due: 17-10-2017

1   Project Work

In phase 1 and 2, a controller and trajectory generator are implemented respectively. Phase 3 will focus on path finding and obstacle avoidance.

1.1   A* Path Search

Two simple 2D grid maps which contain the obstacles, start and target locations will be provided. You need to implement a 2D A* path search method to find a optimal path with safty guarantee. Then you need to connect all the path points using your previous trajectory generator and control your drone to follow the trajectory.

If you design a 3D grid map and extend your A* method to 3D case, you will get bonus points.

2   Structure of Simulator

The simulation code is almost the same but `path_from_A_star.m`. See comments for details.

3   Tutorial

The 2 provided grid maps are shown in Fig.1. The black dot, circles, red * represent start point, obstacles and goal respectively. The environments are devided into 1 x 1m grids, each grid is represent by the coordinates of the right-top corner. We provide the code to pre-process these map into 2D map array in `path_from_A_star.m`.
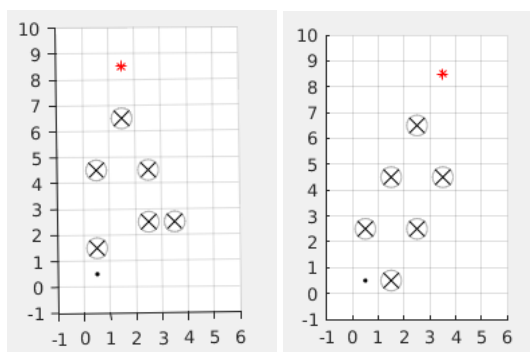

Figure 1: 2D grid maps

4   Submission

When you finish the assignment you may submit your code and documents on **canvas** before **17-10-2017 23:59:59**. The project name for this assignment is titled "`proj1phase3`".

Your submission should contain:

1. A **maximum 2-page** document including:

   (a) Figures which include the path and trajectory.

   (b) Analysis of your result. (For example, parameter studies).

   (c) Any other things we should be aware of.

2. Files `controller.m`, `trajectory_generator.m`, `path_from_A_star.m` as well as any other Matlab files you need to run your code.

You will be graded on successful completion of the code and how optimal your path and trajectory are. This time we will also test one other set of 2D grid map which will not be released.