

CLAIMS

What is claimed is:

1. A computer-implemented method, comprising:
 - determining behavior data of a user, wherein the behavior data describes user activities of the user using a computer network;
 - identifying a particular event chain from the behavior data, wherein the particular event chain includes one or more events of the user activities;
 - determining a risk coefficient of the particular event chain, wherein the risk coefficient expresses the degree of rareness of the particular event chain; and
 - based on the risk coefficient, determining whether the particular event chain represents a risky user behavior.
2. The computer-implemented method of claim 1, wherein identifying the particular event chain from the behavior data comprises:
 - identifying a time period;
 - based on behavior data corresponding to the time period, determining events occurred during the time period; and
 - determining the particular event chain by sorting the determined events in a chronological order.
3. The computer-implemented method of claim 1, wherein the risk coefficient comprises one or more of a short-term risk coefficient, a long-term risk coefficient, or a group risk coefficient.
4. The computer-implemented method of claim 3, wherein determining the short-term risk coefficient comprises:
 - determining a short-term time period associated with the short-term risk coefficient;
 - determining a total number of event chains the user performed in the short-term time period;
 - determining a number of times the user performed the particular event chain in the short-term time period; and

determining the short-term risk coefficient based on the total number of event chains and the number of times the user performed the particular event chain.

5. The computer-implemented method of claim 3, wherein determining the long-term risk coefficient comprises:

determining a long-term time period associated with the long-term risk coefficient;

determining a time length that the user performed the particular event chain during the long-term time period; and

determining the long-term risk coefficient based on the long-term time period and the time length for performing the particular event chain.

6. The computer-implemented method of claim 3, wherein determining the group risk coefficient comprises:

determining a total number of users in a user group associated with the user;

determining a group time period associated with the group risk coefficient;

determining a number of users in the user group that performed the particular event chain in the group time period; and

determining the group risk coefficient based on the total number of users in the user group and the number of users that performed the particular event chain.

7. The computer-implemented method of claim 1, wherein determining whether the particular event chain represents a risky user behavior comprises determining whether the risk coefficient is higher than a threshold.

8. A non-transitory, computer-readable medium storing one or more instructions executable by a computer system to perform operations comprising:

determining behavior data of a user, wherein the behavior data describes user activities of the user using a computer network;

identifying a particular event chain from the behavior data, wherein the particular event chain includes one or more events of the user activities;

determining a risk coefficient of the particular event chain, wherein the risk coefficient expresses the degree of rareness of the particular event chain; and

based on the risk coefficient, determining whether the particular event chain represents a risky user behavior.

9. The non-transitory, computer-readable medium of claim 8, wherein identifying the particular event chain from the behavior data comprises:

identifying a time period;

based on behavior data corresponding to the time period, determining events occurred during the time period; and

determining the particular event chain by sorting the determined events in a chronological order.

10. The non-transitory, computer-readable medium of claim 8, wherein the risk coefficient comprises one or more of a short-term risk coefficient, a long-term risk coefficient, or a group risk coefficient.

11. The non-transitory, computer-readable medium of claim 10, wherein determining the short-term risk coefficient comprises:

determining a short-term time period associated with the short-term risk coefficient;

determining a total number of event chains the user performed in the short-term time period;

determining a number of times the user performed the particular event chain in the short-term time period; and

determining the short-term risk coefficient based on the total number of event chains and the number of times the user performed the particular event chain.

12. The non-transitory, computer-readable medium of claim 10, wherein determining the long-term risk coefficient comprises:

determining a long-term time period associated with the long-term risk coefficient;

determining a time length that the user performed the particular event chain during the long-term time period; and

determining the long-term risk coefficient based on the long-term time period and the time length for performing the particular event chain.

13. The non-transitory, computer-readable medium of claim 10, wherein determining the group risk coefficient comprises:

determining a total number of users in a user group associated with the user;

determining a group time period associated with the group risk coefficient;

determining a number of users in the user group that performed the particular event chain in the group time period; and

determining the group risk coefficient based on the total number of users in the user group and the number of users that performed the particular event chain.

14. The non-transitory, computer-readable medium of claim 8, wherein determining whether the particular event chain represents a risky user behavior comprises determining whether the risk coefficient is higher than a threshold.

15. A computer-implemented system, comprising:

one or more computers; and

one or more computer memory devices interoperably coupled with the one or more computers and having tangible, non-transitory, machine-readable media storing instructions that, when executed by the one or more computers, perform operations comprising:

determining behavior data of a user, wherein the behavior data describes user activities of the user using a computer network;

identifying a particular event chain from the behavior data, wherein the particular event chain includes one or more events of the user activities;

determining a risk coefficient of the particular event chain, wherein the risk coefficient expresses the degree of rareness of the particular event chain; and

based on the risk coefficient, determining whether the particular event chain represents a risky user behavior.

16. The computer-implemented system of claim 15, wherein identifying the particular event chain from the behavior data comprises:

identifying a time period;
based on behavior data corresponding to the time period, determining events occurred during the time period; and
determining the particular event chain by sorting the determined events in a chronological order.

17. The computer-implemented system of claim 15, wherein the risk coefficient comprises one or more of a short-term risk coefficient, a long-term risk coefficient, or a group risk coefficient.

18. The computer-implemented system of claim 17, wherein determining the short-term risk coefficient comprises:

determining a short-term time period associated with the short-term risk coefficient;
determining a total number of event chains the user performed in the short-term time period;
determining a number of times the user performed the particular event chain in the short-term time period; and
determining the short-term risk coefficient based on the total number of event chains and the number of times the user performed the particular event chain.

19. The computer-implemented system of claim 17, wherein determining the long-term risk coefficient comprises:

determining a long-term time period associated with the long-term risk coefficient;
determining a time length that the user performed the particular event chain during the long-term time period; and
determining the long-term risk coefficient based on the long-term time period and the time length for performing the particular event chain.

20. The computer-implemented system of claim 17, wherein determining the group risk coefficient comprises:

determining a total number of users in a user group associated with the user;
determining a group time period associated with the group risk coefficient;

determining a number of users in the user group that performed the particular event chain in the group time period; and

determining the group risk coefficient based on the total number of users in the user group and the number of users that performed the particular event chain.