sim_astar

October 16, 2021

1 A* Motion Planning

[1]:
```
# 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
```

1.1 Simple Environment

1.1.1 Workspace

(Try changing this and see what happens)

[2]:
```
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)

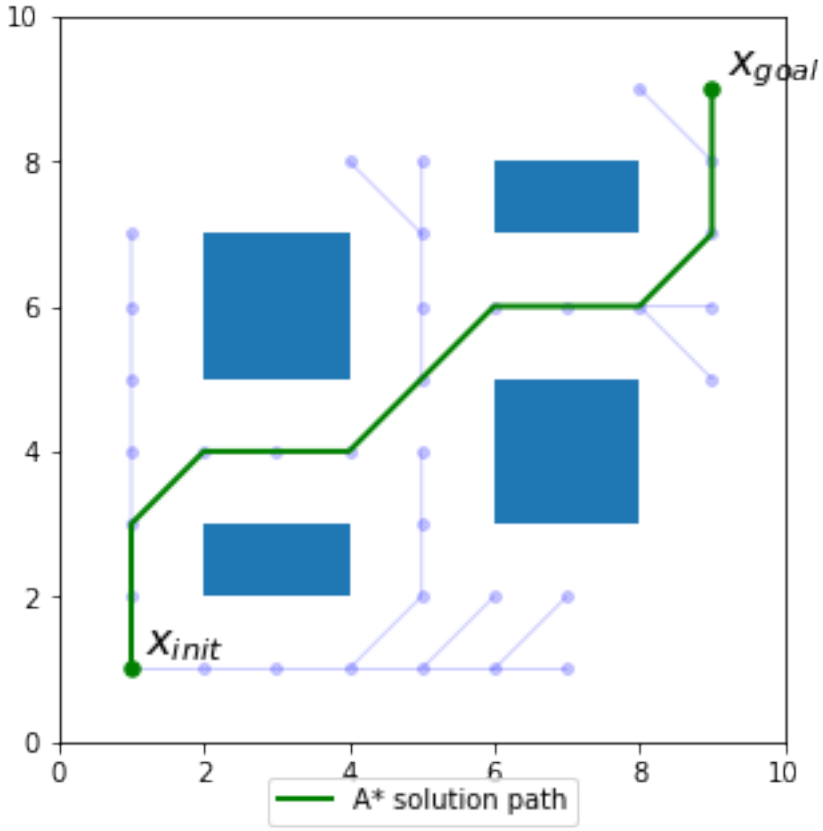
[3]:
```
x_init = (1, 1)
x_goal = (9, 9)
```

1.1.3 Run A* planning

[4]:
```
astar = AStar((0, 0), (width, height), x_init, x_goal, occupancy)
if not astar.solve():
    print("No path found")
else:
    plt.rcParams['figure.figsize'] = [5, 5]
    astar.plot_path()
```

```
    astar.plot_tree()
```

```
/home/sarah/aa274/AA274A_HW2/P1_astar.py:215: MatplotlibDeprecationWarning:
Adding an axes using the same arguments as a previous axes currently reuses the
earlier instance.  In a future version, a new instance will always be created
and returned.  Meanwhile, this warning can be suppressed, and the future
behavior ensured, by passing a unique label to each axes instance.
  ax = fig.add_subplot(111, aspect='equal')
```



1.2 Random Cluttered Environment

1.2.1 Generate workspace, start and goal positions

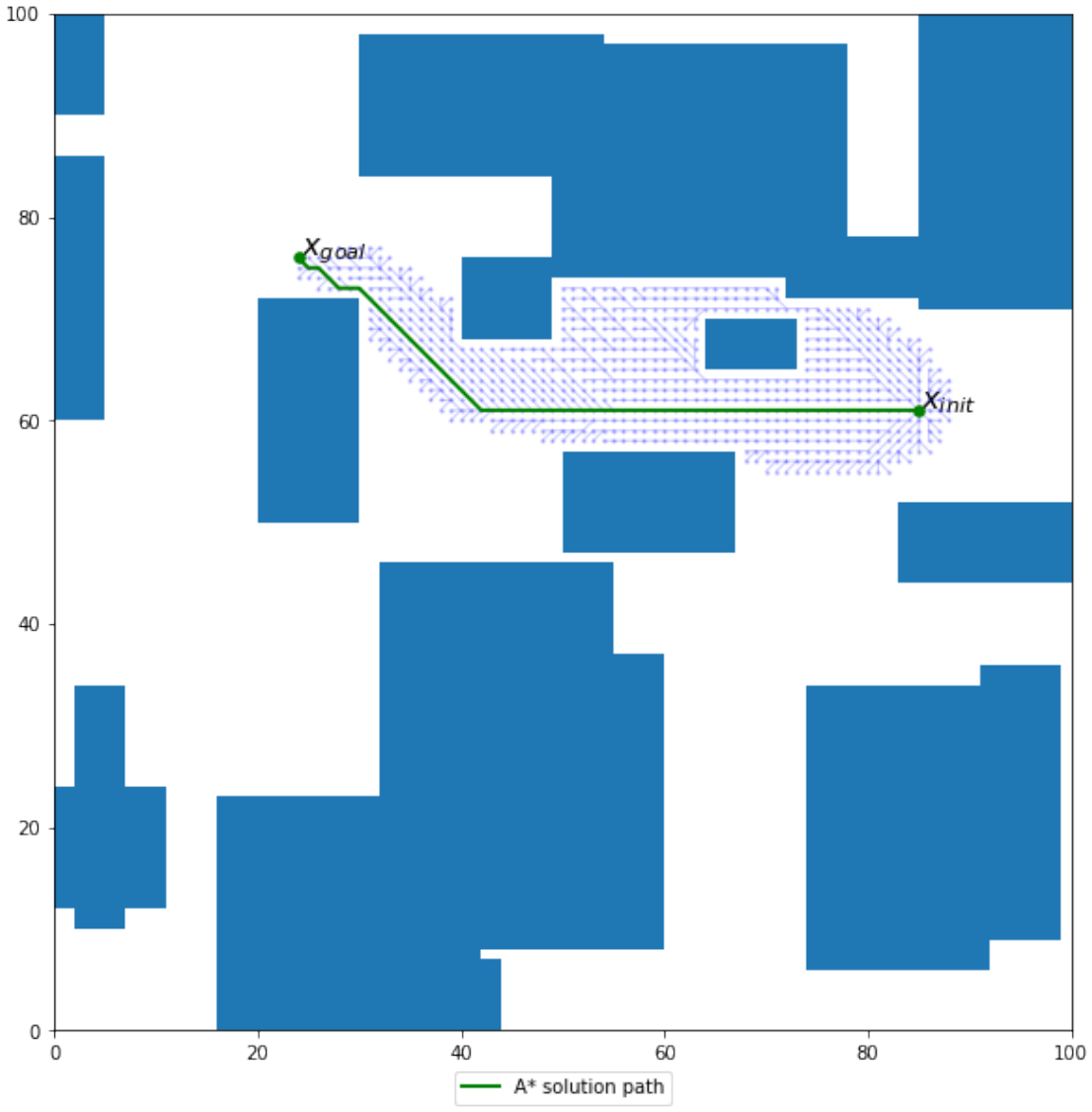
(Try changing these and see what happens)

[7]:
```
width = 100
height = 100
num_obs = 25
min_size = 5
max_size = 30
```

```
occupancy, x_init, x_goal = generate_planning_problem(width, height, num_obs,␣
↪min_size, max_size)
```

1.2.2 Run A* planning

[8]:
```
astar = AStar((0, 0), (width, height), x_init, x_goal, occupancy)
if not astar.solve():
    print("No path found")
else:
    plt.rcParams['figure.figsize'] = [10, 10]
    astar.plot_path()
    astar.plot_tree(point_size=2)
```



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