

WHAT IS CLAIMED IS:

1. A method comprising:

a) receiving, by a server computer, network data comprising a plurality of transaction data for a plurality of transactions, wherein each transaction data comprises a plurality of data elements with data values, wherein at least one of the plurality of data elements comprises a user identifier for a user;

b) generating, by the server computer, one or more graphs comprising a plurality of communities based on the network data;

c) determining, by the server computer, fuzzy values for at least some of the data values for each transaction of the plurality of transactions;

d) for each user, determining, by the server computer, fuzzy values for communities within the plurality of communities; and

e) generating, by the server computer, a model using the fuzzy values obtained in steps c) and d), and at least some of the data values,

wherein determining fuzzy values for at least some of the data values further comprises:

determining, by the server computer, a set of membership functions for each data element corresponding to the at least some of the data values; and

determining, by the server computer, the fuzzy values for the at least some of the data values using the set of membership functions.

2. The method of claim 1 further comprising:

receiving, by the server computer, a request from an evaluation computer, wherein the request comprises request data;

determining, by the server computer, output data output by the model, wherein the request data is input into the model; and

providing, by the server computer, the output data to the evaluation computer.

1 3. The method of claim 1, wherein the data elements include at least
2 one or more of the user identifier, a resource provider identifier, a day of year, a time of
3 day, a location, an IP address, and an amount.

1 4. The method of claim 3, wherein the data elements include the time
2 of day, wherein the fuzzy values for communities are fuzzy community values, and
3 wherein the fuzzy values for at least some of the data values corresponding to the time
4 of day are fuzzy event values.

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1 5. The method of claim 4 further comprising:
2 creating, by the server computer, a data table comprising at least the
3 fuzzy event values and the fuzzy community values.

1 6. ~~The method of claim 5~~ A method comprising:
2 a) receiving, by a server computer, network data comprising a plurality of
3 transaction data for a plurality of transactions, wherein each transaction data comprises
4 a plurality of data elements with data values, wherein at least one of the plurality of data
5 elements comprises a user identifier for a user;
6 b) generating, by the server computer, one or more graphs comprising a
7 plurality of communities based on the network data;
8 c) determining, by the server computer, fuzzy values for at least some of
9 the data values for each transaction of the plurality of transactions;
10 d) for each user, determining, by the server computer, fuzzy values for
11 communities within the plurality of communities; and
12 e) generating, by the server computer, a model using the fuzzy values
13 obtained in steps c) and d), and at least some of the data values,
14 wherein the data elements include at least one or more of the user
15 identifier, a resource provider identifier, a day of year, a time of day, a location, an IP
16 address, and an amount; and
17 wherein the data elements include the time of day, wherein the fuzzy
18 values for communities are fuzzy community values, and wherein the fuzzy values for at
19 least some of the data values corresponding to the time of day are fuzzy event values;
20 wherein the method further comprises:
21 creating, by the server computer, a data table comprising at least the
22 fuzzy event values and the fuzzy community values; and
23 wherein creating the data table further comprises:
24 storing, by the server computer, into the data table the fuzzy event values
25 and the fuzzy community values for each transaction data of the plurality of transaction
26 data; and
27

28 removing, by the server computer, the user identifier of each transaction
29 data of the plurality of transaction data.

1 7. The method of claim 6 further comprising:
2 storing, by the server computer, a subset of the plurality of data elements
3 into the data table.

1 ~~8. The method of claim 1, wherein determining fuzzy values for at~~
2 ~~least some of the data values further comprises:~~
3 ~~determining, by the server computer, a set of membership functions for~~
4 ~~each data element corresponding to the at least some of the data values; and~~
5 ~~determining, by the server computer, the fuzzy values for the at least~~
6 ~~some of the data values using the set of membership functions.~~

1 ~~89.~~ The method of claim 1, wherein the model is one of a support
2 vector machine, an artificial neural network, a decision tree, a Bayesian network, and a
3 genetic algorithm.

1 ~~910.~~ The method of claim 1A method comprising:
2 a) receiving, by a server computer, network data comprising a plurality of
3 transaction data for a plurality of transactions, wherein each transaction data comprises
4 a plurality of data elements with data values, wherein at least one of the plurality of data
5 elements comprises a user identifier for a user;
6 b) generating, by the server computer, one or more graphs comprising a
7 plurality of communities based on the network data;
8 c) determining, by the server computer, fuzzy values for at least some of
9 the data values for each transaction of the plurality of transactions;
10 d) for each user, determining, by the server computer, fuzzy values for
11 communities within the plurality of communities; and
12 e) generating, by the server computer, a model using the fuzzy values
13 obtained in steps c) and d), and at least some of the data values,
14 wherein the server computer is a first server computer, and after
15 generating the model, the method further comprises:

16 transmitting, by the first server computer to ~~the~~ a second server computer,
17 the model, wherein the second server computer determines whether or not external
18 data and the model can be used to identify at least one user.
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1 1011. A server computer comprising:
2 a processor;
3 a memory; and
4 a computer-readable medium coupled to the processor, the computer-
5 readable medium comprising code executable by the processor for implementing a
6 method comprising:
7 a) receiving network data comprising a plurality of transaction data for
8 a plurality of transactions, wherein each transaction data comprises a plurality of data
9 elements with data values, wherein at least one of the plurality of data elements
10 comprises a user identifier for a user;
11 b) generating one or more graphs comprising a plurality of
12 communities based on the network data;
13 c) determining fuzzy values for at least some of the data values for
14 each transaction of the plurality of transactions;
15 d) for each user, determining fuzzy values for communities within the
16 plurality of communities; and
17 e) generating a model using the fuzzy values obtained in steps c) and
18 d), and at least some of the data values;
19 wherein determining fuzzy values for at least some of the data values
20 further comprises:
21 determining, by the server computer, a set of membership functions for
22 each data element corresponding to the at least some of the data values; and
23 determining, by the server computer, the fuzzy values for the at least
24 some of the data values using the set of membership functions.

1 1112. The server computer of claim 1011, wherein the method
2 further comprises:
3 receiving, by the server computer, a request from an evaluation computer,
4 wherein the request comprises request data;
5 determining, by the server computer, output data output by the model,
6 wherein the request data is input into the model; and

7 providing, by the server computer, the output data to the evaluation
8 computer.

1 1213. The server computer of claim 1011, wherein the data elements
2 include at least one of the user identifier, a resource provider identifier, a day of year, a
3 time of day, a location, an IP address, and an amount.

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1 1314. The server computer of claim 1213, wherein the data elements
2 include the time of day, wherein the fuzzy values for communities are fuzzy community
3 values, and wherein the fuzzy values for at least some of the data values corresponding
4 to the time of day are fuzzy event values.

1 1415. The server computer of claim 1314, wherein the method further
2 comprises:
3 creating a data table comprising at least the fuzzy event values and the
4 fuzzy community values.

1 1516. A server computer comprising:
2 a processor;
3 a memory; and
4 a computer-readable medium coupled to the processor, the computer-
5 readable medium comprising code executable by the processor for implementing a
6 method comprising:
7 a) receiving, by a server computer, network data comprising a plurality of
8 transaction data for a plurality of transactions, wherein each transaction data comprises
9 a plurality of data elements with data values, wherein at least one of the plurality of data
10 elements comprises a user identifier for a user;
11 b) generating, by the server computer, one or more graphs comprising a
12 plurality of communities based on the network data;
13 c) determining, by the server computer, fuzzy values for at least some of
14 the data values for each transaction of the plurality of transactions;
15 d) for each user, determining, by the server computer, fuzzy values for
16 communities within the plurality of communities; and
17 e) generating, by the server computer, a model using the fuzzy values
18 obtained in steps c) and d), and at least some of the data values
19 The server computer of
claim 15,

20 wherein the data elements include at least one or more of the user
21 identifier, a resource provider identifier, a day of year, a time of day, a location, an IP
22 address, and an amount;

23 wherein the data elements include the time of day, wherein the fuzzy
24 values for communities are fuzzy community values, and wherein the fuzzy values for at
25 least some of the data values corresponding to the time of day are fuzzy event values;
26 and

27 wherein creating the data table further comprises:
28 storing into the data table the fuzzy event values and the fuzzy community
29 values for each transaction data of the plurality of transaction data; and
30 removing, by the server computer, the user identifier of each transaction
31 data of the plurality of transaction data.

1 1617. The server computer of claim 1516 further comprising:
2 storing a subset of the plurality of data elements into the data table.

1 ~~18. The server computer of claim 11, wherein determining fuzzy values~~
2 ~~for at least some of the data values further comprises:~~
3 ~~determining, by the server computer, a set of membership functions for~~
4 ~~each data element corresponding to the at least some of the data values; and~~
5 ~~determining, by the server computer, the fuzzy values for the at least~~
6 ~~some of the data values using the set of membership functions.~~

7 1719. The server computer of claim 1011, wherein the model is one of a
8 support vector machine, an artificial neural network, a decision tree, a Bayesian
9 network, and a genetic algorithm.

10 1820. A server computer comprising:
11 a processor;
12 a memory; and
13 a computer-readable medium coupled to the processor, the computer-
14 readable medium comprising code executable by the processor for implementing a
15 method comprising:

16 a) receiving, by a server computer, network data comprising a plurality of
17 transaction data for a plurality of transactions, wherein each transaction data comprises
18 a plurality of data elements with data values, wherein at least one of the plurality of data
19 elements comprises a user identifier for a user;
20 b) generating, by the server computer, one or more graphs comprising a
21 plurality of communities based on the network data;
22 c) determining, by the server computer, fuzzy values for at least some of
23 the data values for each transaction of the plurality of transactions;
24 d) for each user, determining, by the server computer, fuzzy values for
25 communities within the plurality of communities; and
26 e) generating, by the server computer, a model using the fuzzy values
27 obtained in steps c) and d), and at least some of the data values.
28 ~~of claim 11,~~ wherein the server computer is a first server computer, and after generating
29 the model, the method further comprises:
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transmitting, by the first server computer to ~~the~~a second server computer, the model, wherein the second server computer determines whether or not external data and the model can be used to identify at least one user.