What is claimed is:

1. An entity transaction attribute determination method for determining an attribute state or an attribute category of a to-be-predicted entity on a preset transaction attribute, the method comprising:

obtaining a plurality of historical relational networks sequentially arranged in accordance with a temporal order, wherein the historical relational networks respectively correspond to historical time points having a preset time interval, each of the historical relational networks comprises a plurality of nodes, each of the nodes corresponds to a plurality of entities comprising the to-be-predicted entity, each of the historical relational networks is configured to describe association relationships between the plurality of entities which correspond to a corresponding historical time point, the entities having an association relationship are connected by a connecting edge therebetween, and each of the nodes corresponds to a node vector composed of transaction characteristics extracted based on description information of the corresponding entities;

determining, for each of the historical relational networks and through vector fusion of neighbor nodes, a plurality of expression vectors of the to-be-predicted entity;

processing, through a pre-trained time-series neural network, the expression vectors to obtain an output result; and

determining, according to the output result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity,

wherein the historical relational networks comprise a first relational network, the to-be-predicted entity corresponds to a first node in the first relational network, and

the determining, for each of the historical relational networks and through vector fusion of the neighbor nodes, a plurality of expression vectors of the to-be-predicted entity comprises:

processing the relational network through a multilayer graph neural network, the multilayer graph neural network updating, after processing of a current layer is done, the node vector of the first node based on the following result: a weighted result from a product of the previous layer-updated node vector of each neighbor node and an auxiliary weight matrix; and

using the node vector of the first node updated by the last layer of the graph neural network as a first expression vector of the first node corresponding to the first relational network.

2. The method according to claim 1, wherein the time-series neural network is trained in the following manner:

obtaining a current training sample corresponding to a sample entity and an attribute tag of the sample entity with respect to the preset transaction attribute;

executing, for each historical relational network of T historical relational networks sequentially arranged in accordance with the temporal order, a node vector fusion operation of the neighbor nodes, to determine T expression vectors respectively corresponding to the sample entity under the T relational networks, the T historical relational networks being established in accordance with T time points having the preset time interval;

sequentially inputting, under the temporal order of the corresponding historical relational networks, the T expression vectors into a selected time-series neural network, and obtaining a sample output result of the time-series neural network for the sample entity; and

adjusting, with an objective of matching the sample output result with the attribute tag, model parameters to train the time-series neural network.

3. The method according to claim 1, wherein the transaction characteristics in the node vector corresponding to a single node are extracted through description information at a corresponding historical time point of a corresponding relational network, or extracted through description information within a time interval between the corresponding historical time point and a previous historical time point of the corresponding relational network.

4. The method according to claim 1, wherein in the case that the to-be-predicted entity is a user, the entities in each of the historical relational networks comprise a plurality of users, and further comprise at least one of the following:

an IP identifier or a WIFI identifier for a user device to access a network, and

an application installed on the user device.

5. The method according to claim 1, wherein the neighbor nodes of the first node comprise a second node, and at the current layer, a weight of the second node relative to the first node is: an exponential form-based normalization result of a similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node relative to a sum of similarity levels between the previous layer-updated node vector of the first node and the previous layer-updated node vector of each of the neighbor

nodes.

6. The method according to claim 5, wherein the similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node is determined in the following manner:

concatenating the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node to form a concatenation vector;

performing, through a spatial auxiliary weight matrix, a dimensionality reduction process on the concatenation vector to obtain an intermediate vector having preset dimensions; and

processing, through an auxiliary vector having the preset dimensions, the intermediate vector to obtain the similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node.

7. The method according to claim 1, wherein in the case that the output result is an output vector, the determining, according to the output result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity comprises:

processing the output vector through a fully connected neural network; and

determining, through an obtained processing result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity.

8. The method according to claim 1, wherein in the case that the output result is an output vector, the attribute states or attribute categories of the preset transaction attribute for the to-be-predicted entity further respectively correspond to description vectors, and the determining, according to the output result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity comprises:

determining respective corresponding similarity levels between the output vector and each of the description vectors; and

determining an attribute state or attribute category corresponding to a description vector having the highest similarity level as the attribute state or attribute category of the preset transaction attribute for the to-be-predicted entity during a preset time period.

9. An entity transaction attribute determination apparatus, configured for determining, through a plurality of historical relational networks based on a temporal order, an attribute

state or an attribute category on a preset transaction attribute for a to-be-predicted entity, the apparatus comprising:

a determining unit, configured to obtain a plurality of historical relational networks sequentially arranged in accordance with a temporal order, wherein the historical relational networks respectively correspond to historical time points having a preset time interval; each of the relational networks comprises a plurality of nodes, each of the nodes corresponds to a plurality of entities comprising the to-be-predicted entity, each of the historical relational networks is configured to describe association relationships between a plurality of entities which correspond to a corresponding historical time point, the entities having an association relationship are connected by a connecting edge therebetween, and each of the nodes corresponds to a node vector composed of transaction characteristics extracted based on description information of the corresponding entities;

a fusion unit, configured to determine, for each of the relational networks and through vector fusion of neighbor nodes, a plurality of expression vectors of the to-be-predicted entity;

a time-series data processing unit, configured to process, through a pre-trained time-series neural network, the expression vectors to obtain an output result; and

a prediction unit, configured to determine, according to the output result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity,

wherein the historical relational networks comprise a first relational network, the to-be-predicted entity corresponds to a first node in the first relational network, and the fusion unit is further configured to:

process the relational network through a multilayer graph neural network, the multilayer graph neural network updates, after processing of a current layer is done, the node vector of the first node based on the following result: a weighted result from a product of the previous layer-updated node vector of each neighbor node and an auxiliary weight matrix; and

use the node vector of the first node updated by the last layer of the graph neural network as a first expression vector of the first node corresponding to the first relational network.

10. The apparatus according to claim 9, wherein the transaction characteristics in the node vector corresponding to a single node are extracted through description information at a corresponding historical time point of a corresponding relational network, or extracted

through description information within a time interval between the corresponding historical time point and a previous historical time point of the corresponding relational network.

11. The apparatus according to claim 9, wherein in the case that the to-be-predicted entity is a user, the entities in each of the historical relational networks comprise a plurality of users, and further comprise at least one of the following:

an IP identifier or a WIFI identifier for a user device to access a network, and

an application installed on the user device.

12. The apparatus according to claim 9, wherein the neighbor nodes of the first node comprise a second node, and at the current layer, the fusion unit is further configured to determine the following result as a weight of the second node relative to the first node:

an exponential form-based normalization result of a similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node relative to a sum of similarity levels between the previous layer-updated node vector of the first node and the previous layer-updated node vector of each of the neighbor nodes.

13. The apparatus according to claim 12, wherein the fusion unit is configured to determine the similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node in the following manner:

concatenating the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node to form a concatenation vector;

performing, through a spatial auxiliary weight matrix, a dimensionality reduction process on the concatenation vector to obtain an intermediate vector having preset dimensions; and

processing, through an auxiliary vector having the preset dimensions, the intermediate vector to obtain the similarity level between the previous layer-updated node vector of the first node and the previous layer-updated node vector of the second node.

14. The apparatus according to claim 9, wherein the prediction unit is further configured to:

process the output vector through a fully connected neural network; and

determine, through an obtained processing result, the attribute state or the attribute category of the preset transaction attribute for the to-be-predicted entity.

15. The apparatus according to claim 9, wherein in the case that the output result is an output vector, the attribute states or attribute categories of the preset transaction attribute for the to-be-predicted entity further respectively correspond to description vectors, and the prediction unit is further configured to:

determine respective corresponding similarity levels between the output vector and each of the description vectors; and

determine an attribute state or attribute category corresponding to a description vector having the highest similarity level as the attribute state or attribute category of the preset transaction attribute for the to-be-predicted entity during a preset time period.

16. A computer-readable storage medium having a computer program stored thereon, and when the computer program is executed in a computer, the computer is caused to execute the method of any one of claims 1-8.

17. A computing device, comprising a memory and a processor, wherein executable code is stored in the memory, and when executing the executable code, the processor implements the method of any one of claims 1-8.