Upon determining that this probability or binding score is less than a threshold, the authenticated state is invalidated (or lessened) and the user is required to reauthenticate on the mobile device using a primary identifier to further engage with the device or particular features and services on the device. Because the calculated bio leash strength covers an interval, several such thresholds can be set to limit the behavior and access level of a variety of services on the device depending on their sensitivity and security requirements. For instance, a lower strength of the bio leash can disable access to high security applications (or limit their functionality), while still allowing for access to lower security applications and functions without a need for reauthentication by a primary identifier.

An embodiment 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; capturing movement data by a movement or positional sensor of the mobile device; determining that the movement data exceeds a threshold and has resulted in an occurrence of a triggering event, and, in response to the triggering event, initiating capture by the mobile device of second device possession measurement data comprising radio signal data, sound wave data, image data, or video data; and determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a likelihood that the device remains in physical possession of the user.

Another embodiment provides a system comprising one or more computers 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; capturing movement data by a movement or positional sensor of the mobile device; determining that the movement data exceeds a threshold and has resulted in an occurrence of a triggering event, and, in response to the triggering event, initiating capture by the mobile device of second device possession measurement data comprising radio signal data, sound wave data, image data, or video data; and determining, based at least in part on an evaluation of the second device possession measurement data captured by the mobile device, a likelihood that the device remains in physical possession of the user.

[0005] The details of one or more implementations of the subject matter described in the present specification are set forth in the accompanying drawings and the description below. Other features, aspects, and advantages of the subject matter will become apparent from the description, the drawings, and the claims.

Brief Description of the Drawings

[0006] In the drawings, like reference characters generally refer to the same parts throughout the different views. Also, the drawings are not necessarily to scale, emphasis instead generally being placed upon illustrating the principles of the implementations. In the following description, various implementations are described with reference to the following drawings, in which:

[0007] FIG. 1 is a flowchart of an example method for electronically leashing a user (establishing a bio leash) to a mobile device according to an implementation.

[0008] FIG. 2 is a diagram of an example high-level architecture of a system for electronically leashing a user to a mobile device according to an implementation.

Detailed Description

[0009] Described herein in various implementations are systems and accompanying methods for determining whether a mobile device remains in a user's possession using functionality available on the mobile device, such as radio, audio, imaging, motion, orientation, and other sensor features. A biological-electronic leash can be formed between the user and the mobile device and, when the leash is broken or weakened below a threshold, the user can be required to reauthenticate with the device using a primary identifier. As used herein the terms "bio leash" and "electronic leash" refer to an association that is created between an authenticated user and a mobile device and maintained by determining whether the device remains in physical possession of the user. "In possession of the user" can include physical