

CLAIMS

1. A computer-implemented method, comprising:

obtaining, through preset sensing hardware, interaction characteristics of a user of a virtual reality (VR) terminal interacting with the VR terminal in response to a request for execution of a target task requiring user identity verification;

calculating motion parameters associated with the obtained interaction characteristics of the user of the VR terminal;

comparing the calculated motion parameters associated with the obtained interaction characteristics of the user of the VR terminal with motion parameters associated with preset interaction characteristics of an authorized user of the VR terminal;

determining whether one or more of the calculated motion parameters associated the obtained interaction characteristics of the user of the VR terminal are within a preset motion threshold of one or more of the motion parameters associated with the preset interaction characteristics of an authorized user of the VR terminal;

based upon the one or more of the parameters associated the obtained interaction characteristics of the user of the VR terminal being within the preset threshold, successfully verifying identity of the user of the VR terminal;

based upon successfully verifying identity of the user of the VR terminal, executing the target task; and

based upon unsuccessfully verifying identity of the user of the VR terminal, executing supplemental identity verification for the user of the VR terminal.

2. The computer-implemented method of claim 1, wherein the interaction characteristics comprise any one of:

a head posture of the user;

a three-dimensional gesture; or

a displacement track generated by movement of a visual focus, the visual focus controlled through the head posture, the three-dimensional gesture, or an external device.

3. The computer-implemented method of claim 1, wherein upon unsuccessfully verifying identity of the use of the VR terminal, the method comprising:

determining a number of unsuccessful verification attempts;

determining whether the number of unsuccessful verification attempts is greater than a preset number;

based on the determination that the number of unsuccessful verification attempts is greater than the preset number, executing the supplemental identity verification for the user; and
based on a successful supplemental identity verification, executing the target task.

4. The computer-implemented method of claim 1, wherein the user identity verification has been successful, the method comprising:

obtaining, through the preset sensing hardware, additional interaction characteristics of the user interacting with the VR terminal, the additional interaction characteristics comprising behavioral interaction characteristics;

comparing the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is not the identity-verified user of the VR terminal, executing supplemental identity verification for the user.

5. The computer-implemented method of claim 4, wherein the comparing the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal comprises:

obtaining a preset behavioral interaction characteristic identification model representing the behavioral interaction characteristics of the identity-verified user of the VR terminal, wherein the preset behavioral interaction characteristics identification model is generated by training with behavioral interaction characteristics training samples of the identity-verified user of the VR terminal using a preset deep learning algorithm; and

comparing the obtained additional interaction characteristics of the user with the preset behavioral interaction characteristic identification model to determine whether the user is the identity-verified user of the VR terminal.

6. The computer-implemented method of claim 3, wherein the executing supplemental identity verification for the user comprises:

obtaining, through preset biometrics identification hardware, biometric characteristics of the user;

comparing the obtained biometric characteristics with preset biometric characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verifying the identity of the user; or

obtaining, from the user, an identity verification password;

comparing the obtained identity verification password with a preset identity verification password to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verifying the identity of the user.

7. The method of claim 1, wherein the target task comprises a task for unlocking the VR terminal.

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

obtaining, through preset sensing hardware, interaction characteristics of a user of a virtual reality (VR) terminal interacting with the VR terminal in response to a request for execution of a target task requiring user identity verification;

calculating motion parameters associated with the obtained interaction characteristics of the user of the VR terminal;

comparing the calculated motion parameters associated with the obtained interaction characteristics of the user of the VR terminal with motion parameters associated with preset interaction characteristics of an authorized user of the VR terminal;

determining whether one or more of the calculated motion parameters associated the obtained interaction characteristics of the user of the VR terminal are within a preset motion threshold of one

or more of the motion parameters associated with the preset interaction characteristics of an authorized user of the VR terminal;

based upon the one or more of the parameters associated the obtained interaction characteristics of the user of the VR terminal being within the preset threshold, successfully verifying identity of the user of the VR terminal;

based upon successfully verifying identity of the user of the VR terminal, executing the target task; and

based upon unsuccessfully verifying identity of the user of the VR terminal, executing supplemental identity verification for the user of the VR terminal.

9. The non-transitory, computer-readable medium of claim 8, wherein the interaction characteristics comprise any one of:

a head posture of the user;

a three-dimensional gesture; or

a displacement track generated by movement of a visual focus, the visual focus controlled through the head posture, the three-dimensional gesture, or an external device.

10. The non-transitory, computer-readable medium of claim 8, wherein upon unsuccessfully verifying identity of the user of the VR terminal, the method comprising:

determining a number of unsuccessful verification attempts;

determining whether the number of unsuccessful verification attempts is greater than a preset number;

based on the determination that the number of unsuccessful verification attempts is greater than the preset number, executing the supplemental identity verification for the user; and

based on a successful supplemental identity verification, executing the target task.

11. The non-transitory, computer-readable medium of claim 8, wherein the user identity verification has been successful, and wherein the operations comprise:

obtaining, through the preset sensing hardware, additional interaction characteristics of the user interacting with the VR terminal, the additional interaction characteristics comprising behavioral interaction characteristics;

comparing the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is not the identity-verified user of the VR terminal, executing supplemental identity verification for the user.

12. The non-transitory, computer-readable medium of claim 11, wherein the comparing the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal comprises one or more instructions to:

obtain a preset behavioral interaction characteristic identification model representing the behavioral interaction characteristics of the identity-verified user of the VR terminal, wherein the preset behavioral interaction characteristics identification model is generated by training with behavioral interaction characteristics training samples of the identity-verified user of the VR terminal using a preset deep learning algorithm; and

compare the obtained additional interaction characteristics of the user with the preset behavioral interaction characteristic identification model to determine whether the user is the identity-verified user of the VR terminal.

13. The non-transitory, computer-readable medium of claim 10, wherein the executing supplemental identity verification for the user comprises one or more instructions to:

obtain, through preset biometrics identification hardware, biometric characteristics of the user;

compare the obtained biometric characteristics with preset biometric characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verify the identity of the user; or

obtain, from the user, an identity verification password;

compare the obtained identity verification password with a preset identity verification password to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verify the identity of the user.

14. The non-transitory, computer-readable medium of claim 8, wherein the target task comprises a task for unlocking the VR terminal.

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 one or more instructions that, when executed by the one or more computers, perform operations comprising:

obtaining, through preset sensing hardware, interaction characteristics of a user of a virtual reality (VR) terminal interacting with the VR terminal in response to a request for execution of a target task requiring user identity verification;

calculating motion parameters associated with the obtained interaction characteristic of the user of the VR terminal;

comparing the calculated motion parameters associated with the obtained interaction characteristics of the user of the VR terminal with motion parameters associated with preset interaction characteristics of an authorized user of the VR terminal;

determining whether one or more of the calculated motion parameters associated the obtained interaction characteristics of the user of the VR terminal are within a preset motion threshold of one or more of the motion parameters associated with the preset interaction characteristics of an authorized of the VR terminal;

based upon the one or more of the parameters associated the obtained interaction characteristics of the user of the VR terminal being within the preset threshold, successfully verifying identity of the user of the VR terminal;

based upon successfully verifying identity of the user of the VR terminal, executing the target task; and

based upon unsuccessfully verifying identity of the user of the VR terminal, executing supplemental identity verification for the user of the VR terminal.

16. The computer-implemented system of claim 15, wherein the interaction characteristics comprise any one of:

a head posture of the user;

a three-dimensional gesture; or

a displacement track generated by movement of a visual focus, the visual focus controlled through the head posture, the three-dimensional gesture, or an external device.

17. The computer-implemented system of claim 15, wherein upon unsuccessfully verifying identity of the user of the VR terminal, the method comprising:

determine a number of unsuccessful verification attempts;

determine whether the number of unsuccessful verification attempts is greater than a preset number;

based on the determination that the number of unsuccessful verification attempts is greater than the preset number, executing the supplemental identity verification for the user; and

based on a successful supplemental identity verification, execute the target task.

18. The computer-implemented system of claim 15, wherein the user identity verification has been successful, and wherein the system is further configured to:

obtain, through the preset sensing hardware, additional interaction characteristics of the user interacting with the VR terminal, the additional interaction characteristics comprising behavioral interaction characteristics;

compare the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is not the identity-verified user of the VR terminal, execute supplemental identity verification for the user.

19. The computer-implemented system of claim 18, wherein the comparing the obtained additional interaction characteristics of the user with behavioral interaction characteristics of the identity-verified user of the VR terminal is further configured to:

obtain a preset behavioral interaction characteristic identification model representing the behavioral interaction characteristics of the identity-verified user of the VR terminal, wherein the preset behavioral interaction characteristics identification model is generated by training with behavioral interaction characteristics training samples of the identity-verified user of the VR terminal using a preset deep learning algorithm; and

compare the obtained additional interaction characteristics of the user with the preset behavioral interaction characteristic identification model to determine whether the user is the identity-verified user of the VR terminal.

20. The computer-implemented system of claim 17, wherein the executing supplemental identity verification for the user is further configured to:

obtain, through preset biometrics identification hardware, biometric characteristics of the user;

compare the obtained biometric characteristics with preset biometric characteristics of the identity-verified user of the VR terminal to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verify the identity of the user; or

obtain, from the user, an identity verification password;

compare the obtained identity verification password with a preset identity verification password to determine whether the user is the identity-verified user of the VR terminal; and

based on the determination that the user is the identity-verified user of the VR terminal, verify the identity of the user.