BIO LEASH FOR USER AUTHENTICATION

Cross-Reference to Related Application

[0001] This application claims priority to and the benefit of U.S. Provisional Patent Application No. 61/976,219, filed on April 7, 2014, and entitled "Bio Leash for User Authentication," the entirety of which is incorporated by reference herein.

Background

[0002] The present disclosure relates generally to user authentication and, more particularly, to systems and methods for electronically leashing a user (that is, the user's biological presence within a certain proximity) to a mobile device using radio waves, sound waves, captured imagery, and other sensor data available to the mobile device.

[0003] Existing techniques for authenticating a user on a mobile or other computing device require the user to reenter a password, passphrase, PIN, gesture, digital certificate, biometric identifier, or other security identifier (henceforth referred to as primary identifier) each time that the user desires to engage with the device after a period of non-use, or other authenticated state exit conditions such as pressing a button or switching to another application. For example, after a timeout period or pressing a button, the lock screen of the mobile device may reactivate, or the user may have to login again using a primary identifier to secure applications, websites, or other services offered through the device. In other instances, a user may have to enter a primary identifier for each feature or website that the user wants to engage with, even though the user has been previously authenticated by a primary identifier for another use. These reauthentication requirements can be frustrating and cumbersome for the user, particularly if the mobile device has remained in the possession of the user.

Brief Summary

[0003a] An aspect of the present invention provides a computer-implemented method comprising:

authenticating a user on a mobile device;

capturing first device possession measurement data by the mobile device and, based on an evaluation of the first device possession measurement data, establishing that the mobile device is in physical possession of the user;

determining, based on movement data captured by a movement or positional sensor of the mobile device, that a triggering event has occurred;

in response to the triggering event occurrence determined from the movement data, capturing second device possession measurement data by the mobile device;

determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a value representing a likelihood that the device remains in physical possession of the user; and

upon determining that the value is less than a first threshold, requiring the user to reauthenticate on the mobile device.

[0003b] Another aspect of the present invention provides a system comprising: one or more computer programmed to perform operations comprising:

authenticating a user on a mobile device;

capturing first device possession measurement data by the mobile device and, based on an evaluation of the first device possession measurement data, establishing that the mobile device is in physical possession of the user;

determining, based on movement data captured by a movement or positional sensor of the mobile device, that a triggering event has occurred;

in response to the triggering event occurrence determined from the movement data, capturing second device possession measurement data by the mobile device;

determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a value representing a likelihood that the device remains in possession of the user; and

upon determining that the value is less than a first threshold, requiring the user to reauthenticate on the mobile device.

[0001] Systems and methods are presented for electronically leashing a user to a mobile device in order to minimize the need for the user to reauthenticate with the mobile device using the primary identifier. A user is authenticated on the mobile device and initial sensor data (e.g., radio signal readings, accelerometer and magnetometer readings, image/video, audio) is

What is claimed is:

1. A computer-implemented method comprising:

authenticating a user on a mobile device;

capturing first device possession measurement data by the mobile device and, based on an evaluation of the first device possession measurement data, establishing that the mobile device is in physical possession of the user;

determining, based on movement data captured by a movement or positional sensor of the mobile device, that a triggering event has occurred;

in response to the triggering event occurrence determined from the movement data, capturing second device possession measurement data by the mobile device;

determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a value representing a likelihood that the device remains in physical possession of the user; and

upon determining that the value is less than a first threshold, requiring the user to reauthenticate on the mobile device.

2. The method of claim 1, wherein the user is authenticated based on at least one of a password, a passphrase, a gesture, a digital certificate, and a biometric identifier.

3. The method of claim 1, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises a plurality of radio signal readings.

4. The method of claim 3, wherein determining the value comprises evaluating whether a difference between the radio signal readings exceeds a threshold.

5. The method of claim 3, wherein the evaluation is performed upon determining that the mobile device has moved.

6. The method of claim 1, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises readings from a movement or positional sensor.

7. The method of claim 6, wherein determining the value comprises evaluating whether the movement or positional sensor readings conform with a known behavior pattern of the user.

8. The method of claim 1, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises audio captured by a microphone associated with the mobile device.

9. The method of claim 8, wherein determining the value comprises using at least one of acoustic location and voice recognition to determine whether the user is within a threshold distance of the mobile device.

10. The method of claim 9, wherein the acoustic location is performed upon determining that the mobile device has moved.

11. The method of claim 1, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises one or more images captured by a camera associated with the mobile device.

12. The method of claim 11, wherein determining the value comprises analyzing the images to determine whether the user is shown.

13. The method of claim 11, wherein at least one of the images is captured upon determining that the camera associated with the mobile device has a line of sight to the user.

14. The method of claim 1, further comprising, upon determining that the value is greater than the first threshold and less than a second threshold, deactivating a subset of features on the mobile device.

15. A system comprising:

one or more computer programmed to perform operations comprising:

authenticating a user on a mobile device;

capturing first device possession measurement data by the mobile device and, based on an evaluation of the first device possession measurement data, establishing that the mobile device is in physical possession of the user;

determining, based on movement data captured by a movement or positional sensor of the mobile device, that a triggering event has occurred;

in response to the triggering event occurrence determined from the movement data, capturing second device possession measurement data by the mobile device;

determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a value representing a likelihood that the device remains in possession of the user; and

upon determining that the value is less than a first threshold, requiring the user to reauthenticate on the mobile device.

16. The system of claim 15, wherein the user is authenticated based on at least one of a password, a passphrase, a gesture, a digital certificate, and a biometric identifier.

17. The system of claim 15, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises a plurality of radio signal readings.

18. The system of claim 17, wherein determining the value comprises evaluating whether a difference between the radio signal readings exceeds a threshold.

19. The system of claim 17, wherein the evaluation is performed upon determining that the mobile device has moved.

20. The system of claim 15, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises readings from a movement or positional sensor.

21. The system of claim 20, wherein determining the value comprises evaluating whether the movement or positional sensor readings conform with a known behavior pattern of the user.

22. The system of claim 15, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises audio captured by a microphone associated with the mobile device.

23. The system of claim 22, wherein determining the value comprises using at least one of acoustic location and voice recognition to determine whether the user is within a threshold distance of the mobile device.

24. The system of claim 23, wherein the acoustic location is performed upon determining that the mobile device has moved.

25. The system of claim 15, wherein at least one of the first device possession measurement data and the second device possession measurement data captured by the mobile device comprises one or more images captured by a camera associated with the mobile device.

26. The system of claim 25, wherein determining the value comprises analyzing the images to determine whether the user is shown.

27. The system of claim 25, wherein at least one of the images is captured upon determining that the camera associated with the mobile device has a line of sight to the user.

28. The system of claim 15, wherein the operations further comprise, upon determining that the value is greater than the first threshold and less than a second threshold, deactivating a subset of features on the mobile device.

29. The method of claim 1, wherein the first device possession measurement data and the second device possession measurement data are captured using different data capturing components of the mobile device.

30. The method of claim 1, wherein the triggering event comprises a determination, based on the movement data, that the mobile device (i) has been picked up, (ii) has been put down, (iii) has experienced sudden or violent movement, or (iv) has experienced movement different from an expected pattern of movement.