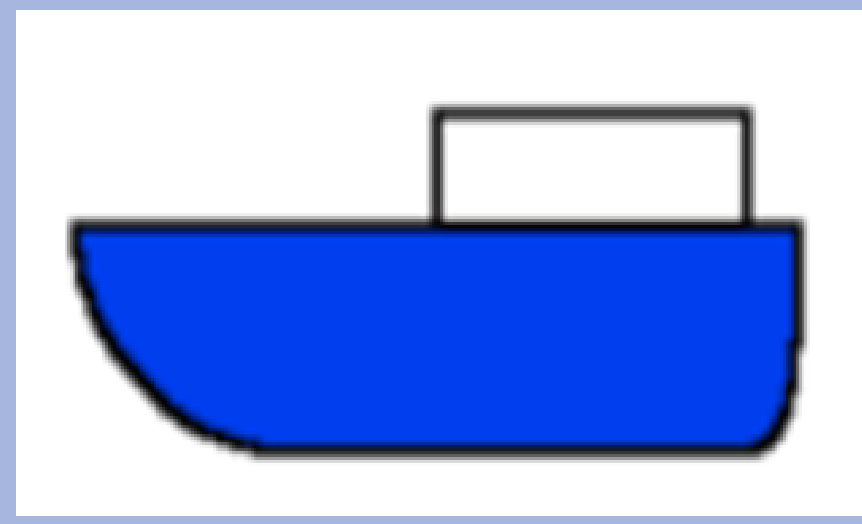


Project

- Multi-robot systems are assigned a set of motion tasks
- Solutions utilize interactions between robots

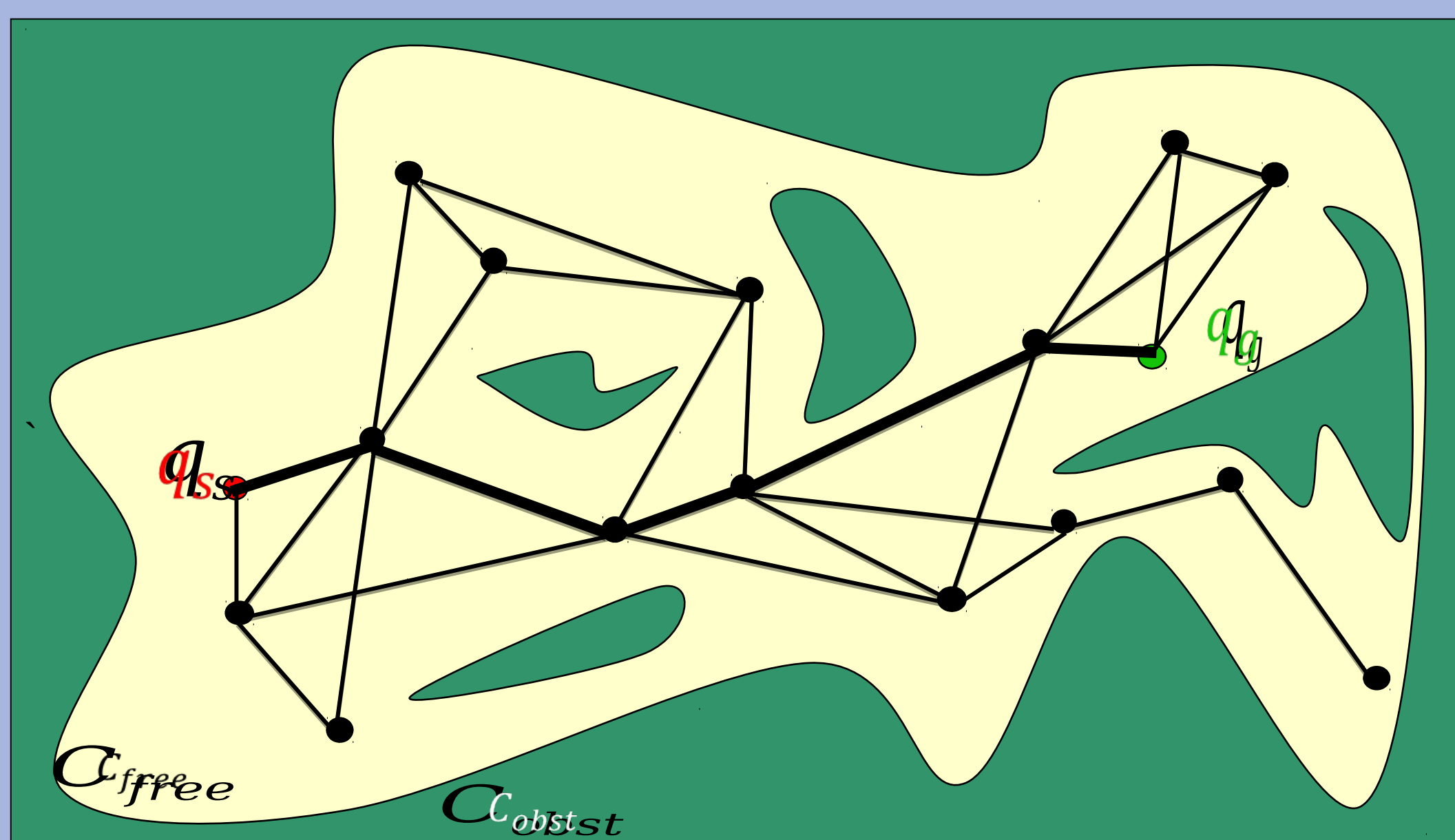


Motivation

- Influence the decision to perform or not to perform interaction
- Avoid when carrying expensive or sensitive cargo
- Performing interactions increase robot availability

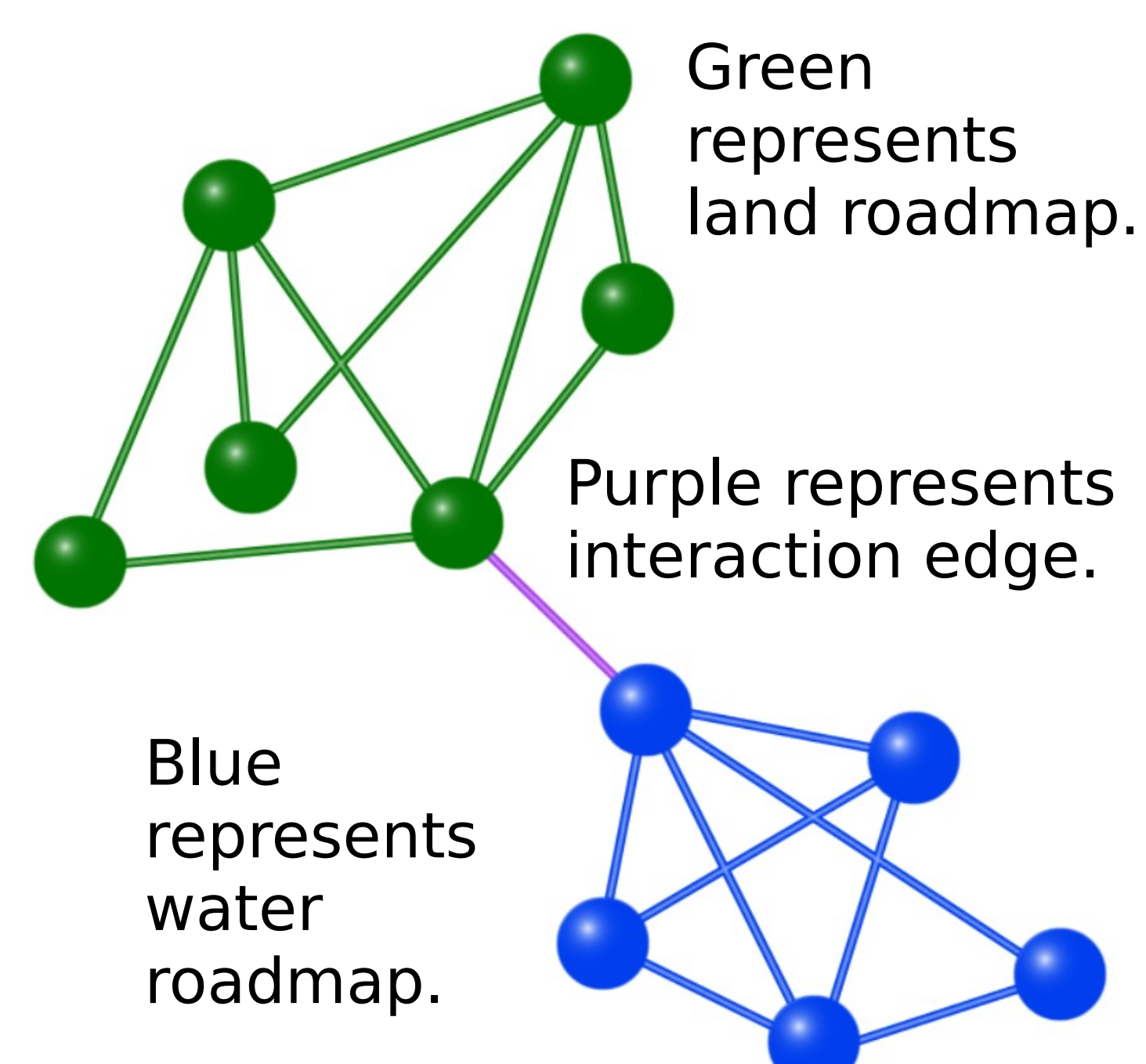
Motion Planning

- Getting robot from point A to point B



- Roadmap, a graph structure, is constructed to approximate and connect free C-space
- Each edge is assigned a weight
- A path through the roadmap represents a motion plan

Method



- These templates consist of two roadmaps connected by an interaction edge
- Interaction templates are placed on the borders of disjoint workspaces

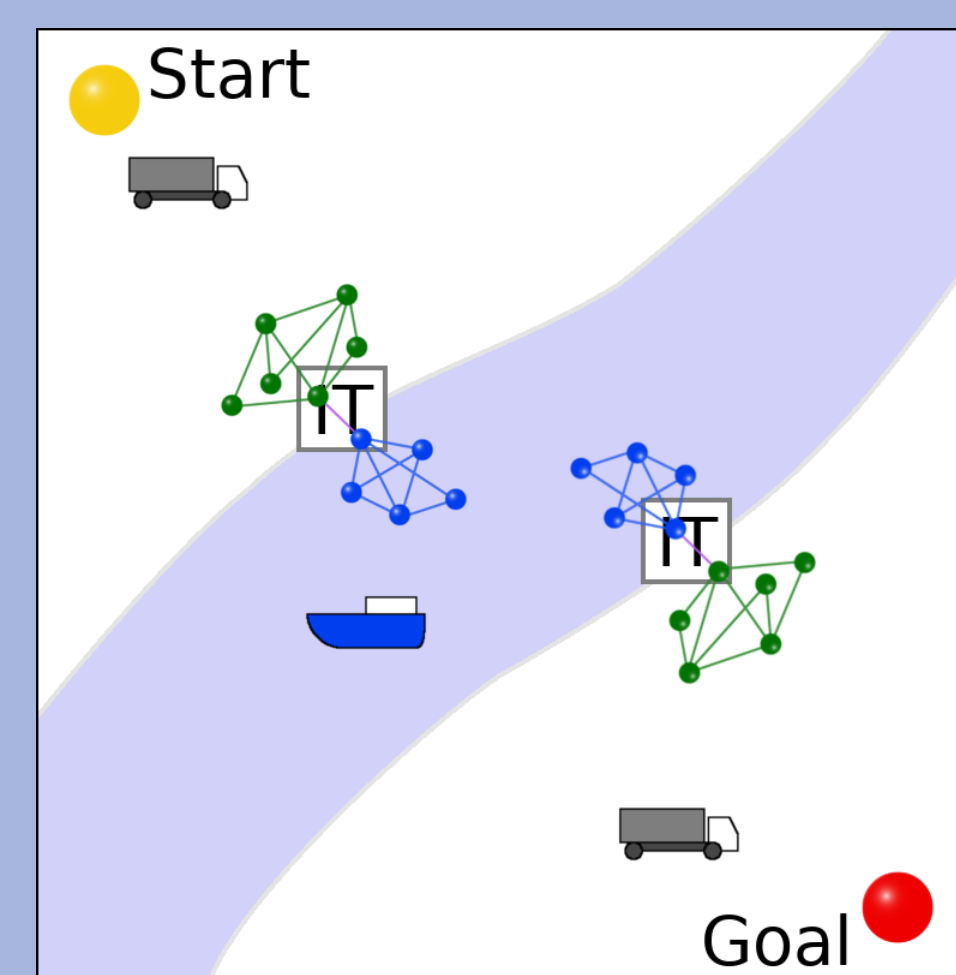


Figure 1

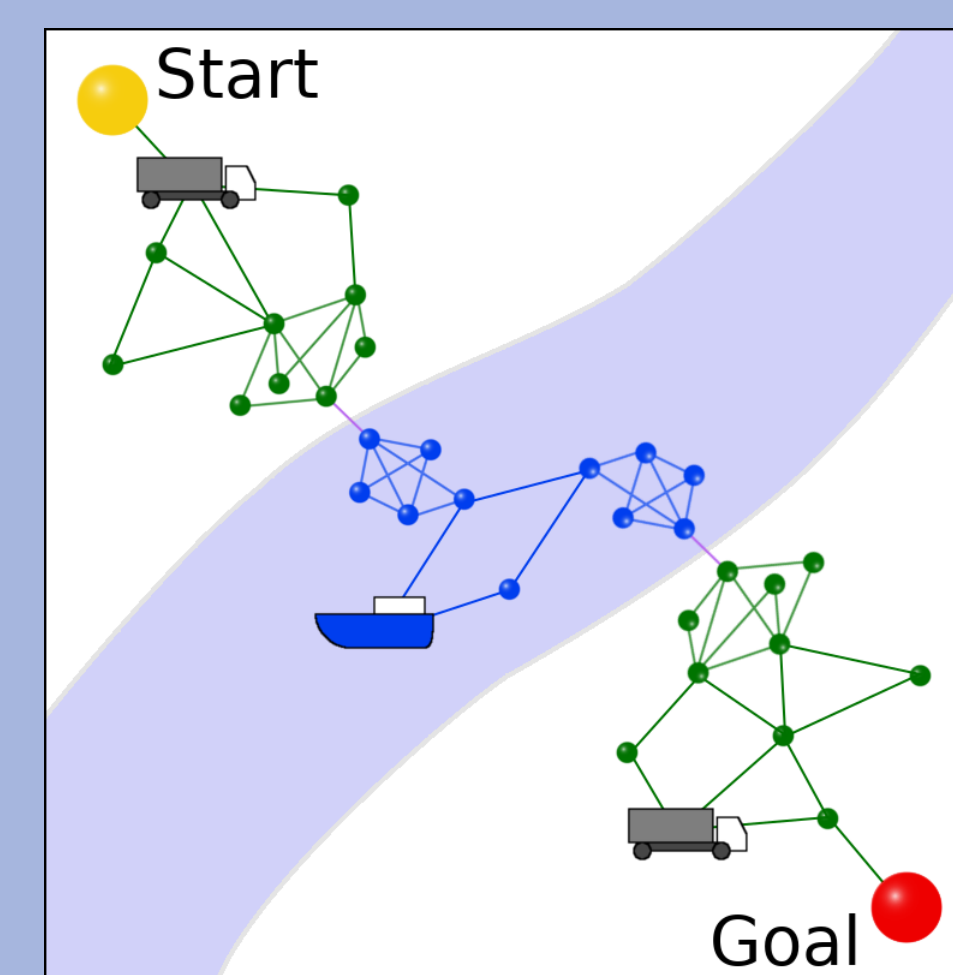


Figure 2

- ITs are placed in the environment
- ITs are connected to form the combined roadmap
- Crossing an interaction edge represents performing an interaction

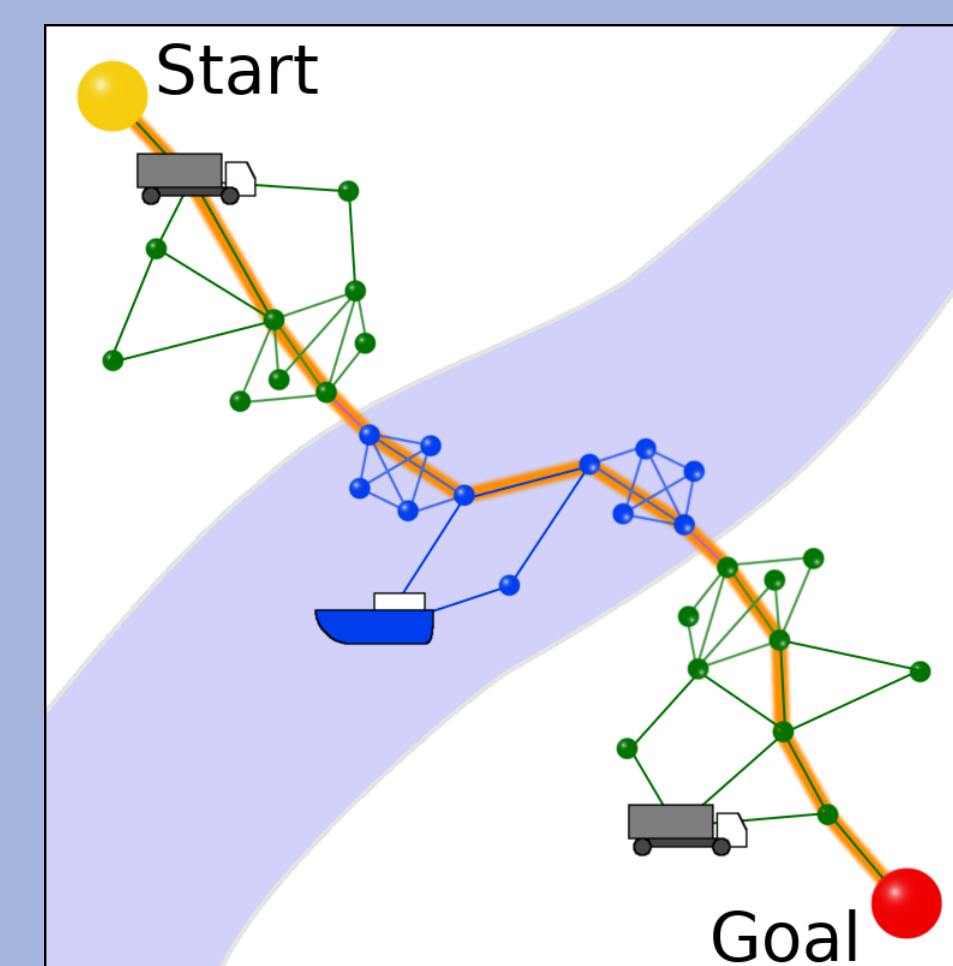


Figure 3

- The bias is implemented by changing the weight of the interaction edge
- The higher the weight, the less desire we have for the interaction

Experiments



- Simulated coastal environment provides optional interaction
- 4 tasks with increasing benefit of interaction

- Ran 35 trials, 4 biases, 4 different tasks

$$|\text{Manhattan} - \text{Euclidean}| = \text{Bias}$$

Bias	Number of Interactions			
	Task1	Task2	Task3	Task4
0	0.34	1.66	2.00	2.00
2	0.00	0.29	1.94	2.00
6	0.00	0.00	0.06	0.51
12	0.00	0.00	0.00	0.00
16	0.00	0.00	0.00	0.00

- As the bias increases the number of interactions decreases

Conclusion

- Bias can influence the task planning process
- Higher the bias, the less likely the system is to perform the interaction

Acknowledgments

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