Meeting 04/14/2020

Shuo Zhang

Astar Planner I used

- **Is based on the learned stochastic Neural Network model**

- **Has a check if the state is valid based on**
  - **If the location is in the range of valid locations**
  - **If both loads are greater than 1**
  - **If the location would collide with any of obstacles**

- **Has an option whether one step of action or 10 steps of the same action are used to predict next states**

- **Uses discretized 8 actions to expand nodes: [[1,-1],[-1,1],[1,1],[-1,-1],[1,0],[0,1],[-1,0],[0,-1]]**

- **Uses the distance to the goal location as cost function(heuristic), while using "distance to the goal location + length of path so far" as cost function can not give us a planned path within a reasonable time**

Summary of Limitations

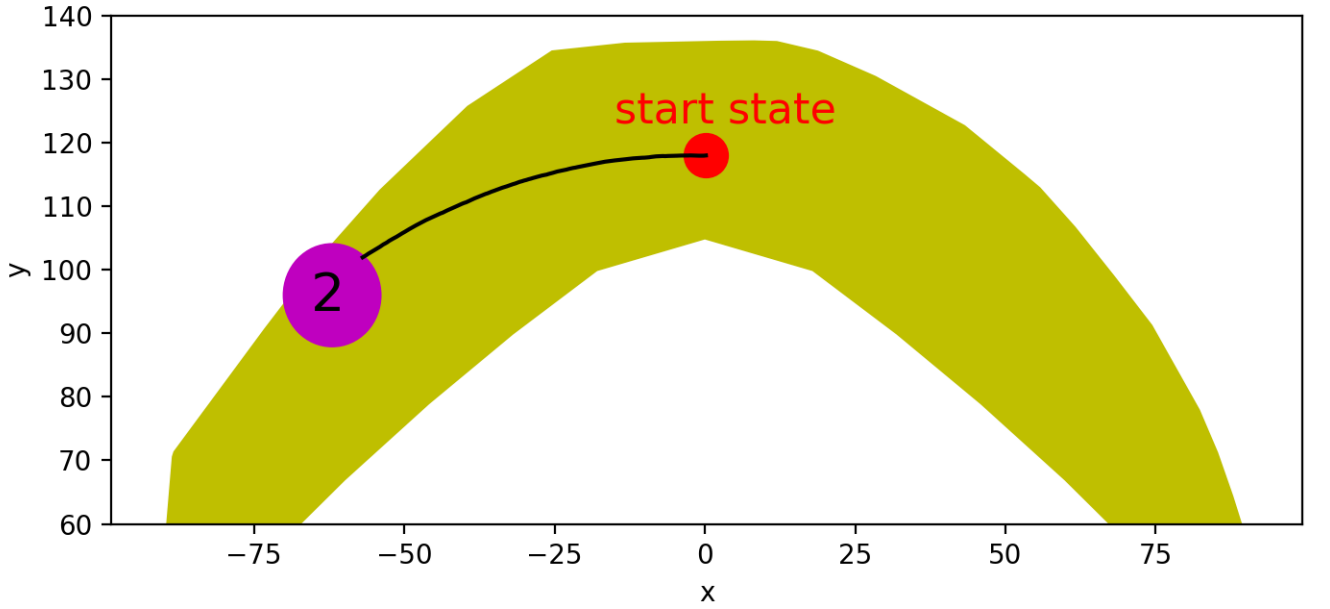
1) **The planned path is not the shortest path due to the cost function**

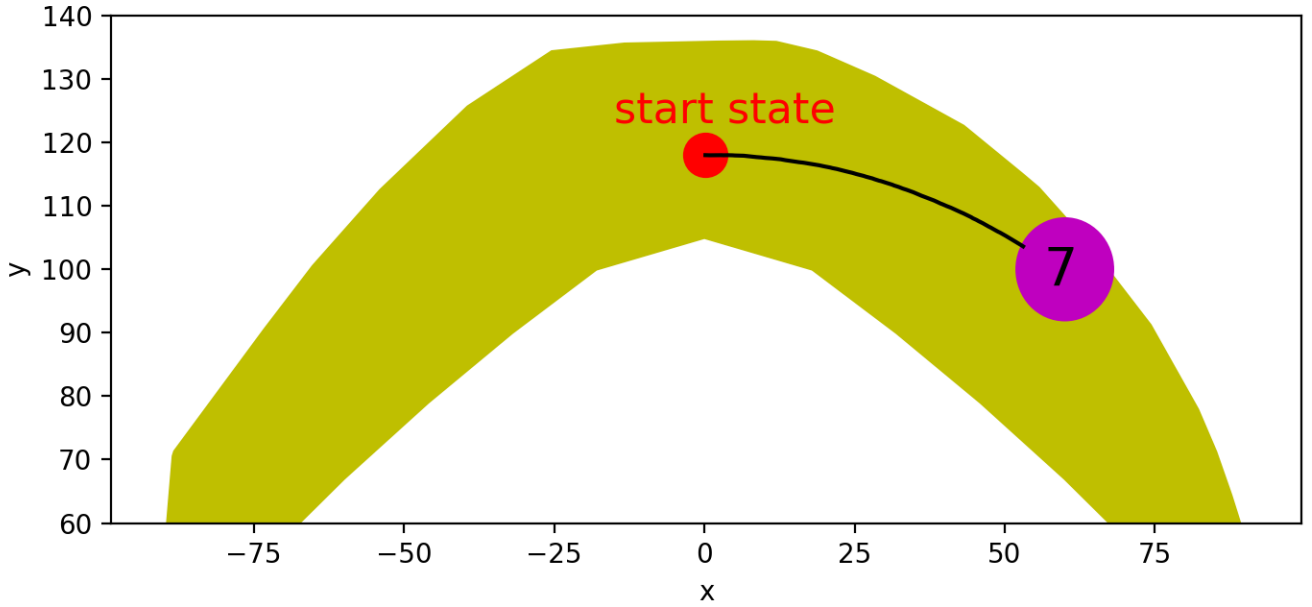
2) **If the scene is difficult enough (obstacle radius is large enough), the planner can not give us a path within a reasonable time. (Might also due to the cost function)**

Summary of Limitations

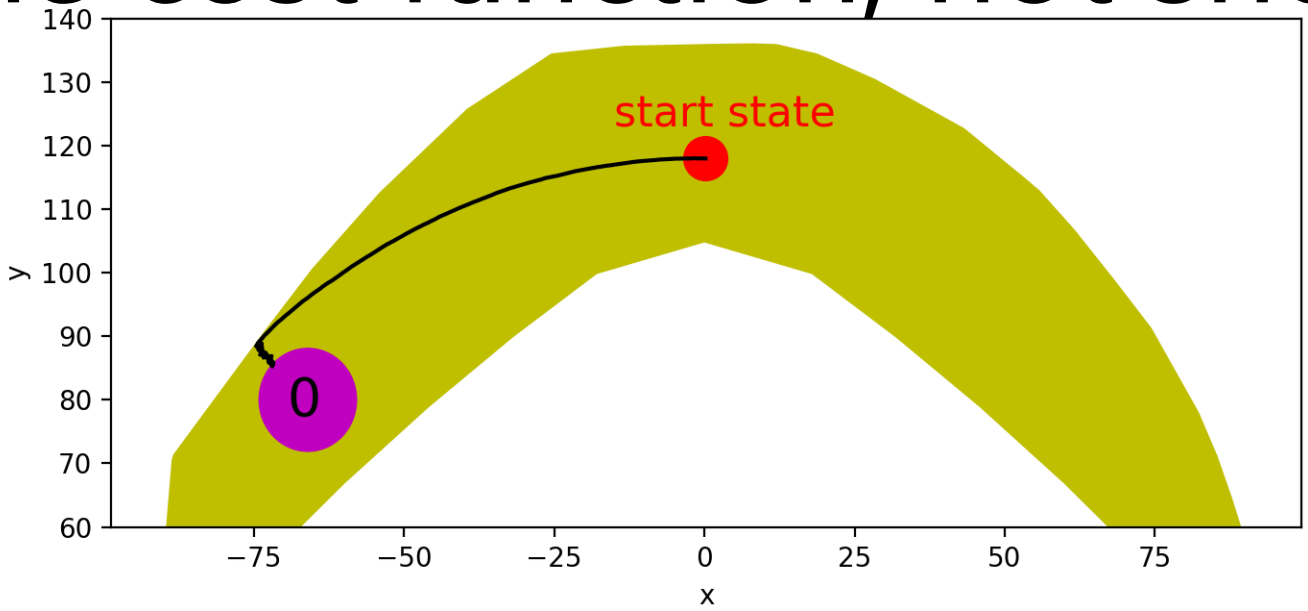
1) **The planned path is not the shortest path due to the cost function**

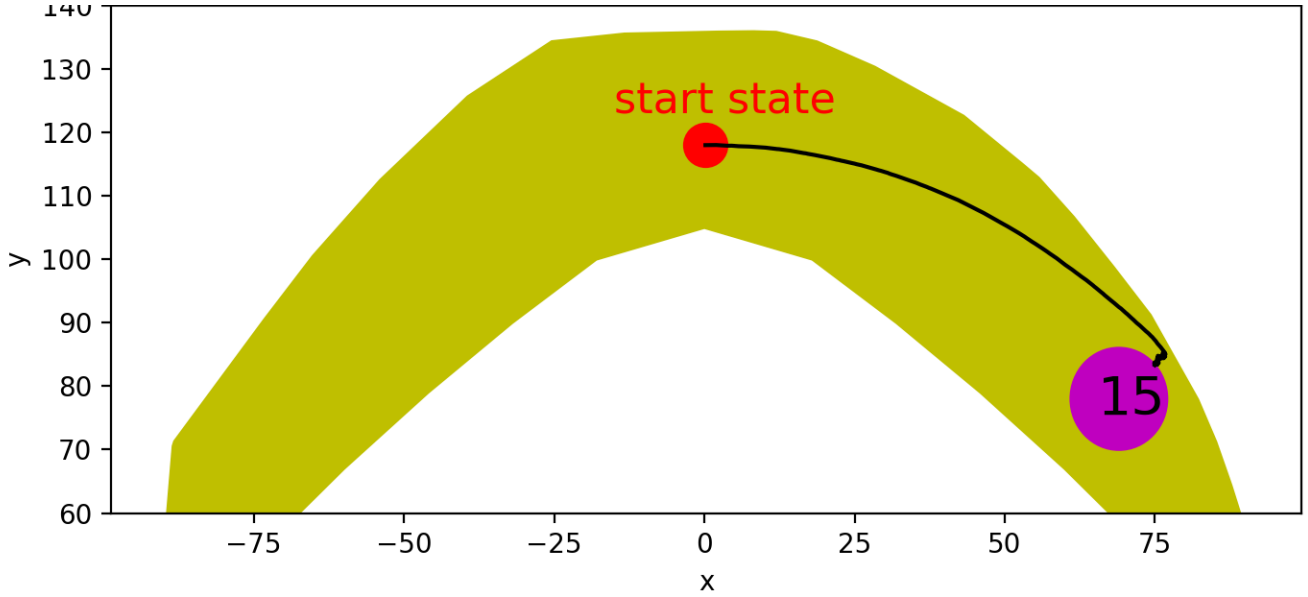
Good Cases without Obstacles





Bad Cases without Obstacles (due to the cost function, not shortest path)



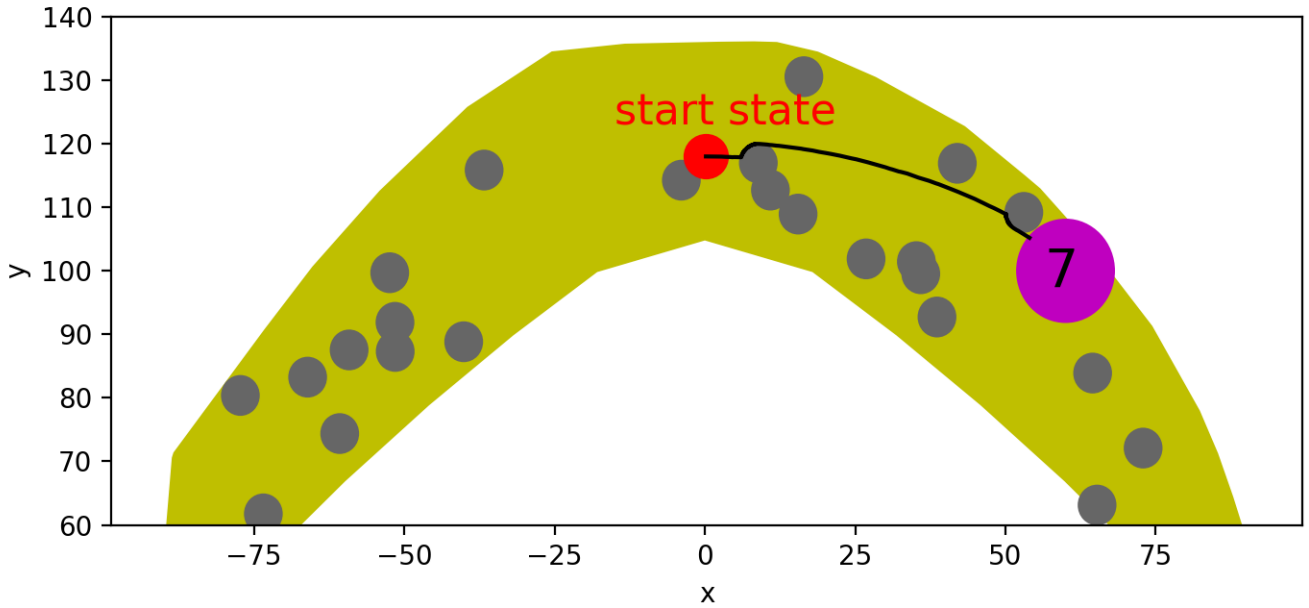


Summary of Limitations

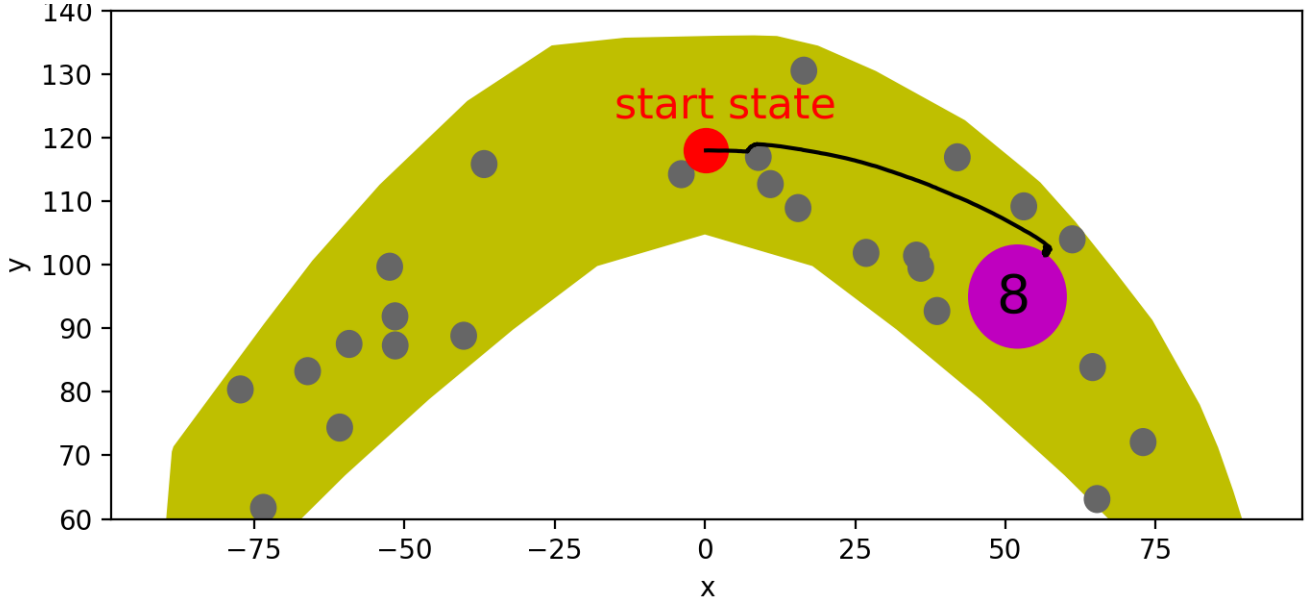
1) **The planned path is not the shortest path due to the cost function**

2) **If the scene is difficult enough (obstacle radius is large enough), the planner can not give us a path within a reasonable time. (Might also due to the cost function)**

Good Cases with Obstacles

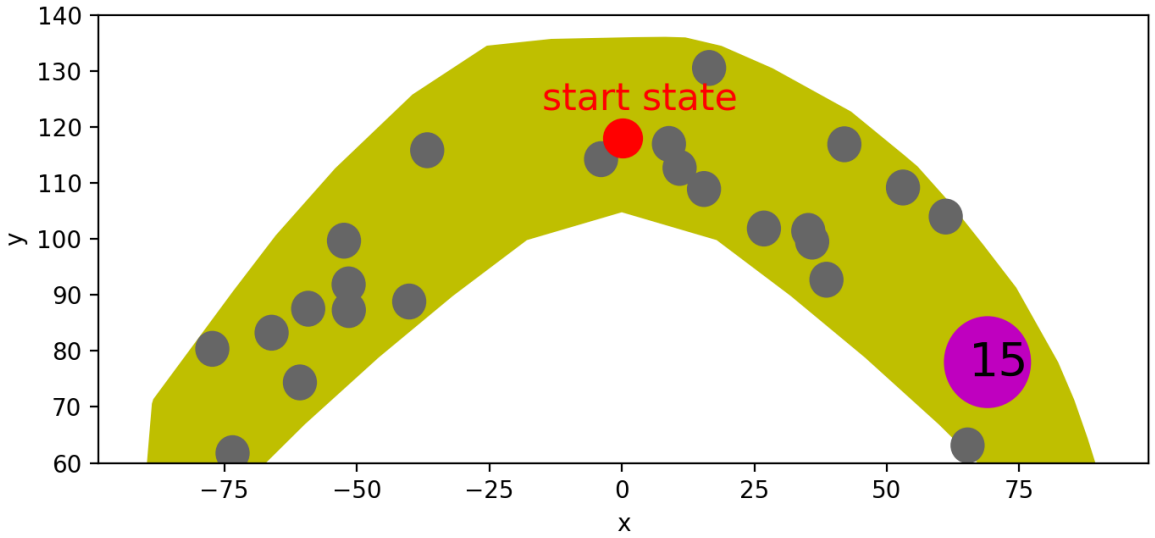


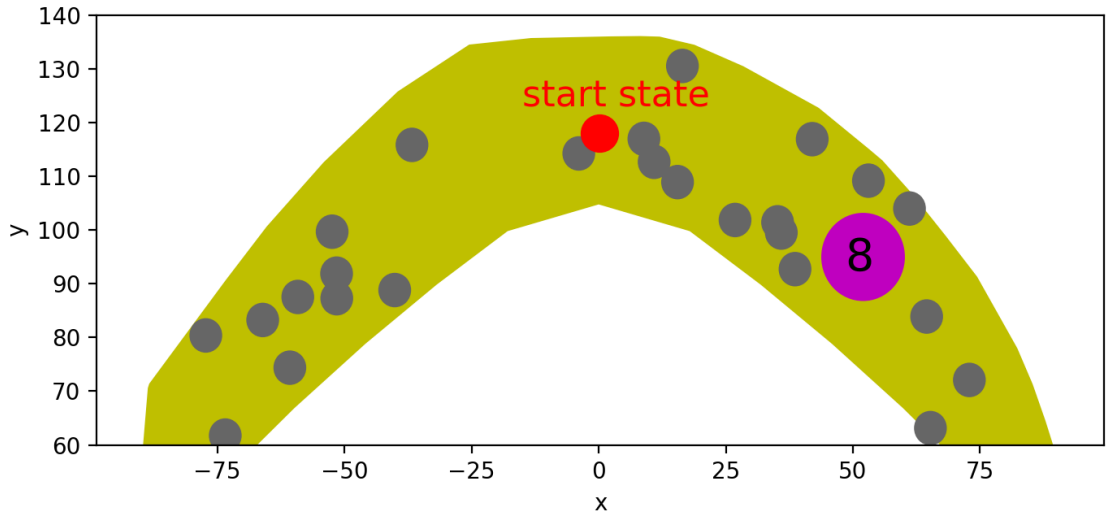
obstacle radius is 3



obstacle radius is 2

Bad Cases with Obstacles (no path planned within 10 mins, if the scene is difficult (obstacle radius is 3))





Questions and Discussions

- **The planned path is not the shortest path due to the cost function.**

  --How should we deal with this?

- **If the scene is difficult enough (obstacle radius is large enough), the planner can not give us a path within a reasonable time. (Might also due to the cost function)**

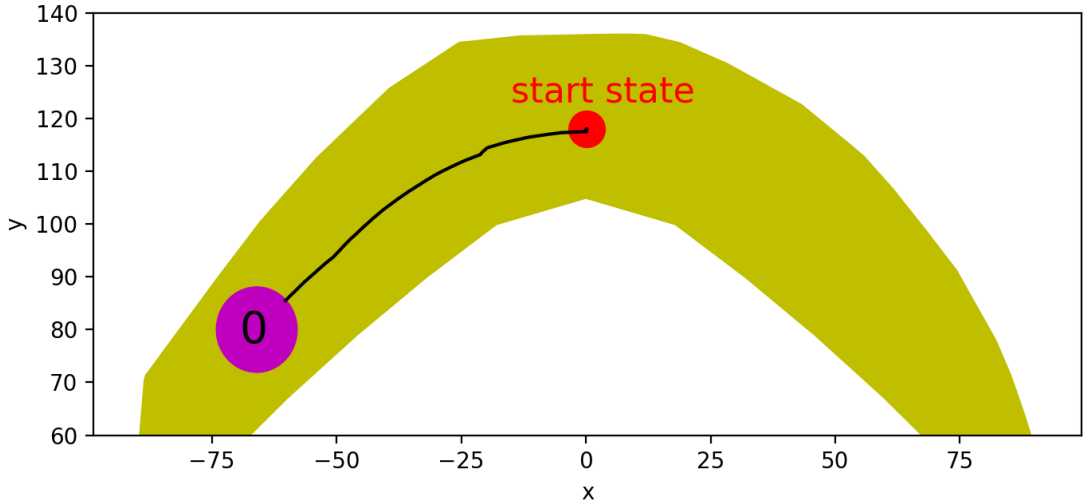
  --How should we deal with this?

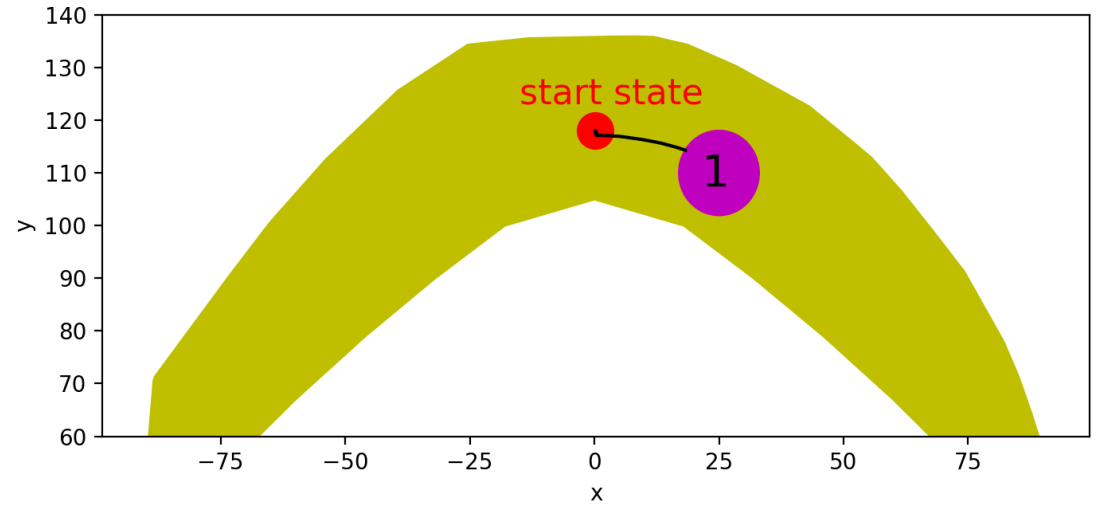
Update of Today

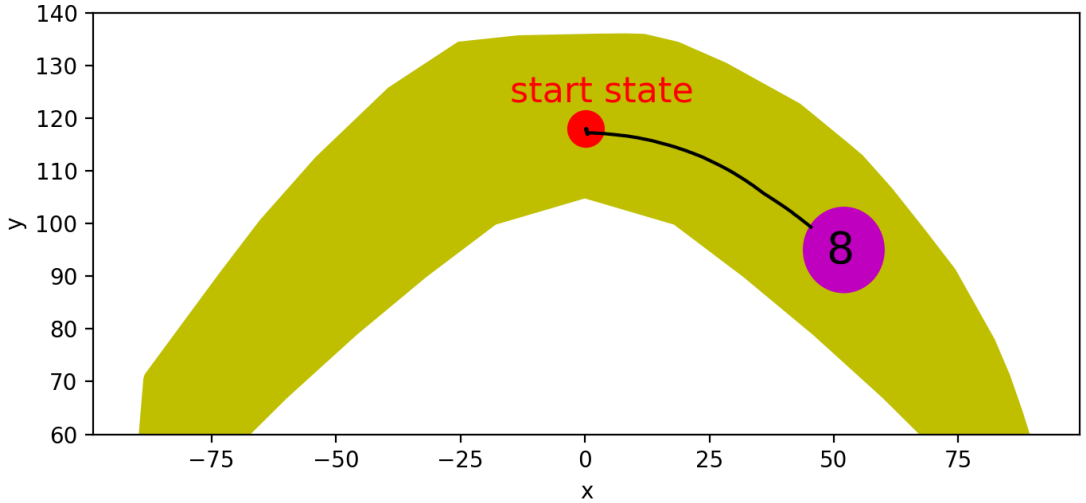
- **The planned path is not the shortest path due to the cost function.**

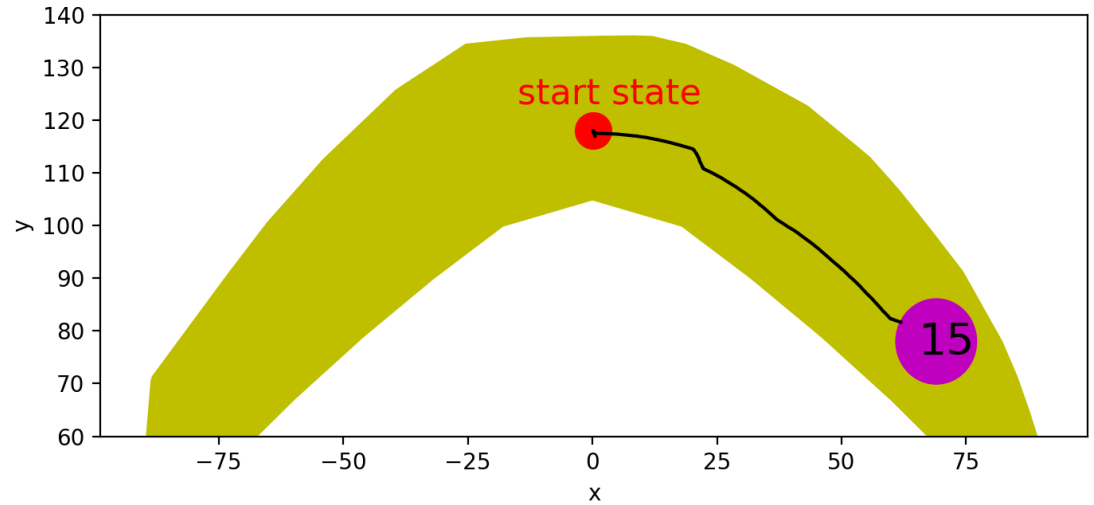
--How should we deal with this?

Solved! ***(using multiple steps (num_steps=100) and "distance to the goal location + length of path so far" as cost function)***


start state
0
x
y


start state
1
x
y


start state
8
x
y

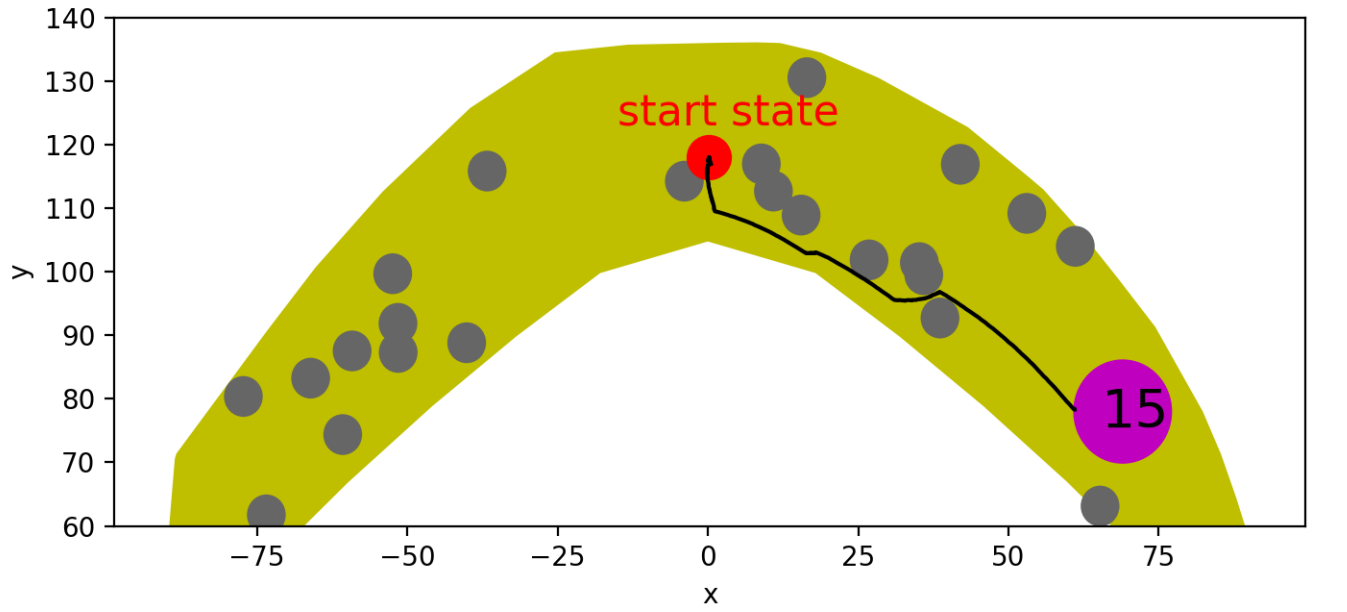

start state
15
x
y

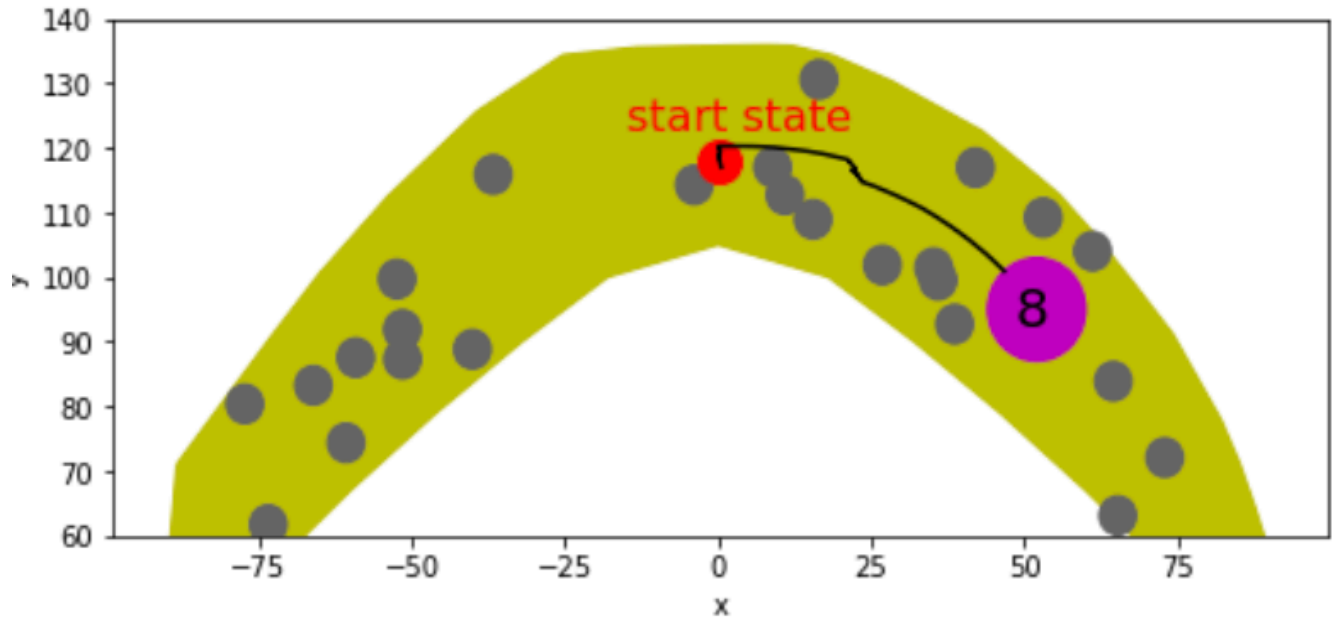
Update of Today

- **If the scene is difficult enough (obstacle radius is large enough), the planner can not give us a path within a reasonable time. (Might also due to the cost function)**

  --How should we deal with this?

  Solved!* *(using multiple steps (num_steps=100) and "distance to the goal location + length of path so far" as cost function) (Got a path within 10 or 20 minutes)


start state
15
x
y


start state
8
x
y