CLAIMS

What is claimed is:

1. A method for identifying a list of nearest vehicles comprising:

obtaining vehicle position information of a plurality of vehicle objects, wherein the vehicle position information includes geographical locations of the plurality of vehicle objects;

translating the geographical locations of the plurality of vehicle objects to vehicle positions on an edge-based graph including a plurality of edges;

determining a starting point on the edge-based graph, wherein the starting point is positioned on an edge of the plurality of edges of the edge-based graph;

determining whether one or more vehicle objects are positioned on the edge, and if the one or more vehicle objects are positioned on the edge, appending the one or more vehicle objects to the list of nearest vehicles; and

traversing an adjacent edge of the plurality of edges and determining whether one or more further vehicle objects are positioned on the adjacent edge, and if the one or more further vehicle objects are positioned on the adjacent edge, appending the one or more further vehicle objects to the list of nearest vehicles,

wherein the translating comprises: if a vehicle object of the plurality of vehicle objects is positioned between edges of the edge-based graph based on a geographical location of the vehicle object, generating phantom nodes representing a vehicle position of the vehicle object on the edges, by drawing perpendicular lines from the geographical location of the vehicle object to the edges; and choosing one of the phantom nodes based on a distance between the geographical location of the vehicle object and each of the phantom nodes, to represent the vehicle position of the vehicle object.

2. The method of claim 1, further comprising determining a driving distance for at least one of the vehicle objects, wherein the driving distance comprises a distance along the edges between the starting point and the vehicle position of the at least one of the vehicle objects.

3. The method of claim 2, further comprising comparing the driving distance for two or more of the vehicle objects; and

determining a shortest driving distance based on the comparison.

4. The method of any one of claims 1 to 3, wherein the each of the plurality of edges comprises geographical data.

5. The method of any one of claims 1 to 4, wherein each of the one or more vehicle objects comprises geographical data.

6. The method of claim 2, further comprising determining an estimated time of arrival for the at least one of the vehicle objects based on the driving distance, wherein the estimated time of arrival comprises time to travel from the vehicle position of the at least one of the vehicle objects and the starting position.

7. The method of claim 6, further comprising comparing the estimated time of arrival for two or more of the vehicle objects; and

determining a shortest time based on the comparison.

8. The method of any one of claims 1 to 7, further comprising:

periodically updating locations of each of the one or more vehicle objects to obtain one or more updated vehicle object locations.

9. The method of claim 8, further comprising:

determining whether the one or more vehicle objects are positioned on the edge based on the one or more updated vehicle object locations.

10. A method for identifying a nearest vehicle comprising:

receiving a ride request comprising a request position;

obtaining vehicle information of a plurality of vehicles, wherein the vehicle information comprises vehicle position information including geographical locations of the plurality of vehicles;

converting a geographical location of each of the plurality of vehicles to a vehicle position on an edge-based graph including a plurality of edges, wherein the edge-based graph represents a road system; and

determining a driving distance between the vehicle position of at least one of the plurality of vehicles and the request position, wherein the driving distance comprises a path along the edge-based graph from the vehicle position of the at least one of the plurality of vehicles and the request position, and wherein the driving distance is a fastest path between the vehicle position of the at least one of the plurality of vehicles and the request position,

wherein the converting comprises: if a vehicle of the plurality of vehicles is positioned between edges of the edge-based graph based on a geographical location of the vehicle, generating phantom nodes representing a vehicle position of the vehicle on the edges, by drawing perpendicular lines from the geographical location of the vehicle to the edges; and

choosing one of the phantom nodes based on a distance between the geographical location of the vehicle and each of the phantom nodes, to represent the vehicle position of the vehicle.

11. The method of claim 10, further comprising:

obtaining map data, wherein the map data comprises geographical data;

converting the map data to the plurality of edges and a plurality of nodes, wherein the plurality of edges and the plurality of nodes comprise geographical data;

generating the edge-based graph based on the geographical data of the plurality of edges and the plurality of nodes; and

overlaying the vehicle position on the edge-based graph.

12. The method of claim 10 or claim 11, further comprising a traffic delay and further determining the driving distance based on the traffic delay.

13. The method of any one of claims 10 to 12, further comprising a traffic rule and further determining the driving distance based on the traffic rule.

14. The method of claim 13, wherein the traffic rule comprises determining that an edge corresponds to a one-way road.

15. The method of any of claims 10 to 14, further comprising comparing the driving distance of two or more vehicles of the plurality of vehicles; and

determining a shortest driving distance based on the comparison.

16. The method of claim 15, further comprising sending a message to fulfill the ride request to a vehicle corresponding to the shortest driving distance.

17. The method of any one of claims 10 to 16, further comprising:

periodically updating locations of each of the plurality of vehicles to obtain one or more updated vehicle object locations.

18. The method of claim 17, further comprising: determining the driving distance between the at least one of the plurality of vehicles and the request position based on the one or more updated vehicle object locations.

19. A device for identifying a nearest vehicle according to any one of claims 10 to 18.

20. A non-transitory computer-readable medium storing computer executable code comprising instructions for identifying a nearest vehicle according to any one of claims 1 to 18.