CLAIMS:

1. A method for estimating arrival time associated with a ride order, comprising:

inputting transportation information to a trained machine learning model, wherein:

the transportation information comprises an origin and a destination associated with the ride order, and

the trained machine learning model comprises a wide network, a deep neural network, and a recurrent neural network all coupled to a multiplayer perceptron network; and

based on the trained machine learning model, obtaining an estimated time for arriving at the destination via a route connecting the origin and the destination.

2. The method of claim 1, wherein training the machine learning model comprises, for each of a plurality of historical vehicle trips:

obtaining transportation training data associated with the historical vehicle trip, wherein the transportation training data comprises a historical route connecting a historical origin and a historical destination and a real historical trip time, and wherein the historical route corresponds to a sequence of links each corresponding to a road segment;

obtaining one or more global features and local features from the transportation training data; and

inputting the global features to the wide network, inputting the global features to the deep neural network, and inputting the local features to the recurrent neural network to obtain outputs respectively.

3. The method of claim 2, further comprising:

inputting the outputs from the wide network, the deep neural network, and the recurrent neural network to the multiplayer perceptron network to obtain an estimated historical trip time.

4. The method of claim 2, wherein:

the global features are uniform for the links in the historical route, and

the local features are associated with the links individually.

5. The method of claim 2, wherein the global features comprise:

sparse features comprising at least one of: driver identification, passenger identification, day-of-week, time, weather, or peak hour determination; and

first dense features comprising a shape encompassing the route.

6. The method of claim 2, wherein the local features comprise:

nominal features correspondingly associated with the links, the nominal features comprising at least one of: link identification, link speed limit, link toll determination, link road width, or link road classification; and

second dense features correspondingly associated with the links, the second dense features comprising at least one of: real-time link traffic speed, link length, or link traffic light duration.

7. The method of claim 2, wherein inputting the global features to the wide network to obtain the output from the wide network comprises:

obtaining a plurality of feature products each corresponding to a product between every two of the global features.

8. The method of claim 5, wherein:

the deep neural network comprises a feedforward neural network; and

inputting the global features to the deep neural network to obtain the output from the deep neural network comprises:

embedding the sparse features;

concatenating the first dense features and the embedded sparse features; and

feeding the concatenated first dense features and sparse features to the feedforward neural network to obtain the output from the feedforward neural network.

9. The method of claim 2, wherein:

the recurrent neural network comprises a plurality of layers in a sequence corresponding the sequence of the links; and

inputting the local features to the recurrent neural network to obtain the output from the recurrent neural network comprises, for each of the historical vehicle trips:

correspondingly feeding the local features as inputs to the layers to obtain a current hidden state of a last layer in the sequence of layers.

10. The method of claim 2, wherein:

the recurrent neural network comprises another multiplayer perceptron network coupled to a long short-term memory network; and

inputting the local features to the recurrent neural network to obtain the output from the recurrent neural network comprises:

feeding the local features to the another multiplayer perceptron network to obtain first results correspondingly associated with the links; and

feeding the first results correspondingly as inputs to various layers of the long short-term memory network to obtain a current hidden state of a last layer of the various layers.

11. The method of claim 1, wherein:

the route comprises a sequence of connected links, each link corresponding to a road segment; and

the transportation information further comprises at least one of: driver identification, passenger identification, day-of-week, time, weather, peak hour determination, a shape encompassing the route, link identification, link speed limit, link toll determination, link road width, link road classification, real-time link traffic speed, link length, or link traffic light duration.

12. A system for estimating arrival time associated with a ride order, implementable on a server, comprising a processor and a non-transitory computer-readable storage medium storing instructions that, when executed by the processor, cause the system to perform a method, the method comprising:

inputting transportation information to a trained machine learning model, wherein:

the transportation information comprises an origin and a destination associated with the ride order, and

the trained machine learning model comprises a wide network, a deep neural network, and a recurrent neural network all coupled to a multiplayer perceptron network; and

based on the trained machine learning model, obtaining an estimated time for arriving at the destination via a route connecting the origin and the destination.

13. The system of claim 12, wherein training the machine learning model comprises, for each of a plurality of historical vehicle trips:

obtaining transportation training data associated with the historical vehicle trip, wherein the transportation training data comprises a historical route connecting a

historical origin and a historical destination and a real historical trip time, and wherein the historical route corresponds to a sequence of links each corresponding to a road segment;

obtaining one or more global features and local features from the transportation training data; and

inputting the global features to the wide network, inputting the global features to the deep neural network, and inputting the local features to the recurrent neural network to obtain outputs respectively.

14. The system of claim 13, wherein training the machine learning model further comprises, for each of a plurality of historical vehicle trips:

inputting the outputs from the wide network, the deep neural network, and the recurrent neural network to the multiplayer perceptron network to obtain an estimated historical trip time.

15. The system of claim 13, wherein:

the global features are uniform for the links in the historical route, and

the local features are associated with the links individually.

16. The system of claim 13, wherein the global features comprise:

sparse features comprising at least one of: driver identification, passenger identification, day-of-week, time, weather, or peak hour determination; and

first dense features comprising a shape encompassing the route.

17. The system of claim 13, wherein the local features comprise:

nominal features correspondingly associated with the links, the nominal features comprising at least one of: link identification, link speed limit, link toll determination, link road width, or link road classification; and

second dense features correspondingly associated with the links, the second dense features comprising at least one of: real-time link traffic speed, link length, or link traffic light duration.

18. The system of claim 13, wherein inputting the global features to the wide network to obtain the output from the wide network comprises:

obtaining a plurality of feature products, each feature product corresponding to a product between every two of the global features.

19. The system of claim 16, wherein:

the deep neural network comprises a feedforward neural network; and

inputting the global features to the deep neural network to obtain the output from the deep neural network comprises:

embedding the sparse features;

concatenating the first dense features and the embedded sparse features; and

feeding the concatenated first dense features and sparse features to the feedforward neural network to obtain the output from the feedforward neural network.

20. The system of claim 13, wherein:

the recurrent neural network comprises a plurality of layers in a sequence corresponding the sequence of the links; and

inputting the local features to the recurrent neural network to obtain the output from the recurrent neural network comprises, for each of the historical vehicle trips:

correspondingly feeding the local features as inputs to the layers to obtain a current hidden state of a last layer in the sequence of layers.

21. The system of claim 13, wherein:

the recurrent neural network comprises another multiplayer perceptron network coupled to a long short-term memory network; and

inputting the local features to the recurrent neural network to obtain the output from the recurrent neural network comprises:

feeding the local features to the another multiplayer perceptron network to obtain first results correspondingly associated with the links; and

feeding the first results correspondingly as inputs to various layers of the long short-term memory network to obtain a current hidden state of a last layer of the various layers.

22. The system of claim 12, wherein:

the route comprises a sequence of connected links, each link corresponding to a road segment; and

the transportation information further comprises at least one of: driver identification, passenger identification, day-of-week, time, weather, peak hour determination, a shape encompassing the route, link identification, link speed limit, link toll determination, link road width, link road classification, real-time link traffic speed, link length, or link traffic light duration.

23. A method for estimating arrival time associated with a ride order, comprising:

receiving from a device a ride order for transportation from an origin to a destination;

determining a route connecting the origin and the destination;

obtaining transportation information associated with the route;

inputting the obtained transportation information to a trained machine learning model to obtain an estimated time for arriving at the destination via the route; and

causing the estimated time to be played on the device.

24. The method of claim 23, wherein:

the route comprises a sequence of connected links, each link corresponding to a road segment; and

the transportation information comprises at least one of: driver identification, passenger identification, day-of-week, time, weather, peak hour determination, a shape encompassing the route, link identification, link speed limit, link toll determination, link road width, link road classification, real-time link traffic speed, link length, or link traffic light duration.

25. The method of claim 23, wherein the trained machine learning model comprises a wide network, a deep neural network, and a recurrent neural network all coupled to a multilayer perceptron network.

26. A system for estimating arrival time associated with a ride order, comprising a processor and a non-transitory computer-readable storage medium storing instructions that, when executed by the processor, cause the system to perform a method, the method comprising:

receiving from a device a ride order for transportation from an origin to a destination;

determining a route connecting the origin and the destination;

obtaining transportation information associated with the route;

inputting the obtained transportation information to a trained machine learning model to obtain an estimated time for arriving at the destination via the route; and

causing the estimated time to be played on the device.

27. The system of claim 26, wherein:

the route comprises a sequence of connected links, each link corresponding to a road segment; and

the transportation information comprises at least one of: driver identification, passenger identification, day-of-week, time, weather, peak hour determination, a shape encompassing the route, link identification, link speed limit, link toll determination, link road width, link road classification, real-time link traffic speed, link length, or link traffic light duration.

28. The system of claim 26, wherein the trained machine learning model comprises a wide network, a deep neural network, and a recurrent neural network all coupled to a multilayer perceptron network.

29. A non-transitory computer-readable storage medium storing instructions that, when executed by a processor, cause the processor to perform a method for estimating arrival time associated with a ride order, the method comprising:

receiving from a device a ride order for transportation from an origin to a destination;

determining a route connecting the origin and the destination;

obtaining transportation information associated with the route;

inputting the obtained transportation information to a trained machine learning model to obtain an estimated time for arriving at the destination via the route; and

causing the estimated time to be played on the device.

30. The non-transitory computer-readable storage medium storing of claim 29, wherein:

the route comprises a sequence of connected links, each link corresponding to a road segment; and

the transportation information comprises at least one of: driver identification, passenger identification, day-of-week, time, weather, peak hour determination, a shape encompassing the route, link identification, link speed limit, link toll determination, link road width, link road classification, real-time link traffic speed, link length, or link traffic light duration.

31. The non-transitory computer-readable storage medium storing of claim 29, wherein the trained machine learning model comprises a wide network, a deep neural network, and a recurrent neural network all coupled to a multilayer perceptron network.