WHAT IS CLAIMED IS:

1. A method performed by a computer system, the method comprising:

obtaining input data comprising quantitative data and categorical data, wherein the categorical data corresponds to a plurality of categories;

determining one or more quantitative embeddings for the quantitative data;

determining a plurality of categorical embeddings for the plurality of categories using a plurality of embedding layers;

determining a combined embedding based on the one or more quantitative embeddings and the plurality of categorical embeddings; and

generating a prediction based on the combined embedding for the input data.

2. The method of claim 1, further comprising:

prior to determining the plurality of categorical embeddings, identifying categorical data for a category based on a predetermined criteria;

generating one or more additional data graphs based on data derived from the categorical data for the category; and

including the one or more additional data graphs into the categorical data, wherein the data derived from the category is one or more new categories in the plurality of categories.

3. The method of claim 2, wherein the predetermined criteria is that the categorical data for the category includes a sparse graph of data, wherein the category that includes the sparse graph of data is IP address and wherein the data derived from the category includes a first category of classless inter-domain routing and a second category of autonomous system number.

4. The method of claim 2, wherein the predetermined criteria is that the categorical data for the category includes a sparse graph of data, wherein the category that includes the sparse graph of data is telephone number and wherein the data derived from the category includes a first category of country code, a second category of area code, a third category of prefix, and a fourth category of line number.

5. The method of claim 1, wherein the one or more quantitative embeddings are one or more time indexed quantitative embeddings wherein determining the one or more indexed quantitative embeddings comprises:

obtaining time data associated with the quantitative data from a data storage;

combining the quantitative data with time data; and

determining one or more time indexed quantitative embeddings using the combination of the quantitative data with the time data using a machine learning model.

6. The method of claim 5 further comprising:

compressing the one or more time indexed quantitative embeddings into a compressed quantitative embedding.

7. The method of claim 5, wherein the machine learning model is a first machine learning model, wherein combining the quantitative data with time data comprises:

combining the quantitative data with the time data using a second machine learning model, wherein the second machine learning model is a neural network with a periodical activation function.

8. The method of claim 1, wherein determining the combined embedding further comprises:

determining a dot product for each pair of each categorical embedding of the plurality of categorical embeddings and each quantitative embedding of the one or more quantitative embeddings;

combining each dot product to form an interacted embedding; and

generating the combined embedding by concatenating the one or more quantitative embeddings and the interacted embedding.

9. The method of claim 1, wherein determining the combined embedding further comprises:

generating the combined embedding using a transformer, wherein the one or more quantitative embeddings and the plurality of categorical embeddings are inputs to the transformer.

10. The method of claim 1, wherein determining the combined embedding further comprises:

concatenating each categorical embedding of the plurality of categorical embeddings and each quantitative embedding of the one or more quantitative embeddings to form the combined embedding.

11. The method of claim 1, wherein the quantitative data includes a transaction amount and/or an accumulated transaction volume, and wherein the categorical data includes a card type, a device, an email domain, an IP address, a shipping address, and/or a resource provider identifier.

12. The method of claim 1, wherein the prediction is 1) authorized or not authorized, 2) fraudulent or not fraudulent, or 3) accept or do not accept.

13. The method of claim 1, wherein the quantitative data and the categorical data relate to an access request that includes a request for access to a resource between a user of a user device and a resource provider of a resource provider computer.

14. The method of claim 1, wherein the method further comprises:

prior to obtaining the input data, receiving a prediction request message from a client device, wherein the prediction request message comprises a data identifier that identifies the input data;

after generating the prediction, generating a prediction response message comprising the prediction; and

providing the prediction response message to the client device.

15. A system comprising:

one or more processors; and

a computer readable medium storing a plurality of instructions that, when executed, causes the one or more processors to perform the method of any one of the preceding claims.