RISK DETERMINATION METHOD AND APPARATUS, STORAGE MEDIUM, AND ELECTRONIC DEVICE

FIELD OF THE PRESENT DISCLOSURE

[0001] The present disclosure relates to the field of terminal technologies, and in particular, to a risk determination method and apparatus, a storage medium, and an electronic device.

BACKGROUND OF THE PRESENT DISCLOSURE

[0002] With the development of the artificial intelligence field, a near-field environment is usually equipped with a plurality of near-field devices (including, for example, a sweeping robot, a smart camera, and a smart speaker). Near-field devices usually send risk prompt information after detecting a risk event (for example, a user falling down or an unclosed refrigerator door).

[0003] In related technologies, near-field devices cannot accurately determine risk intervention actions.

SUMMARY OF THE PRESENT DISCLOSURE

[0004] To resolve the foregoing technical problem, the present disclosure provides a risk determination method and apparatus, a storage medium, and an electronic device, so that a risk can be accurately perceived based on risk context information, and risk prediction can be performed more accurately to implement risk intervention, thereby improving user safety.

[0005] According to a first aspect of the present disclosure, a risk determination method is provided, including:

[0006] determining a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space;

[0007] determining risk context information based on the risk event, where the risk context information includes at least one of context information of a target object

associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event; and

[0008] determining a risk intervention action based on the risk context information.

[0009] According to a second aspect of the present disclosure, a risk determination apparatus is provided, including:

[0010] a first determining module, configured to determine a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space;

[0011] a second determining module, configured to determine risk context information based on the risk event, where the risk context information includes at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event; and

[0012] a third determining module, configured to determine a risk intervention action based on the risk context information.

[0013] According to a third aspect of the present disclosure, a computer-readable storage medium is provided. The storage medium stores a computer program, which, when executed by a processor, causes the processor to perform the risk determination method provided in the embodiment of the first aspect.

[0014] According to a fourth aspect of the present disclosure, an electronic device is provided, including a processor and a memory configured to store instructions executable by the processor. The processor is configured to read the executable instructions from the memory and execute the instructions to implement the risk determination method provided in the embodiment of the first aspect.

[0015] According to the risk determination method and apparatus, the storage medium, and the electronic device provided in embodiments of the present disclosure, a risk event in a to-be-detected risk space is determined based on an image of the to-be-detected risk space, and risk context information is determined based on the risk event. In this

way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, a risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. 1 is a schematic diagram of a near-field device system according to an exemplary embodiment of the present disclosure;

[0017] FIG. 2 is a software architecture diagram of a near-field device system according to an exemplary embodiment of the present disclosure;

[0018] FIG. 3 is a schematic flowchart of a risk determination method according to an exemplary embodiment of the present disclosure;

[0019] FIG. 4 is a schematic flowchart of step S300 according to an exemplary embodiment of the present disclosure;

[0020] FIG. 5 is a schematic flowchart of step S310 according to an exemplary embodiment of the present disclosure;

[0021] FIG. 6 is a schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure;

[0022] FIG. 7 is a schematic flowchart of step S3111 according to an exemplary embodiment of the present disclosure;

[0023] FIG. 8 is another schematic flowchart of step S310 according to an exemplary embodiment of the present disclosure;

[0024] FIG. 9 is another schematic flowchart of a risk determination method according to an exemplary embodiment of the present disclosure;

[0025] FIG. 10 is another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure;

[0026] FIG. 11 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure;

[0027] FIG. 12 is still another schematic flowchart of step S311 according to an

exemplary embodiment of the present disclosure;

[0028] FIG. 13 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure;

[0029] FIG. 14 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure;

[0030] FIG. 15 is a schematic structural diagram of a risk determination apparatus according to an exemplary embodiment of the present disclosure;

[0031] FIG. 16 is another schematic structural diagram of a risk determination apparatus according to an exemplary embodiment of the present disclosure; and

[0032] FIG. 17 is a structural diagram of an electronic device according to an embodiment of the present disclosure.

DESCRIPTION OF THE EMBODIMENTS

[0033] To explain the present disclosure, exemplary embodiments of the present disclosure are described below in detail with reference to the accompanying drawings. It is clear that the described embodiments are merely a part of rather than all embodiments of the present disclosure. It should be understood that the present disclosure is not limited by the exemplary embodiments.

[0034] It should be noted that unless otherwise stated specifically, relative arrangement of components and steps, numerical expressions, and numerical values set forth in these embodiments do not limit the scope of the present disclosure.

[0035] Application overview

[0036] Near-field devices refer to terminal devices deployed in a near-field environment (for example, a home or an office) and having a sensing, moving, or interaction capability. Such devices are usually located in a local area network or an ecological system, and can exchange data and cooperatively work with each other.

[0037] Near-field devices in a home scenario are used as an example for description. The near-field devices in the home scenario usually include a sweeping robot, a smart camera, a smart speaker, a smart door lock, a millimeter-wave radar, a smart light, an environmental sensor, a pan-tilt device, a home robot, and the like.

[0038] In the home scenario, the near-field devices (for example, the smart camera) usually send risk prompt information (for example, an alarm) after detecting a risk event (for example, a user falling down, an unclosed refrigerator door, smoke in the kitchen, or a user staying stationary for a long time). In this way, the near-field devices cannot actively sense risks.

[0039] That is, in the near-field environment, there exists a problem that the near-field devices cannot actively sense risks to avoid the risks. Moreover, the near-field devices cannot actively perform risk intervention.

[0040] To resolve the foregoing problem, the present disclosure provides a risk determination method and apparatus, a storage medium, and an electronic device. According to the method, in a near-field device system, a risk event in a to-be-detected risk space is determined based on an image of the to-be-detected risk space, and risk context information is determined based on the risk event. In this way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, a risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

[0041] Exemplary system

[0042] FIG. 1 is a schematic diagram of a near-field device system according to an exemplary embodiment of the present disclosure.

[0043] As shown in FIG. 1, in some embodiments, the risk determination method may be applied to the near-field device system 100, and the near-field device system 100 includes at least one near-field device.

[0044] For ease of describing embodiments of the present disclosure, the following embodiments of the present disclosure are described by using an example that the near-field device system 100 includes a first device 110, a second device 120, and a third device 130.

[0045] The first device 110 may be configured as a master device, and the second device 120 and the third device 130 may be configured as slave devices.

[0046] For example, when serving as a master device, the first device 110 may be

configured to schedule near-field devices in the near-field device system 100. The first device 110 is, for example, a home gateway.

[0047] The second device 120 may be a slave device at a fixed position, which is configured to continuously acquire surveillance data in a near-field environment for risk determination. The second device 120 is, for example, a smart camera.

[0048] The third device 130 may be a mobile slave device, which is configured to acquire surveillance data from a supplementary angle of view to the second device 120 for further risk determination. The third device 130 is, for example, a sweeping robot.

[0049] The first device 110, the second device 120, and the third device 130 may be communicatively connected to cooperatively work with each other.

[0050] In an implementation, the second device 120 is configured to: acquire an image of a to-be-detected risk space, and send the image of the to-be-detected risk space to the first device 110.

[0051] The first device 110 is configured to: determine a risk event in the to-be-detected risk space based on the received image of the to-be-detected risk space.

[0052] The first device 110 is further configured to: determine risk context information based on the risk event, where the risk context information includes at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event.

[0053] The first device 110 is further configured to: determine a risk intervention action based on the risk context information.

[0054] The first device 110 is further configured to: control the third device 130 to execute the risk intervention action.

[0055] Alternatively, the first device 110 may execute the risk intervention action. A specific execution subject of the risk intervention action may be determined based on an action type thereof. A specific execution manner of the risk intervention action is not limited in this embodiment of the present disclosure.

[0056] It should be noted herein that the near-field device system 100 includes, but is

not limited to, the first device 110, the second device 120, and the third device 130. The near-field device system 100 may include more or fewer near-field devices. For example, the near-field device system 100 may further include a smart speaker, a smart door lock, a millimeter-wave radar, a smart light, an environmental sensor, a pan-tilt device, or a home robot. The numbers and types of near-field devices in the near-field device system 100, master-slave relationships between near-field devices, and specific configuration manners of the near-field devices are not limited in this embodiment of the present disclosure.

[0057] In the process of implementing the risk determination method based on the near-field device system 100 in this embodiment of the present disclosure, instead of simply adding a new detection algorithm to any near-field device, a plurality of near-field devices are cooperatively scheduled to form an active sensing network, so that the near-field device system 100 is not limited to risk detection, but forms a closed-loop solution of risk evolution analysis, active sensing enhancement, and active patrol.

[0058] In the near-field device system 100 in this embodiment of the present disclosure, when the second device 120 acquires the image of the to-be-detected risk space and sends the image of the to-be-detected risk space to the first device 110, the first device 110 analyzes the image of the to-be-detected risk space to determine the risk event in the to-be-detected risk space, and determines, based on the risk event, the risk context information including at least one of the context information of the target object associated with the risk event, the context information of the risk area in which the risk event occurs, the context information of the time at which the risk event occurs, the context information of the change trend of the risk event, and the context information of the environment of the risk event. In this way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, the risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

[0059] FIG. 2 is a software architecture diagram of a near-field device system according to an exemplary embodiment of the present disclosure.

[0060] As shown in FIG. 2, in some embodiments, a software architecture of the near-field device system 100 may include a risk semantic space module 101, a behavior trend modeling module 102, a risk evolution inference module 103, an active sensing enhancement module 104, and a graded active intervention module 105.

[0061] The risk semantic space module 101, the behavior trend modeling module 102, the risk evolution inference module 103, the active sensing enhancement module 104, and the graded active intervention module 105 may be configured on the same near-field device or different near-field devices.

[0062] This embodiment of the present disclosure is described only by using an example that the risk semantic space module 101, the behavior trend modeling module 102, the risk evolution inference module 103, the active sensing enhancement module 104, and the graded active intervention module 105 may be configured on the same near-field device (for example, the first device 110).

[0063] The risk semantic space module 101 may be configured to construct spatial relationships, including, for example, a risk area, a visible area, an occlusion relationship, a dynamic visual field, and a device spatial relationship.

[0064] The risk area refers to a specific pre-defined or dynamically-identified geographical range or spatial entity with potential safety hazards in the near-field environment. The visible area refers to a physical spatial range in the near-field environment that can be observed by a near-field device at a specific moment and a specific position without occlusion. The occlusion relationship refers to a line-of-sight blockage state in the near-field environment that is formed by a foreground object (for example, furniture or walls) in space blocking a background target object or a specific risk area from a specific angle of view. The dynamic visual field refers to a dynamic space set of a near-field device having a moving capability or a pan-tilt adjustment capability, whose visible area is updated in real time with changes of time, position, and orientation during movement or posture adjustment. The device spatial relationship refers to relative positions, distances, topological structures, and orientation relationships between near-field devices inside the near-field device system, and between the near-field environment (for example, walls, furniture, or risk areas) and the near-field devices.

[0065] The risk semantic space module 101 may further construct other types of spatial relationships, which are not limited in this embodiment of the present disclosure.

[0066] The behavior trend modeling module 102 may be configured to analyze a user behavior trend, for example, behavior continuity, a behavior deviation degree, a behavior chain, a moving trend, and a risk precursor of a user.

[0067] In some possible implementations, the behavior trend modeling module 102 may be configured to generate behavior chain data.

[0068] The behavior chain data is a structured data set formed by connecting a series of interrelated actions, reactions, positions, and state changes of a target object (for example, an older person, a child, or a pet) within a specific time window in chronological order based on time-sequential behavior change data and environment change data, and reflects a complete trajectory and logical association of behavior evolution of the target object. For example, the behavior chain data includes risk chain data of the older person falling down (that is, a series of data such as the older person getting up, walking unstably, and walking while holding onto a wall), behavior chain data of the child engaging in danger (that is, a series of data such as the child entering a kitchen, approaching a knife area, and stretching a hand), and risk chain data of overturning by the pet (that is, a series of data such as the pet approaching a table, there being a water cup on the table, and the pet jumping).

[0069] The risk evolution inference module 103 may be configured to generate risk evolution process information, including, for example, risk trend information, risk level information, and risk uncertainty information.

[0070] In some possible implementations, the risk evolution inference module 103 may further generate a risk diffusion path. The risk diffusion path refers to a trajectory along which a risk spreads outward from an initial area, following movement of the target object (for example, the pet). For example, when the near-field device system detects pollution in a cat litter area and the pet is moving, the system may overlay pollution source markers onto a moving trajectory of the pet, predict that the pollution will spread outward along a moving path of the pet, and generate a risk diffusion path.

[0071] The active sensing enhancement module 104 may be configured to actively

sense risks, for example, actively identifying a sensing blind area, generating an observation requirement, scheduling a mobile device, and acquiring a supplementary angle of view.

[0072] The graded active intervention module 105 may be configured to control near-field devices to dynamically execute risk intervention actions, for example, a voice alert action, a video verification action, a robot approaching action, a contact notification action, and an emergency call action.

[0073] Modules such as the risk semantic space module 101, the behavior trend modeling module 102, the risk evolution inference module 103, the active sensing enhancement module 104, and the graded active intervention module 105 cooperatively work with each other to implement the risk determination method.

[0074] Steps of the risk determination method in subsequent embodiments of the present disclosure correspond to functions of the modules, and specific implementations of the modules may be adaptively derived based on the subsequent embodiments, which are not described in detail in this embodiment of the present disclosure.

[0075] In the near-field device system 100 in this embodiment of the present disclosure, through cooperative work among the risk semantic space module 101, the behavior trend modeling module 102, the risk evolution inference module 103, the active sensing enhancement module 104, and the graded active intervention module 105, a risk event in a to-be-detected risk space can be determined based on an image of the to-be-detected risk space, and risk context information can be determined based on the risk event. In this way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, a risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

[0076] Exemplary method

[0077] FIG. 3 is a schematic flowchart of a risk determination method according to an exemplary embodiment of the present disclosure.

[0078] This embodiment may be applied to a near-field device system, and the near-

field device system may include at least one near-field device. The risk determination method provided in this embodiment of the present disclosure may be performed by a master device (for example, a home gateway or a control device of a smart home system) in the near-field device system, any near-field device having a computing capability in the near-field device system, or a cloud server communicatively connected to the near-field device system, which is not limited in this embodiment of the present disclosure. As shown in FIG. 3, in some embodiments, the method includes steps S100 to S300.

[0079] Step S100: Determining a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space.

[0080] The to-be-detected risk space refers to a physical spatial area covered by the near-field device system and requiring risk monitoring and assessment. Near-field devices are deployed in the to-be-detected risk space, and the near-field device system identifies, by acquiring images or other sensing data in the to-be-detected risk space, risk events occurring in the to-be-detected risk space.

[0081] In this embodiment of the present disclosure, the to-be-detected risk space may be a near-field environment, for example, an indoor near-field environment, which may be specifically a home environment.

[0082] The following embodiments of the present disclosure are all described by using the home environment as an example. A specific space type of the to-be-detected risk space is not limited in this embodiment of the present disclosure.

[0083] The risk event refers to a dynamic process within a specific time and space range, where a behavior state of a target object, an environment state, or an object state deviates from a preset safety threshold or a normal mode, and tends to evolve into danger (for example, injury or accidents).

[0084] For example, the risk event includes a child approaching a kitchen, an older person staying in a bathroom for a long time, a pet approaching a table, or presence of liquid on the floor.

[0085] An event type of the risk event is not limited in this embodiment of the present disclosure.

[0086] In the implementation of this step, the near-field device system can acquire the

risk event to analyze risk context information based on the risk event.

[0087] Step S200: Determining risk context information based on the risk event, where the risk context information includes at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event.

[0088] The risk context information refers to a multi-dimensional dynamic information set associated with the risk event.

[0089] In the implementation of this step, the near-field device system obtains the risk context information by analyzing the risk event, so that the risk context information can be introduced into a risk assessment system, and a risk intervention means can be dynamically adjusted in a subsequent process, thereby improving effectiveness of risk intervention.

[0090] Step S300: Determining a risk intervention action based on the risk context information.

[0091] The risk intervention action refers to an operation for avoiding risks.

[0092] In the implementation of this step, the near-field device system performs risk assessment by introducing the risk context information, to perform accurate risk prediction and implement accurate matches and differentiated responses for risk actions, thereby improving effectiveness of a risk intervention process.

[0093] According to the technical solution shown in this embodiment of the present disclosure, a risk event in a to-be-detected risk space is determined based on an image of the to-be-detected risk space, and risk context information is determined based on the risk event. In this way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, a risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

[0094] FIG. 4 is a schematic flowchart of step S300 according to an exemplary

embodiment of the present disclosure.

[0095] As shown in FIG. 4, in some embodiments, step S300 of determining a risk intervention action based on the risk context information includes steps S310 and S320.

[0096] Step S310: Determining risk intervention policy information based on the risk context information.

[0097] The risk intervention policy information is used to indicate a risk intervention action to be executed by the near-field device system.

[0098] For example, the risk intervention policy information includes at least one of a voice alert intervention policy, a light alert intervention policy, a robot approaching alert intervention policy, a family member notification intervention policy, and a device control intervention policy (for example, turning off the gas).

[0099] In an implementation, the risk intervention policy information may be divided into different levels based on different policy types.

[00100] For example, the risk intervention policy information includes first-level intervention policy information, second-level intervention policy information, and third-level intervention policy information.

[00101] The first-level intervention policy information includes the voice alert intervention policy and the light alert intervention policy.

[00102] The second-level intervention policy information includes the robot approaching alert intervention policy, the family member notification intervention policy, and the device control intervention policy (for example, controlling a device to perform video verification).

[00103] The third-level intervention policy information includes the device control intervention policy (including, for example, controlling a device to make an emergency call, controlling a device to automatically cut off power, and controlling a device to perform external interaction).

[00104] The division of different levels of risk intervention policy information can facilitate graded responses to risks, avoiding a problem of excessive risk intervention or insufficient risk intervention.

[00105] A specific policy type of the risk intervention policy information is not limited in this embodiment of the present disclosure.

[00106] The near-field device system may determine matched risk intervention policy information based on the risk context information. The risk context information and the risk intervention policy information may be matched in a plurality of manners.

[00107] In an implementation, the near-field device system may map the risk context information to a risk level, to determine the risk intervention policy information based on the risk level.

[00108] This implementation is described in a subsequent embodiment of the present disclosure, and is not described in detail herein.

[00109] In another implementation, the near-field device system may generate an identity profile (including, for example, an age, a health status, behavior habits, and historical risk records) based on the context information of the target object in the risk context information, to determine the risk intervention policy information based on the identity profile.

[00110] For example, when the identity profile is a profile of a child, a policy featuring gentle guidance and guardian notification, for example, the voice alert intervention policy or the family member notification intervention policy, is used as the risk intervention policy information.

[00111] When the identity profile is a profile of an older person, intense unpleasant sound or light needs to be avoided, and a policy featuring soft voice and automatically contacting a family member, for example, the light alert intervention policy and the family member notification intervention policyy, is used as the risk intervention policy information.

[00112] When the identity profile is a profile of a pet, a policy featuring expelling by sound or light and physical obstruction, for example, the voice alert intervention policy, the light alert intervention policy, and the robot approaching alert intervention policy, is used as the risk intervention policy information.

[00113] It should be noted herein that besides matching with risk intervention policy information based on risk levels and identity profiles, there may be more matching manners available to the risk context information, for example, matching with risk intervention policy information based on scene information (for example, a daytime

scene or a night scene). A specific matching manner between the risk context information and the risk intervention policy information is not limited in this embodiment of the present disclosure.

[00114] In the implementation of this step, the near-field device system can determine, based on the risk context information, risk intervention policy information meeting user requirements, to subsequently execute a risk intervention action meeting user requirements, thereby improving user safety.

[00115] Step S320: Determining the risk intervention action based on the risk intervention policy information.

[00116] In an implementation, the near-field device system selects, based on a policy type of the risk intervention policy information, an appropriate near-field device to execute the risk intervention action.

[00117] For example, when the risk intervention policy information is the voice alert intervention policy, the near-field device system invokes the first device 110 (for example, a gateway having a voice function) shown in FIG. 1 to execute the risk intervention action (for example, issuing a voice alert).

[00118] For example, when the risk intervention policy information is the robot approaching alert intervention policy, the near-field device system invokes the third device 130 (for example, a sweeping robot) shown in FIG. 1 to execute the risk intervention action.

[00119] In the implementation of this step, the near-field device system can cooperatively schedule a plurality of near-field devices, and dynamically select a near-field device with the best matched capability from the near-field device system to execute the risk intervention action, thereby improving a risk intervention effect.

[00120] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system first determines the risk intervention policy information based on the risk context information, and then determines the risk intervention action based on the risk intervention policy information, decoupling policy formulation from action execution. In this way, the near-field device system can have better adaptability and expandability for different types of near-field devices.

[00121] FIG. 5 is a schematic flowchart of step S310 according to an exemplary embodiment of the present disclosure.

[00122] As shown in FIG. 5, in some embodiments, step S310 of determining risk intervention policy information based on the risk context information includes steps S311 and S312.

[00123] Step S311: Determining a risk level based on the risk context information.

[00124] In an implementation, the near-field device system may obtain a risk growth rate, a risk duration, and sensing credibility through analysis based on the risk context information, and then determine the risk level based on the risk growth rate, the risk duration, and the sensing credibility.

[00125] In this way, the near-field device system can dynamically adjust the risk level based on changes of the risk context information.

[00126] The near-field device system may determine the risk level based on risk context information in a plurality of different dimensions. The risk level in different division manners may include a low risk, a medium risk, or a high risk, or may include a first-level risk, a second-level risk, a third-level risk, or more levels of risks. A division manner of the risk level is not limited in this embodiment of the present disclosure.

[00127] In the implementation of this step, the near-field device system can dynamically adjust the risk level based on risk context information in a plurality of different dimensions, to predict a risk more accurately.

[00128] Step S312: Determining the risk intervention policy information based on the risk level.

[00129] In an implementation, the near-field device system determines the risk intervention policy information based on at least one of the risk level, a risk evolution trend, risk credibility, and a home environment state.

[00130] It should be noted herein that in the foregoing embodiments, in the process in which the near-field device system determines the risk event in the to-be-detected risk space based on the image of the to-be-detected risk space, the near-field device system may first determine to-be-detected risk information based on the image of the to-be-detected risk space, and then determine the risk event based on the to-be-detected risk

information.

[00131] The to-be-detected risk information is a risk data set determined by the near-field device system based on the image. The to-be-detected risk information indicates risk data in a plurality of different dimensions, including, for example, a behavior risk, risk confidence, and a risk evolution trend that are associated with a target object in the image and a risk area in the image.

[00132] The behavior risk refers to a risk (for example, a fall-down risk) contained in movement (for example, walking unstably) of the target object (for example, an older person, a child, or a pet).

[00133] The risk confidence is used to measure a certainty degree of the risk determined based on the image.

[00134] The risk evolution trend is used to predict, by analyzing a behavior chain of the target object, a probability change of the risk occurring within a future period of time.

[00135] The home environment state may be determined based on the risk context information.

[00136] In this way, the near-field device system determines the risk intervention policy information based on the risk level in combination with data in a plurality of dimensions, which further improves effectiveness of the risk intervention policy information.

[00137] The process of determining the risk intervention policy information based on the risk level is described below by using an example that risk levels are divided into a low risk, a medium risk, and a high risk.

[00138] For example, when the risk level is the low risk (for example, the child briefly approaching the kitchen door), the near-field device system determines to use the first-level intervention policy information as the risk intervention policy information, which may include the voice alert intervention policy (specifically, for example, a mild voice alert intervention policy) and the light alert intervention policy (specifically, for example, a light flickering alert intervention policy).

[00139] When the risk level is the medium risk (for example, the older person walking unstably and the floor being wet and slippery), the near-field device system determines to use the first-level intervention policy information and/or the second-level intervention

policy information as the risk intervention policy information, which may include the voice alert intervention policy (specifically, for example, an intense voice alert intervention policy), the light alert intervention policy (specifically, for example, an automatic light-on intervention policy), and the family member notification intervention policy (specifically, for example, an intervention policy of sending a notification to an application of a family member).

[00140] When the risk level is the high risk (for example, the older person falling down and staying stationary for a long time), the near-field device system determines to use the second-level intervention policy information and/or the third-level intervention policy information as the risk intervention policy information, which may include the robot approaching alert intervention policy (specifically, for example, an intervention policy of moving a robot to the vicinity of the fall-down area for verification), the family member notification intervention policy (specifically, for example, an intervention policy of making an emergency call to a family member), and the device control intervention policy (specifically, for example, an intervention policy of controlling a device to call an emergency number).

[00141] In the implementation of this step, the near-field device system determines appropriate risk intervention policy information based on the risk level, to respond in a graded manner based on the risk intervention policy information and dynamically adapt, thereby improving effectiveness of the risk intervention policy information.

[00142] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system first determines the risk level based on the risk context information, and then determines the risk intervention policy information based on the risk level, so that policy information is set in a graded manner. In this way, a non-disturbing policy can be used for a low risk level, and a mandatory intervention policy can be used for a high risk level, preventing a decline of user experience caused by frequent false alarms or excessive warnings.

[00143] FIG. 6 is a schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00144] As shown in FIG. 6, in some embodiments, step S311 of determining a risk level

based on the risk context information includes step S3111.

[00145] Step S3111: Determining an updated risk level based on the risk context information, a risk type of the risk event, a behavior state of the target object associated with the risk event, and historical risk information.

[00146] In the implementation of this step, the near-field device system dynamically adjusts the risk level based on data in a plurality of dimensions such as the risk context information, the risk type of the risk event, the behavior state of the target object associated with the risk event, and the historical risk information. This facilitates subsequent dynamic adaptation of the risk intervention policy information, thereby improving effectiveness of risk intervention.

[00147] FIG. 7 is a schematic flowchart of step S3111 according to an exemplary embodiment of the present disclosure.

[00148] As shown in FIG. 7, in some embodiments, step S3111 of determining an updated risk level based on the risk context information, a risk type of the risk event, a behavior state of the target object associated with the risk event, and historical risk information includes steps S3111a to S3111c.

[00149] Step S3111a: Determining a target score of the risk event based on a matching relationship between the risk event and a preset risk event by using a mapping relationship between the preset risk event and a preset score.

[00150] In an implementation, a basic risk scoring relationship table may be set in the near-field device system. The basic risk scoring relationship table is used to indicate a mapping relationship between preset risk events and preset scores.

[00151] For example, a preset risk event of approaching a table corresponds to a preset score of 20. A preset risk event of approaching a knife corresponds to a preset score of 60. A preset risk event of an older person falling to the floor corresponds to a preset score of 90.

[00152] When the risk event is approaching a knife, the risk event matches the preset risk event of approaching a knife. In this case, based on the preset score of 60 corresponding to the preset risk event of approaching a knife, the target score of the risk event is 60.

[00153] In the implementation of this step, the near-field device system may first determine a basic target score of the risk event to quantify a risk degree of the risk event.

[00154] Step S3111b: Determining a gain score of the target score based on the risk context information.

[00155] For example, when the risk event is a child staying in a kitchen area at night, the near-field device system acquires the following information: the context information of the target object associated with the risk event includes a child aged 5 to 7 years old approaching a kitchen alone; the context information of the risk area in which the risk event occurs includes the kitchen area; the context information of the time at which the risk event occurs includes 2:30 a.m.; the context information of the change trend of the risk event includes continuously approaching the kitchen; and the context information of the environment of the risk event includes a night environment. In this case, the near-field device system may obtain the gain score based on all or a part of the context information. For example, the night environment corresponds to a gain score of 20, and alone corresponds to a gain score of 15.

[00156] For example, when the risk event is an older person staying in a bathroom, the near-field device system acquires the following information: the context information of the target object associated with the risk event includes an older person aged 78 to 80 years old walking unstably alone; the context information of the risk area in which the risk event occurs includes a bathroom area; the context information of the time at which the risk event occurs includes 8:30 a.m.; the context information of the change trend of the risk event includes staying in the bathroom for a long time; and the context information of the environment of the risk event includes the floor being wet and slippery. In this case, the near-field device system may obtain the gain score based on all or a part of the context information. For example, the wet slippery floor corresponds to a gain score of 20, and the walking unstably corresponds to a gain score of 15.

[00157] In the implementation of this step, the near-field device system may determine the gain score of the target score to quantify the risk degree of the risk event more accurately.

[00158] Step S3111c: Determining the updated risk level based on a risk score obtained

based on the target score and the gain score, the risk type of the risk event, the behavior state of the target object associated with the risk event, and the historical risk information.

[00159] Further, based on the foregoing example, when the risk event is the child staying in the kitchen area at night, the risk score obtained by the near-field device system is a sum of the target score of 60 for the event of approaching a knife, the gain score of 20 corresponding to the night environment, and the gain score of 15 corresponding to alone, that is, 95.

[00160] In this way, the near-field device system can dynamically adjust the risk level based on the risk score in combination with data such as the risk type of the risk event, the behavior state of the target object associated with the risk event, and the historical risk information.

[00161] In an implementation, the near-field device system may dynamically adjust the risk level based on the risk score in combination with a gain of the risk evolution trend.

[00162] For example, if the risk evolution trend is risk rising caused by a child continuously approaching a dangerous area, the near-field device system may dynamically raise the risk level based on the risk score in combination with the risk evolution trend gain of risk rising.

[00163] In an implementation, when the near-field device system determines that a risk is eliminated, the near-field device system may dynamically lower the risk level.

[00164] In the implementation of this step, the near-field device system can dynamically adjust the risk level, which facilitates subsequent dynamic adaptation of the risk intervention policy information, thereby improving effectiveness of risk intervention.

[00165] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system quantifies the risk degree based on the risk score, and determines the risk level in combination with a plurality of factors such as the behavior state and the historical risk information, thereby significantly improving accuracy of the determined risk level.

[00166] FIG. 8 is another schematic flowchart of step S310 according to an exemplary embodiment of the present disclosure.

[00167] As shown in FIG. 8, in some embodiments, step S310 of determining risk

intervention policy information based on the risk context information includes step S313.

[00168] Step S313: Determining the risk intervention policy information based on a matching relationship between the risk context information and preset risk context information in a preset risk intervention policy information library by using a mapping relationship between the preset risk context information and preset risk intervention policy information in the preset risk intervention policy information library.

[00169] The preset risk intervention policy information library stores at least one piece of preset risk intervention policy information, and the preset risk intervention policy information includes, for example, at least one of the voice alert intervention policy, the light alert intervention policy, the robot approaching alert intervention policy, the family member notification intervention policy, and the device control intervention policy (for example, turning off the gas).

[00170] Specific types of intervention policies in the preset risk intervention policy information library are not limited in this embodiment of the present disclosure.

[00171] A matching process between the risk context information and the risk intervention policy information is described below by using examples.

[00172] For example, when determining, based on the risk context information, that a pet is approaching a table, the near-field device system executes the first-level intervention policy information (that is, mild intervention policy information), which is specifically the mild voice alert intervention policy, for example, issuing a mild voice alert of "do not jump onto the table".

[00173] For example, when determining, based on the risk context information, that a child is approaching a kitchen, the near-field device system executes the first-level intervention policy information and/or the second-level intervention policy information (that is, medium intervention policy information), which is specifically the voice alert intervention policy, the family member notification intervention policy, and the device control intervention policy (for example, turning on the light).

[00174] For example, when determining, based on the risk context information, that an older person has fallen to the floor for a long time, the near-field device system executes the second-level intervention policy information and/or the third-level intervention policy

information (that is, severe intervention policy information), which is specifically the device control intervention policy (including, for example, controlling a device to make an emergency call, controlling a device to automatically cut off power, and controlling a device to perform external interaction).

[00175] For example, when different target objects are determined based on the risk context information, the near-field device system executes personalized intervention policy information. For example, for the older person who responds poorly to voice alerts, the near-field device system executes the third-level intervention policy information, which is specifically the device control intervention policy (including, for example, controlling a device to make an emergency call).

[00176] In the implementation of this step, the near-field device system can determine, based on the risk context information, risk intervention policy information meeting user requirements, to subsequently execute a risk intervention action meeting user requirements, thereby improving user safety.

[00177] FIG. 9 is another schematic flowchart of a risk determination method according to an exemplary embodiment of the present disclosure.

[00178] As shown in FIG. 9, in some embodiments, after step S300 of determining a risk intervention action based on the risk context information, the method further includes step S400.

[00179] Step S400: Updating the mapping relationship between the preset risk context information and the preset risk intervention policy information in the preset risk intervention policy information library based on an intervention type, an intervention result, a response time, and a failure count of the risk intervention action.

[00180] The near-field device system can learn an effective intervention path based on information in a plurality of dimensions such as the intervention type, the intervention result, the response time, and the failure count of the risk intervention action, and update the mapping relationship between the preset risk context information and the preset risk intervention policy information in the preset risk intervention policy information library based on the effective intervention path.

[00181] The intervention type includes, for example, a voice alert. The intervention result

includes, for example, the child moving away from the dangerous area. The response time is, for example, 4.2 seconds. The failure count is, for example, failures of consecutive voice alerts.

[00182] For example, in a scenario of alerting a child, the near-field device system determines, based on information in a plurality of dimensions such as the intervention type, the intervention result, the response time, and the failure count of the risk intervention action, that a voice alert intervention action is efficient to the child, and then determines that the effective intervention path is the voice alert intervention policy. Accordingly, the near-field device system can learn this intervention path to preferentially perform matching with the voice alert intervention policy in subsequent usage processes.

[00183] For example, in a scenario of alerting a pet, the near-field device system determines, based on information in a plurality of dimensions such as the intervention type, the intervention result, the response time, and the failure count of the risk intervention action, that the pet shows no response to a light flickering intervention action but has an obvious response to a robot approaching intervention action, and then determines that the effective intervention path is the robot approaching alert intervention policy. Accordingly, the near-field device system can learn this intervention path to preferentially perform matching with the robot approaching alert intervention policy in subsequent usage processes.

[00184] For example, in a scenario of alerting an older person, the near-field device system determines, based on information in a plurality of dimensions such as the intervention type, the intervention result, the response time, and the failure count of the risk intervention action, that loud voice tends to frighten the older person at night, and then determines that the effective intervention path is the mild voice alert intervention policy. Accordingly, the near-field device system can learn this intervention path to preferentially perform matching with the mild voice alert intervention policy in subsequent usage processes.

[00185] In the implementation of this step, an intervention feedback learning mechanism is introduced, so that the near-field device system can automatically update the mapping relationship between the risk context information and the risk intervention policy

information based on historical intervention data (the intervention type, the intervention result, the response time, and the failure count), to subsequently execute a risk intervention action meeting user requirements, thereby improving user safety.

[00186] FIG. 10 is another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00187] As shown in FIG. 10, in some embodiments, step S311 of determining a risk level based on the risk context information includes step S3112 and S3113.

[00188] Step S3112: Determining the context information of the target object based on at least one of identity information, age information, and behavior state information of the target object associated with the risk event.

[00189] In an implementation, the near-field device system obtains, through analysis based on the risk event, the identity information, the age information, the behavior state information, and alone/non-alone state information of the target object associated with the risk event, and then generates the context information of the target object.

[00190] For example, the near-field device system obtains, through analysis, the following information of the target object associated with the risk event: the identity information is a child, the age information is 5 to 7 years old, the behavior state information is approaching a kitchen, and the alone/non-alone state information is alone, and then generates the context information of the target object. The context information of the target object includes information such as a child aged 5 to 7 years old approaching a kitchen alone.

[00191] In the implementation of this step, the near-field device system determines the context information of the target object based on information of the target object in a plurality of dimensions. In this way, the near-field device system can accurately identify the target object to perform accurate risk prediction.

[00192] Step S3113: Determining the risk level based on the context information of the target object.

[00193] Further, based on the foregoing example, the near-field device system determines, based on the context information of the target object, including the information such as a child aged 5 to 7 years old approaching a kitchen alone, that the

risk level is the high risk.

[00194] In the implementation of this step, the near-field device system can accurately identify the target object based on the context information of the target object, obtain a risk level corresponding to the target object, and then implement risk prediction.

[00195] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system introduces the context information of the target object into the risk assessment system to determine the risk level, so that a risk can be accurately predicted, and a risk intervention action can be accurately provided subsequently to avoid the risk.

[00196] FIG. 11 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00197] As shown in FIG. 11, in some embodiments, step S311 of determining a risk level based on the risk context information includes step S3114 and S3115.

[00198] Step S3114: Determining, based on a matching relationship between a target area in which the target object associated with the risk event is located and a preset risk area, the context information of the risk area in which the risk event occurs.

[00199] For example, the near-field device system determines, through analysis, that the target object associated with the risk event is located in a kitchen area, which matches a preset risk area (including the kitchen area), and then generates the context information of the risk area in which the risk event occurs. The context information of the risk area in which the risk event occurs includes the kitchen area.

[00200] In this case, the near-field device system can determine that the risk area in which the risk event occurs is a high-risk area, and then raise the risk level in the subsequent process of determining the risk level.

[00201] In the implementation of this step, the near-field device system determines the context information of the risk area based on the target area in which the target object is located. In this way, the near-field device system can accurately identify the target object to perform accurate risk prediction.

[00202] Step S3115: Determining the risk level based on the context information of the risk area in which the risk event occurs.

[00203] In the implementation of this step, the near-field device system can accurately identify the risk area based on the context information of the risk area in which the risk event occurs, obtain a risk level corresponding to the risk area, and then implement risk prediction.

[00204] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system introduces a spatial factor into the risk assessment system to determine the risk level, so that a risk can be accurately predicted, and a risk intervention action can be accurately provided subsequently to avoid the risk.

[00205] FIG. 12 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00206] As shown in FIG. 12, in some embodiments, step S311 of determining a risk level based on the risk context information includes step S3116 and S3117.

[00207] Step S3116: Determining, based on a matching relationship between the time at which the risk event occurs and a preset risk time period, the context information of the time at which the risk event occurs.

[00208] For example, when the near-field device system determines, through analysis, that the risk event is a child entering a kitchen area, and the time at which the risk event occurs is 2:30 a.m., which matches a preset risk time period (for example, 22:00 to 6:00), and then generates the context information of the time at which the risk event occurs. The context information of the time at which the risk event occurs includes 2:30 a.m.

[00209] In this way, the near-field device system can determine that the time at which the risk event occurs falls within an unusual time period, and then raise the risk level in the subsequent process of determining the risk level.

[00210] In the implementation of this step, the near-field device system can accurately grasp, based on the context information of the time at which the risk event occurs, the time at which the risk event occurs, to perform accurate risk prediction subsequently.

[00211] Step S3117: Determining the risk level based on the context information of the time at which the risk event occurs.

[00212] In the implementation of this step, the near-field device system can accurately identify a risk time based on the context information of the time at which the risk event

occurs, obtain a risk level corresponding to the risk time, and then implement risk prediction.

[00213] According to the technical solution shown in this embodiment of the present disclosure, the near-field device system introduces a time factor into the risk assessment system to determine the risk level, so that a risk can be accurately predicted, and a risk intervention action can be accurately provided subsequently to avoid the risk.

[00214] FIG. 13 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00215] As shown in FIG. 13, in some embodiments, step S311 of determining a risk level based on the risk context information includes step S3118 and S3119.

[00216] Step S3118: Determining the context information of the change trend of the risk event based on a position change trend of the target object associated with the risk event.

[00217] For example, the near-field device system determines, through analysis, that the position change trend of the target object associated with the risk event is changing from 1.5 meters away from a risk area to 1.2 meters away from the risk area, and then to 0.8 meter away from the risk area, and generates the context information of the change trend of the risk event based on the position change trend.

[00218] In this way, the near-field device system can determine, based on the position change trend, that a risk is approaching, and then raise the risk level in the subsequent process of determining the risk level.

[00219] In the implementation of this step, the near-field device system can accurately grasp the change trend of the risk event based on the context information of the change trend of the risk event, to perform accurate risk prediction subsequently.

[00220] Step S3119: Determining the risk level based on the context information of the change trend of the risk event.

[00221] In the implementation of this step, the near-field device system can accurately identify the change trend of the risk event based on the context information of the change trend of the risk event, obtain a risk level corresponding to the change trend of the risk event, and then implement risk prediction.

[00222] According to the technical solution shown in this embodiment of the present

disclosure, the near-field device system introduces the change trend of the risk event into the risk assessment system to determine the risk level, so that a risk can be accurately predicted, and a risk intervention action can be accurately provided subsequently to avoid the risk.

[00223] FIG. 14 is still another schematic flowchart of step S311 according to an exemplary embodiment of the present disclosure.

[00224] As shown in FIG. 14, in some embodiments, step S311 of determining a risk level based on the risk context information includes step S3120 and S3121.

[00225] Step S3120: Determining the context information of the environment of the risk event based on a matching relationship between the environment of the risk event and a preset risk environment.

[00226] For example, the near-field device system determines, through analysis, that the environment of the risk event is a wet slippery floor, which matches a preset risk environment (including the wet slippery floor), and then generates the context information of the environment of the risk event. The context information of the environment of the risk event includes the wet slippery floor.

[00227] In this way, the near-field device system can determine that the environment of the risk event is the wet slippery floor, and can further determine, in combination with behavior data of the target object (for example, an older person walking unstably), that the risk evolution trend is slipping risk rising, and then raise the risk level in the subsequent process of determining the risk level.

[00228] In the implementation of this step, the near-field device system can determine the environment in which the risk event occurs, and then make a more accurate judgment of the risk level in the subsequent process of determining the risk level.

[00229] Step S3121: Determining the risk level based on the context information of the environment of the risk event.

[00230] In the implementation of this step, the near-field device system determines the risk level based on the context information of the environment of the risk event, so that an environmental factor can be introduced into the risk assessment system to determine a risk evolution trend, accurately predict a risk, and provide a risk intervention action to

avoid the risk.

[00231] Solutions of the present disclosure are not limited to the foregoing embodiments.

[00232] Exemplary apparatus

[00233] The risk determination method provided in embodiments of the present disclosure has been described above. It can be understood that, to implement functions of the risk determination method, the risk determination apparatus may include corresponding hardware and software for implementing functions of the hardware.

[00234] Persons skilled in the art should be easily aware that, embodiments of the present disclosure can be implemented in a hardware form, a form of software driving hardware, or a combined form of hardware and software with reference to the steps of the risk determination method described in embodiments of the present disclosure. Whether a function is performed by hardware or software driving hardware depends on particular applications and design constraints of the technical solutions. Persons skilled in the art may use different methods to implement the described functions for each particular application, but it should not be considered that the implementation goes beyond the scope of the present disclosure.

[00235] FIG. 15 is a schematic structural diagram of a risk determination apparatus according to an exemplary embodiment of the present disclosure.

[00236] As shown in FIG. 15, in some embodiments, the risk determination apparatus 1500 includes:

[00237] a first determining module 1510, configured to determine a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space;

[00238] a second determining module 1520, configured to determine risk context information based on the risk event, where the risk context information includes at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event; and

[00239] a third determining module 1530, configured to determine a risk intervention action based on the risk context information.

[00240] With the risk determination apparatus 1500 provided in this embodiment of the present disclosure, in a near-field device system, a risk event in a to-be-detected risk space is determined based on an image of the to-be-detected risk space, and risk context information is determined based on the risk event. In this way, a risk can be perceived from a plurality of dimensions based on the risk context information. Further, a risk intervention action is determined based on the risk context information. Therefore, risk prediction can be implemented and the risk intervention action can be dynamically adjusted based on the risk context information, to improve user safety.

[00241] FIG. 16 is another schematic structural diagram of a risk determination apparatus according to an exemplary embodiment of the present disclosure.

[00242] As shown in FIG. 16, in some embodiments, the third determining module 1530 is further configured to: determine risk intervention policy information based on the risk context information; and determine the risk intervention action based on the risk intervention policy information.

[00243] In some embodiments, the third determining module 1530 is further configured to: determine a risk level based on the risk context information; and determine the risk intervention policy information based on the risk level.

[00244] In some embodiments, the third determining module 1530 is further configured to: determine a target score of the risk event based on a matching relationship between the risk event and a preset risk event by using a mapping relationship between the preset risk event and a preset score; determine a gain score of the target score based on the risk context information; and determine the updated risk level based on a risk score obtained based on the target score and the gain score, the risk type of the risk event, the behavior state of the target object associated with the risk event, and the historical risk information.

[00245] In some embodiments, the third determining module 1530 is further configured to: determine the risk intervention policy information based on a matching relationship between the risk context information and preset risk context information in a preset risk intervention policy information library by using a mapping relationship between the preset risk context information and preset risk intervention policy information in the preset risk

intervention policy information library.

[00246] In some embodiments, the risk determination apparatus 1500 further includes an update module 1540, configured to: update the mapping relationship between the preset risk context information and the preset risk intervention policy information in the preset risk intervention policy information library based on an intervention type, an intervention result, a response time, and a failure count of the risk intervention action.

[00247] In some embodiments, the third determining module 1530 is further configured to: determine the context information of the target object based on at least one of identity information, age information, and behavior state information of the target object associated with the risk event; and determine the risk level based on the context information of the target object.

[00248] In some embodiments, the third determining module 1530 is further configured to: determine, based on a matching relationship between a target area in which the target object associated with the risk event is located and a preset risk area, the context information of the risk area in which the risk event occurs, and determine the risk level based on the context information of the risk area in which the risk event occurs; and/or determine, based on a matching relationship between the time at which the risk event occurs and a preset risk time period, the context information of the time at which the risk event occurs, and determine the risk level based on the context information of the time at which the risk event occurs.

[00249] In some embodiments, the third determining module 1530 is further configured to: determine the context information of the change trend of the risk event based on different positions of the target object associated with the risk event in the images, and determine the risk level based on the context information of the change trend of the risk event; and/or determine the context information of the environment of the risk event based on a matching relationship between the environment of the risk event and a preset risk environment, and determine the risk level based on the context information of the environment of the risk event.

[00250] For beneficial technical effects corresponding to this exemplary apparatus embodiment, refer to the corresponding beneficial technical effects of the "Exemplary

method" section. Details are not described herein again.

[00251] Exemplary electronic device

[00252] FIG. 17 is a structural diagram of an electronic device according to an embodiment of the present disclosure.

[00253] As shown in FIG. 17, the electronic device 1700 includes at least one processor 1710 and a memory 1720.

[00254] The processor 1710 may be a central processing unit (CPU) or other forms of processing units having a data processing capability and/or an instruction execution capability, and may control other components in the electronic device 1700 to perform desired functions.

[00255] The memory 1720 may include one or more computer program products, and the computer program products may include various forms of computer-readable storage media, for example, a volatile memory and/or a non-volatile memory. The volatile memory may include, for example, a random access memory and/or a cache (cache). The non-volatile memory may include, for example, a read-only memory (ROM), a hard disk drive, or a flash memory. The computer-readable storage medium may store one or more computer program instructions, and the processor 1710 may run the one or more computer program instructions to implement the risk determination method in the foregoing embodiments of the present disclosure and/or other desired functions.

[00256] In an example, the electronic device 1700 may further include an input apparatus 1730 and an output apparatus 1740, and these components are interconnected by a bus system and/or other forms of connection mechanisms (not shown).

[00257] The input apparatus 1730 may further include, for example, a keyboard and a mouse.

[00258] The output apparatus 1740 may output various information to the outside, and may include, for example, a display, a speaker, a printer, a communication network, and a remote output device connected thereto.

[00259] Certainly, for simplicity, FIG. 17 shows only some of components in the electronic device 1700 that are related to the present disclosure, and components such

as a bus and an input/output interface are omitted. In addition, depending on specific application situations, the electronic device 1700 may further include any other appropriate components.

[00260] Exemplary computer program product and computer-readable storage medium

[00261] In addition to the foregoing method and device, an embodiment of the present disclosure may further provide a computer program product, including computer program instructions, when run by a processor, causing the processor to perform steps in the risk determination method in the embodiments of the present disclosure described in the "Exemplary method" section.

[00262] The computer program product may use one or any combination of a plurality of programming languages to write program code for performing operations in embodiments of the present disclosure. The programming languages include object-oriented programming languages, such as Java and C++, and conventional procedural programming languages, such as a "C" language or similar programming languages. The program code can be entirely executed on a user computing device, partly executed on a user device, executed as an independent software package, partly executed on a user computing device and partly executed on a remote computing device, or entirely executed on a remote computing device or server.

[00263] In addition, an embodiment of the present disclosure may further provide a computer-readable storage medium, storing computer program instructions, when run by a processor, causing the processor to perform steps in the risk determination method in the embodiments of the present disclosure described in the "Exemplary method" section.

[00264] The computer-readable storage medium may be one or any combination of a plurality of readable media. The readable medium may be a readable signal medium or a readable storage medium. The readable storage medium may include, for example but not limited to, electronic, magnetic, optical, electromagnetic, infrared, or semiconductor systems, apparatuses, or devices, or any combination thereof. More specific examples (non-exhaustive) of the readable storage medium may include, but are not limited to, an electrical connection having one or more wires, a portable disk, a hard disk drive, a

random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory (EPROM or flash memory), an optical fiber, a portable compact disk read-only memory (CD-ROM), an optical storage device, a magnetic storage device, or any appropriate combination thereof.

[00265] The basic principle of the present disclosure has been described above with reference to specific embodiments, but the advantages, benefits, effects, and the like mentioned in the present disclosure are merely illustrative rather than limitative, and should not be construed as mandatory for the embodiments of the present disclosure. In addition, the specific details disclosed above are intended only for the purpose of illustration and easy understanding, rather than limitations, which do not limit the present disclosure to being implemented by using the specific details.

[00266] Persons skilled in the art can make various modifications and variations to the present disclosure without departing from the spirit and scope of the present disclosure. Therefore, the present disclosure is intended to encompass the modifications and variations to the present disclosure provided that the modifications and variations fall within the scope of the claims of the present disclosure and equivalent technologies thereof.

WHAT IS CLAIMED IS:

1. A risk determination method, comprising:

determining a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space;

determining risk context information based on the risk event, wherein the risk context information comprises at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event; and

determining a risk intervention action based on the risk context information.

2. The risk determination method according to claim 1, wherein the determining a risk intervention action based on the risk context information comprises:

determining risk intervention policy information based on the risk context information; and

determining the risk intervention action based on the risk intervention policy information.

3. The risk determination method according to claim 2, wherein the determining risk intervention policy information based on the risk context information comprises:

determining a risk level based on the risk context information; and

determining the risk intervention policy information based on the risk level.

4. The risk determination method according to claim 3, wherein the determining a risk level based on the risk context information comprises:

determining an updated risk level based on the risk context information, a risk type of the risk event, a behavior state of the target object associated with the risk event, and historical risk information.

5. The risk determination method according to claim 4, wherein the determining an updated risk level based on the risk context information, a risk type of the risk event, a behavior state of the target object associated with the risk event, and historical risk information comprises:

determining a target score of the risk event based on a matching relationship between the risk event and a preset risk event by using a mapping relationship between the preset risk event and a preset score;

determining a gain score of the target score based on the risk context information; and

determining the updated risk level based on a risk score obtained based on the target score and the gain score, the risk type of the risk event, the behavior state of the target object associated with the risk event, and the historical risk information.

6. The risk determination method according to claim 2, wherein the determining risk intervention policy information based on the risk context information comprises:

determining the risk intervention policy information based on a matching relationship between the risk context information and preset risk context information in a preset risk intervention policy information library by using a mapping relationship between the preset risk context information and preset risk intervention policy information in the preset risk intervention policy information library.

7. The risk determination method according to claim 6, wherein, after the determining a risk intervention action based on the risk context information, the method further comprises:

updating the mapping relationship between the preset risk context information and the preset risk intervention policy information in the preset risk intervention policy information library based on an intervention type, an intervention result, a response time, and a failure count of the risk intervention action.

8. The risk determination method according to claim 3, wherein the determining a risk level based on the risk context information comprises:

determining the context information of the target object based on at least one of identity information, age information, and behavior state information of the target object associated with the risk event; and

determining the risk level based on the context information of the target object.

9. The risk determination method according to claim 3, wherein the determining a risk level based on the risk context information comprises:

determining, based on a matching relationship between a target area in which the target object associated with the risk event is located and a preset risk area, the context information of the risk area in which the risk event occurs, and

determining the risk level based on the context information of the risk area in which the risk event occurs; and/or

determining, based on a matching relationship between the time at which the risk event occurs and a preset risk time period, the context information of the time at which the risk event occurs, and

determining the risk level based on the context information of the time at which the risk event occurs.

10. The risk determination method according to claim 3, wherein the determining a risk level based on the risk context information comprises:

determining the context information of the change trend of the risk event based on a position change trend of the target object associated with the risk event, and

determining the risk level based on the context information of the change trend of the risk event; and/or

determining the context information of the environment of the risk event based on a matching relationship between the environment of the risk event and a preset risk environment, and

determining the risk level based on the context information of the environment of the

risk event.

11. A risk determination apparatus, comprising:

a first determining module, configured to determine a risk event in a to-be-detected risk space based on an image of the to-be-detected risk space;

a second determining module, configured to determine risk context information based on the risk event, wherein the risk context information comprises at least one of context information of a target object associated with the risk event, context information of a risk area in which the risk event occurs, context information of a time at which the risk event occurs, context information of a change trend of the risk event, and context information of an environment of the risk event; and

a third determining module, configured to determine a risk intervention action based on the risk context information.

12. The risk determination apparatus according to claim 11, wherein the third determining module is further configured to: determine risk intervention policy information based on the risk context information; and determine the risk intervention action based on the risk intervention policy information.

13. The risk determination apparatus according to claim 11 or 12, wherein the third determining module is further configured to: determine a risk level based on the risk context information; and determine the risk intervention policy information based on the risk level.

14. A computer-readable storage medium, storing a computer program, which, when executed by a processor, causes the processor to perform the risk determination method according to any one of claims 1 to 10.

15. An electronic device, comprising:

a processor; and

a memory configured to store instructions executable by the processor,

wherein the processor is configured to read the executable instructions from the memory and execute the instructions to implement the risk determination method according to any one of claims 1 to 10.