

sim_astar

October 2, 2020

1 A* Motion Planning

```
In [108]: # The autoreload extension will automatically load in new code as you edit files,
# so you don't need to restart the kernel every time
%load_ext autoreload
%autoreload 2
import numpy as np
import matplotlib.pyplot as plt
from P1_astar import DetOccupancyGrid2D, AStar
from utils import generate_planning_problem
```

The autoreload extension is already loaded. To reload it, use:

```
%reload_ext autoreload
```

1.1 Simple Environment

1.1.1 Workspace

(Try changing this and see what happens)

```
In [109]: width = 10
height = 10
obstacles = [((6,7),(8,8)),((2,2),(4,3)),((2,5),(4,7)),((6,3),(8,5))]
occupancy = DetOccupancyGrid2D(width, height, obstacles)
```

1.1.2 Starting and final positions

(Try changing these and see what happens)

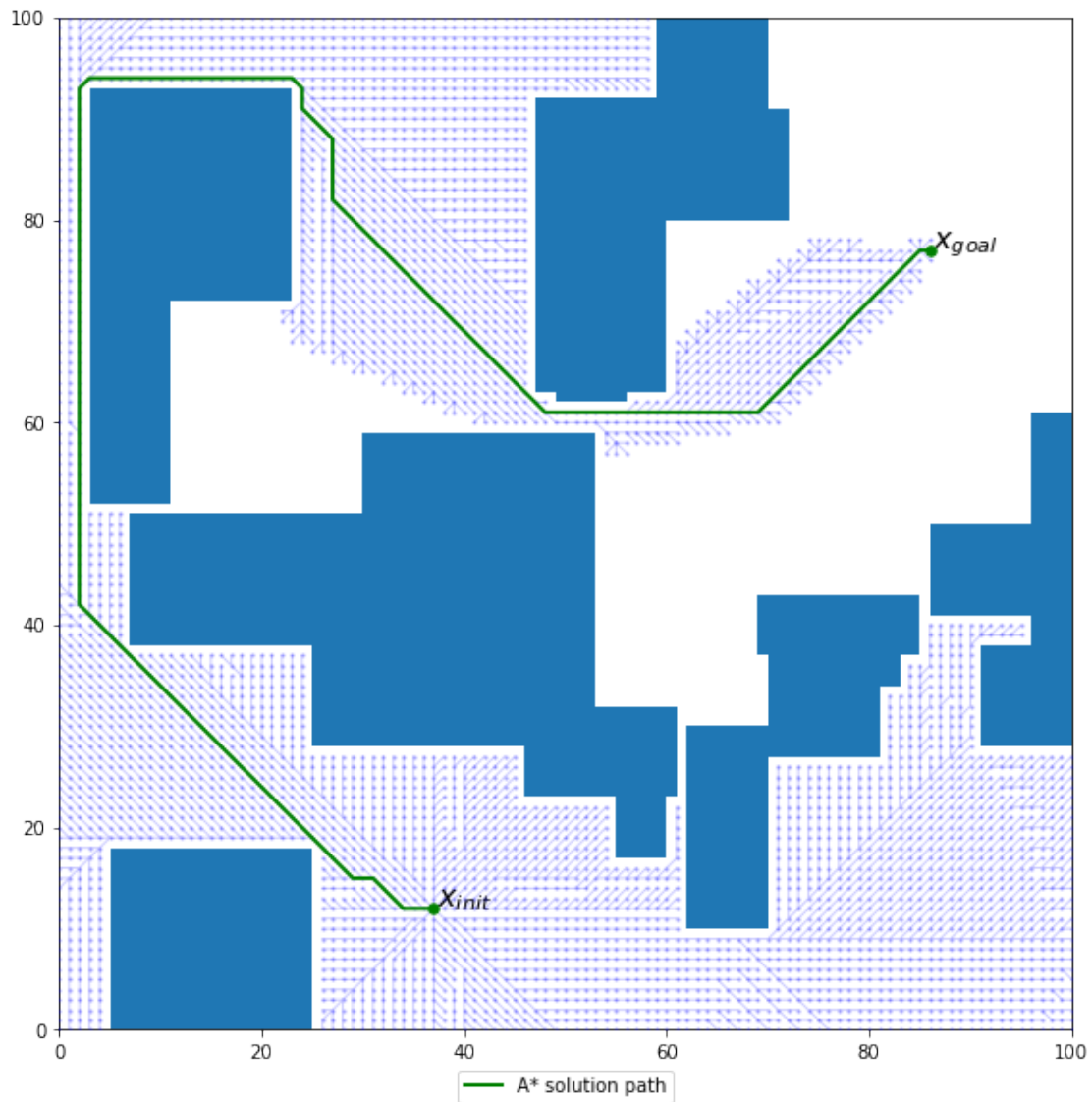
```
In [110]: x_init = (1, 1)
x_goal = (9, 9)
```

1.1.3 Run A* planning

```
In [111]: astar = AStar((0, 0), (width, height), x_init, x_goal, occupancy)
if not astar.solve():
    print "No path found"
else:
```

The figure shows a 2D grid world with obstacles (blue squares) and a search path (green line). The start node is labeled x_{init} and the goal node is labeled x_{goal} . The green line represents the A* solution path. Purple lines and dots represent the search frontier and explored nodes.

```
print "No path found"
else:
    plt.rcParams['figure.figsize'] = [10, 10]
    astar.plot_path()
    astar.plot_tree(point_size=2)
```



In []: