Fast Obstacle k-Nearest Neighbour Query on Navigation Mesh

Final Presentation

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Supervisor: David Taniar, Daniel Harabor

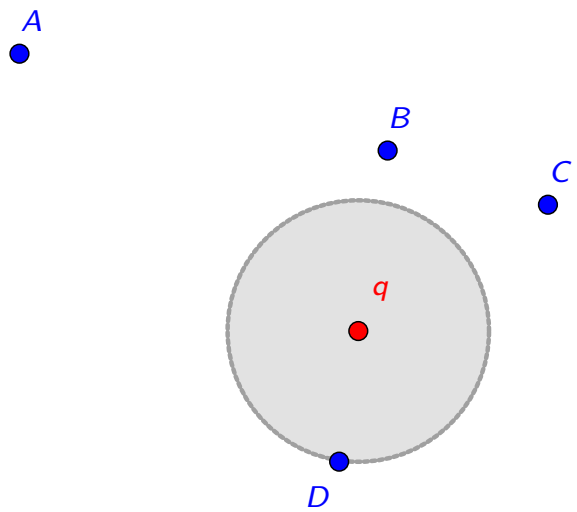
Summary

Outline

Traditional k-Nearest Neighbor

k-Nearest Neighbor:

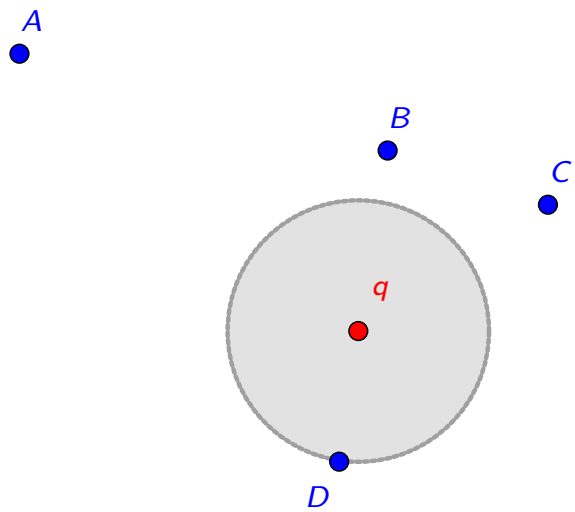
- Given:



Traditional k-Nearest Neighbor

k-Nearest Neighbor:

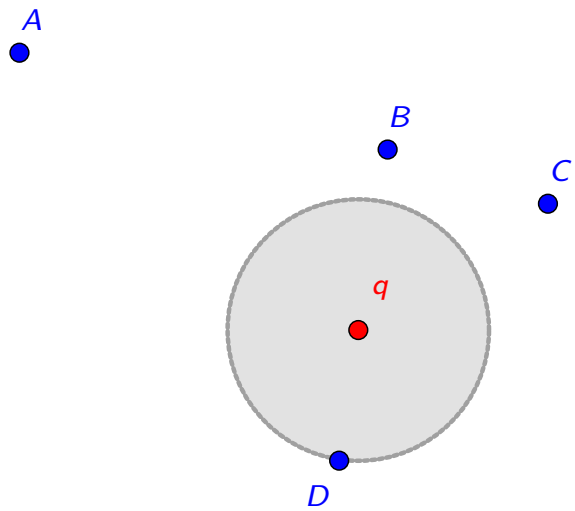
- Given:
  - q: query point



Traditional k-Nearest Neighbor

k-Nearest Neighbor:

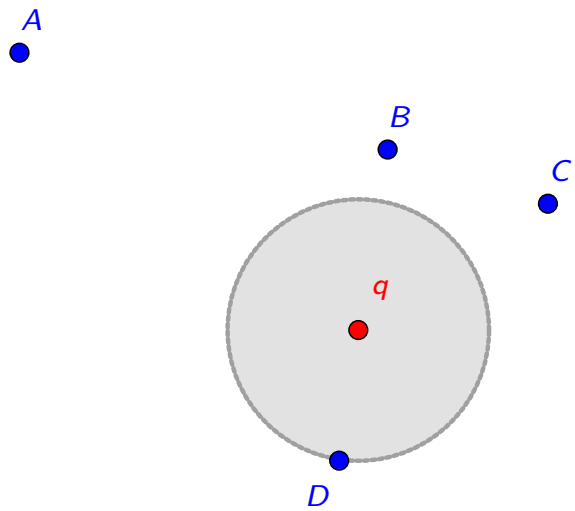
- Given:
  - q: query point
  - T: target set
    (e.g. $\{A, B, C, D\}$)



Traditional k-Nearest Neighbor

k-Nearest Neighbor:

- Given:
  - q: query point
  - T: target set (e.g. $\{A, B, C, D\}$)
  - k: number of retrieved targets (e.g. $k = 1$)



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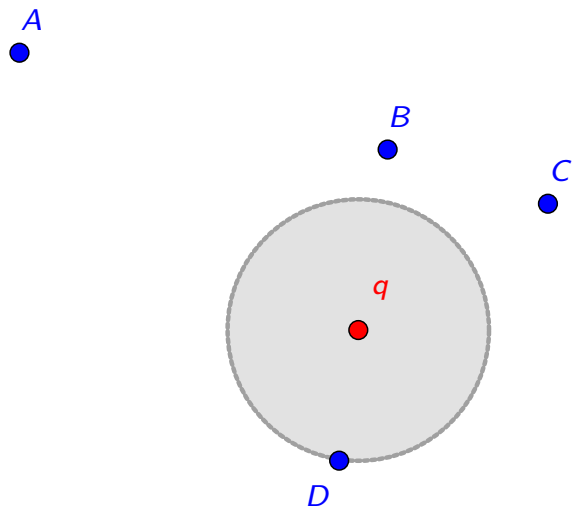
- Return: top k targets regarding *Euclidean distance*



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- Given:
  - q: query point
  - T: target set (e.g. $\{A, B, C, D\}$)
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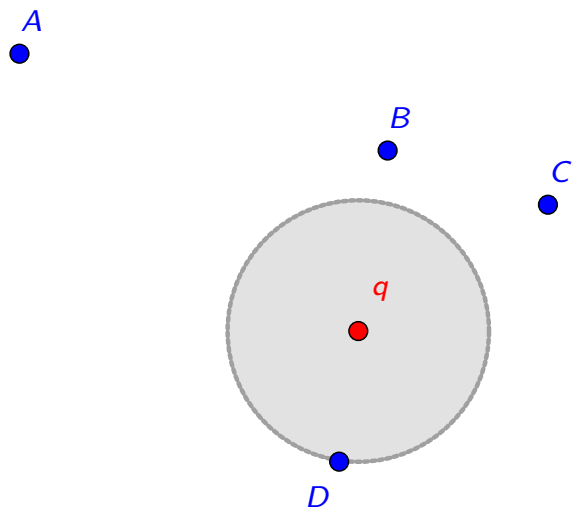
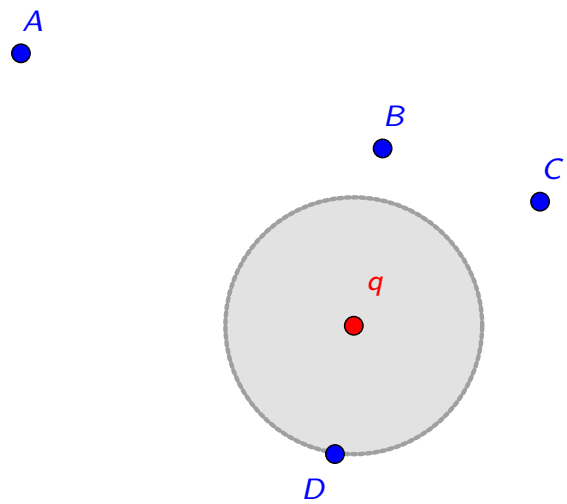
- Return: top k targets regarding *Euclidean distance*
- the circle indicates that D is the nearest neighbor of q



Obstacle k-Nearest Neighbor

- traditional kNN has been well studied.
- when take obstacles into consideration...



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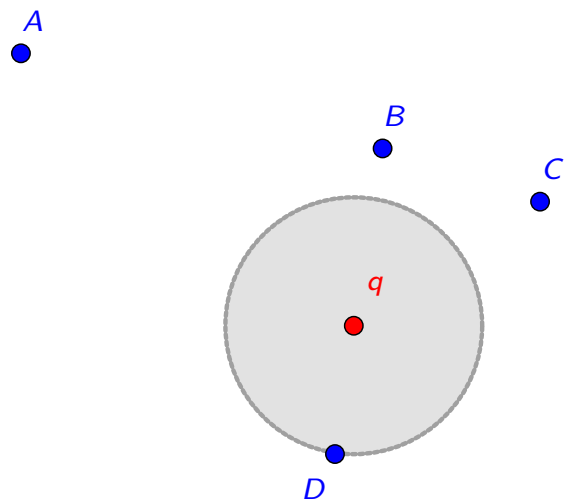

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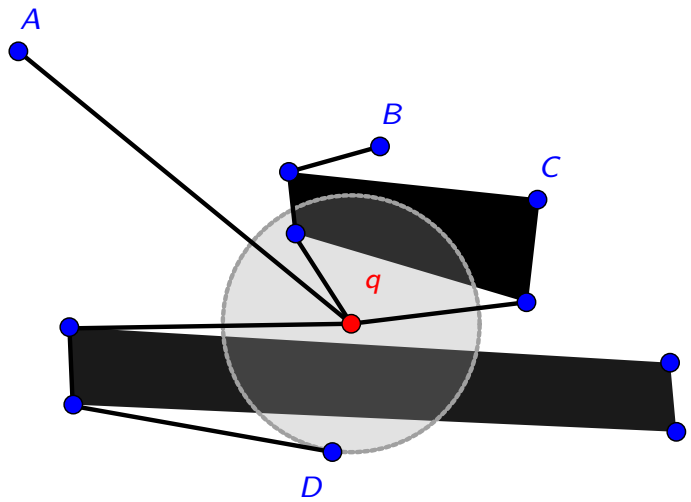

Application Scenario

In an industrial warehouse,
q is a robot.
It's interested in the closest storage locations,
but it can not cross obstacles