

Stochastic Trajectory Optimization for Motion Planning

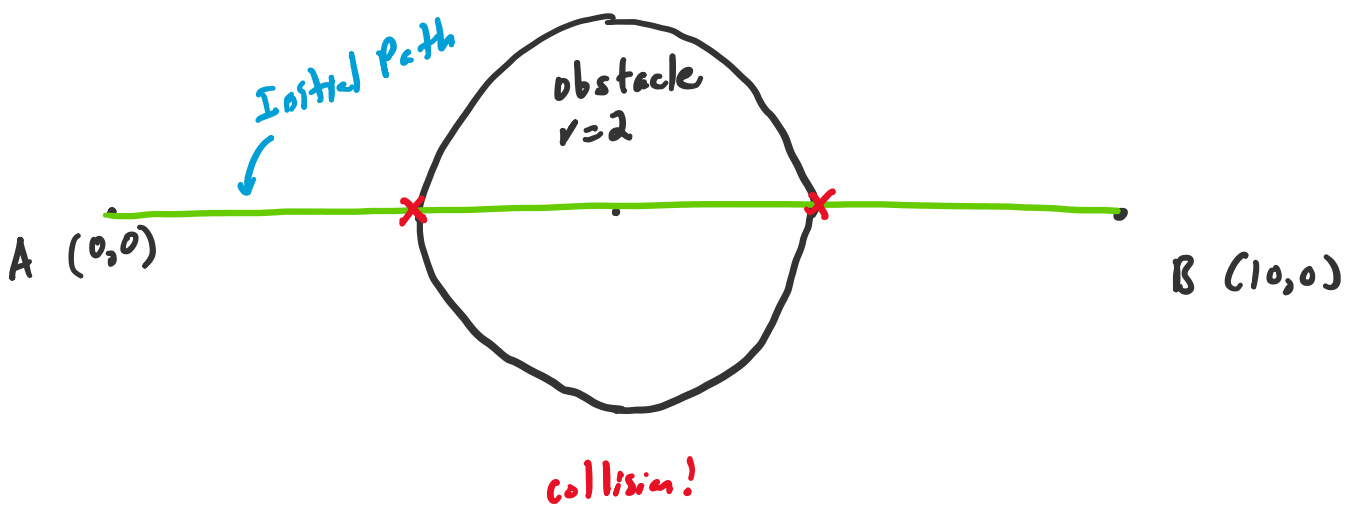
Core Idea:

Iteratively improve an initial guess through stochastic sampling & optimization

Example

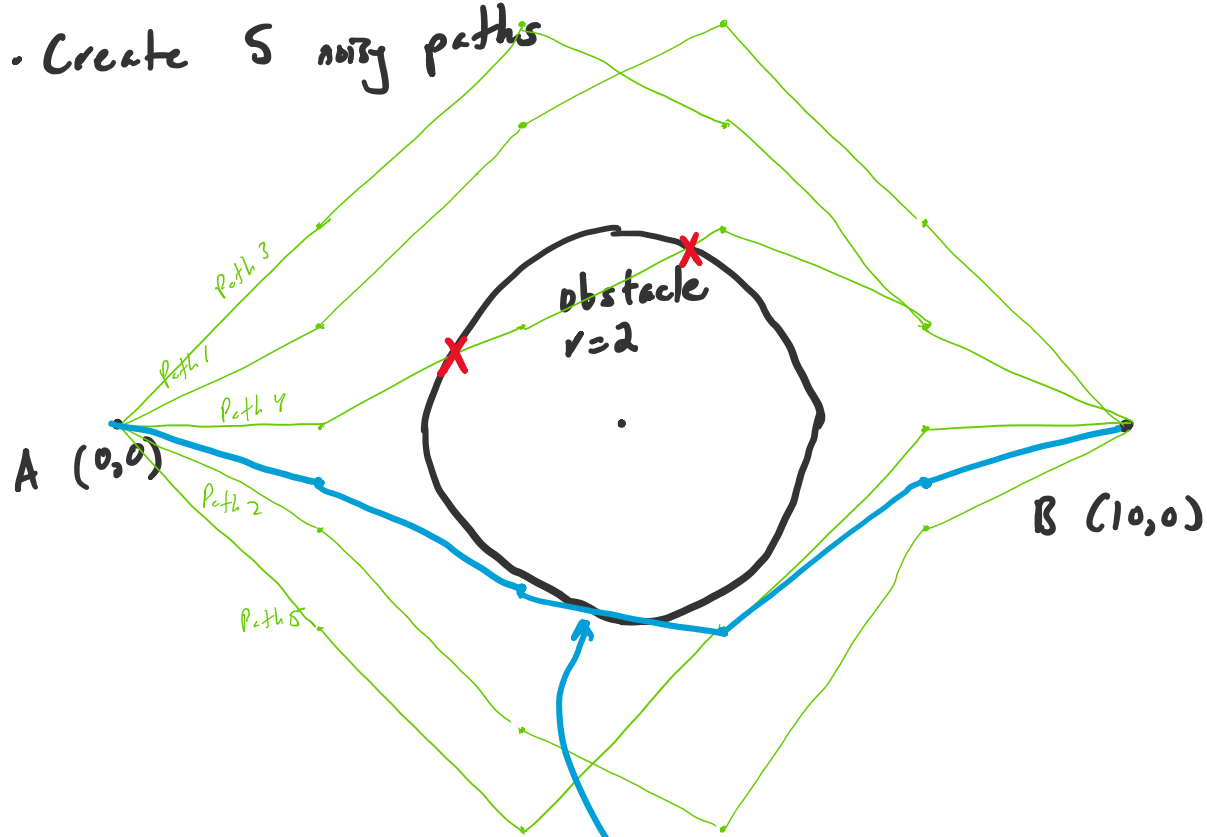


Step 1: Initialize



Step 2: Generate Samples (Loop 1)

- Create 5 noisy paths



Step 3: Evaluate Costs

- Collision cost = { 100 if collision, 0 if clear }
- sharpness cost = { higher if sharp, low if smooth }

Sample	collision	smooth	Total	Path. weight rank
1	0	3	3	2
2	0	2	2	1
3	0	4	4	3
4	100	1	101	5
5	0	5	5	4

Normalize & calc inverse costs for weight

Step 4: Update Trajectory

- Calculate the new path

example new path:

(0,0), (2,-.5), (4,-1.5), (6,-2), (8,-.5), (10,0)

Step 5: Repeat

- Generate 5 new samples around this new trajectory
- Continue for set # of iterations or until convergence.