Claims

1. A data processing system for authenticating a user, the data processing system comprising:

one or more first computer processor devices; and

a first non-transitory data storage device, the first non-transitory data storage device storing instructions operative by the one or more first computer processor devices to:

receive a user indication identifying a user;

receive an authentication indication for the user, wherein the authentication indication comprises a sequence of word-gesture pair indications having a plurality of word indications and a plurality of gesture indications, and wherein each word-gesture pair indication comprises a respective word indication of the plurality of word indications and a respective gesture indication of the plurality of gesture indications;

look up a stored authentication indication for the user;

compare the received authentication indication with the stored authentication indication, comprising determine an order of the plurality of word indications, an order of word indications of the stored authentication indication, an order of the plurality of gesture indications, and an order of gesture indications of the stored authentication indication; and

generate an authentication result indication based on the comparison.

2. The data processing system according to claim 1, wherein the plurality of gesture indications comprises images of the user, a part of the user, a hand of the user, or combinations thereof.

3. The data processing system according to claim 1, wherein the sequence of word-gesture pair indications comprises a first-word gesture pair indication and a second word-gesture pair indication, wherein the first word-gesture pair indication comprises a first word indication and a first gesture indication, wherein the second word-gesture pair indication comprises a second word indication and a second gesture indication, and wherein the first word indication matches the second word indication and the first gesture indication differs from the second gesture indication.

4. The data processing system according to claim 1, wherein the first-non transitory data storage device stores further instructions operative by the one or more first computer processor devices to: determine if an order of word-gesture pair indications of the received authentication indication matches an order of word-gesture pair indications of the stored authentication indication.

5. The data processing system according to claim 1, further comprising:

one or more second computer processor devices; and

a second non-transitory data storage device, the second non-transitory data storage device storing executable instructions operative by the one or more second processor devices to:

receive a sequence of user input pairs, each user input pair comprising a first user input indicating a password and a second user input indicating a gesture;

generate the sequence of word-gesture pair indications from the sequence of user input pairs; and

generate the authentication indication for the user comprising the sequence of word-gesture pair indications.

6. The data processing system according to claim 5, wherein each first user input comprises an indication of a sound signal and wherein the executable instructions are further operative by the one or more second processor devices to: generate the plurality of word indications of the sequence of word-gesture pair indications from the sound signals.

7. The data processing system according to claim 5, wherein each second user input comprises an image sequence from a camera and wherein the executable instructions are further operative by the one or more second processor devices to generate the plurality of gesture indications of the sequence of word-gesture pair indications as images from the image sequences.

8. The data processing system according to claim 7, wherein the executable instructions are further operative by the one or more second processor devices to generate normalized scale images from the image sequences in order to generate the plurality of gesture indications of the word-gesture pair indications.

9. The data processing system according to claim 7, wherein the executable instructions are further operative by the one or more second processor devices to:

identify a target object in the image sequences;

determine a contrast measure between the target object and a background in the image sequences; and

generate the plurality of gesture indications as images from the image sequences if the contrast measure is above a threshold.

10. The data processing system according to claim 9, wherein the executable instructions are further operative by the one or more second processor devices to generate a user prompt to adjust the background if the contrast measure is below the threshold.

11. The data processing system according to claim 1, wherein the instructions to compare the received authentication indication with the stored authentication indication further comprises instructions to:

determine if the order of the plurality of word indications matches the order of the word indications of the stored authentication indication; and

determine if the order of the plurality of gesture indications matches the order of the gesture indications of the stored authentication indication.

12. A method of authenticating a user, the method comprising:

receiving a user indication identifying a first user;

receiving an authentication indication for the first user, wherein the authentication indication comprises a first sequence of word-gesture pair indications having a plurality of word indications and a plurality of gesture indications, and wherein each word-gesture pair indication comprises a respective word indication of the plurality of word indications and a respective gesture indication of the plurality of gesture indications;

looking up a stored authentication indication for the first user;

comparing the received authentication indication with the stored authentication indication, comprising determining an order of the plurality of word indications, an order of word indications of the stored authentication indication, an order of the plurality of gesture indications, and an order of gesture indications of the stored authentication indication; and

generating an authentication result indication based on the comparison.

13. The method according to claim 12, wherein the plurality of gesture indications comprises images of the first user, a part of the first user, a hand of the first user, or combinations thereof.

14. The method according to claim 12, wherein comparing the received authentication indication with the stored authentication indication further comprises:

determining if the order of the plurality of word indications matches the order of the word indications of the stored authentication indication; and

determining if the order of the plurality of gesture indications matches the order of the gesture indications of the stored authentication indication.