Motion Planning | Graph Search I
Autonomous Mobile Robots

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Graph construction | overview

- A graph $G(N, E)$ is characterized by
  - a set of nodes $N$
  - edges $E$ connecting pairs of nodes
- Graphs for motion planning are commonly constructed from map or sensor data
Graph construction | Grid and Lattice graphs

- Lattice graphs are largely independent of the workspace representation
- They overlay a repetitive discretization on the workspace
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Graph construction | Visibility Graph

- The Visibility Graph operates on polygonal workspaces
- It connects all visible nodes (i.e., obstacle corners)
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- Edges pass between objects and along object boundaries
- The method contains the shortest path sequence per construction
- The resulting graph size is a function of the obstacle count and shape
- Robot motion constraints are not considered
The Voronoi Diagram operates on arbitrary closed workspaces
It maximizes the minimal distance to obstacle boundaries
Graph construction | Voronoi Diagram

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- The Voronoi Diagram does not contain shortest path sequences
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