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## Smart Home Mirror

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## **Smart Home Mirror**

### **BACKGROUND**

Mirrors have many obvious uses, including a person viewing his or her reflection. Many people check their appearance one or more times per day, such as before leaving home for work or to otherwise go out. Some people may find it useful for additional information to be provided when the person is viewing himself or herself in the mirror.

### **DETAILED DESCRIPTION**

In various embodiments, an augmented reality (AR) mirror may be presented. An AR mirror may allow a user to view his or her reflection and have the reflection augmented with additional visual information. For example, an AR mirror may allow a user to view his reflection and have his reflection combined with one or more stored or accessed digital images and/or one or more stored or accessed video streams. One possible use case of such an arrangement is for the user's reflection to be overlaid or otherwise modified by a still or video image of a particular clothing article. For instance, the user can view himself in the mirror to see how he would look if he wore a particular shirt. This particular shirt may be a shirt the user already owns or is thinking of purchasing.

Such an AR mirror can provide additional services for a user. For example, a user may, over time, not notice that a particular clothing article has begun to not fit the user properly. The AR mirror may track physical characteristics of the user, such as size or girth, over time. The change in such physical characteristics of the user may be tracked relative to one or more

particular items of clothing. The AR mirror (or a cloud-based server in communication with the AR mirror) may assess whether a particular item of clothing no longer fits the user due to a change in physical characteristic of the user. For instance, the particular item of clothing may hang too loosely on the user to look appropriate or may have become too snug on the user to look appropriate.

In some embodiments, the AR mirror may inform the user as to an assessment of how the piece of clothing looks on the user. This assessment may be performed for a piece of clothing that the user is currently wearing or that the user is having projected as part of the AR image presented by the AR mirror. This AR image may include an image presented by an AR display and a reflection of the AR mirror. The assessment may indicate that the piece of clothing no longer fits properly or is a proper fit for the user. For instance, the assessment may indicate “the selected shirt looks a bit tight around your stomach. Perhaps you want to order the same shirt in a larger size or try a different shirt?” The opposite situation is also possible. For instance, the assessment may indicate the selected shirt looks a bit loose around your stomach. Perhaps you want to order the same shirt in a smaller size or try different shirt?”

In some embodiments, the AR mirror may be able to order items of clothing from one or more different clothing retailers. In some embodiments, the AR mirror may be able to determine a particular make/model of an item of clothing, determine a clothing retailer that has the item of clothing available for sale, and place an order for the item of clothing in a size that is appropriate for the user based on the performed assessment. As such, a user may have an option of obtaining an article of clothing in a size that is more likely to fit the user than either the size the user currently owns or a size of the article of clothing in which the AR image was initially projected.

Fig. 1 illustrates an embodiment of an AR mirror system. Mirror 1 may not be opaque and may be less than fully reflective. For instance, light may be transmitted through mirror 1 from a rear of mirror 1 to a front of mirror 1 (the front of mirror 1 faces user 6). Mirror 1 may, for example, reflect 90% of light, thus allowing user 6 to view his or her reflection. Mirror 1 may also transmit light projected by AR display 3. AR display 3 may be a screen, projector, or other image-displaying device that can cause an image to be optically presented through mirror 1 such that it is presented simultaneously with a reflected image of user 6. From the point of view of user 6, the image viewed on mirror 1 may include a reflection of user 6 and an image displayed or otherwise projected by AR display 3.

Camera 2 may be hidden from user 6 somewhere behind mirror 1 (such that camera 2 views user 6 though mirror 1) or may be positioned separate from mirror 1 such that user 6 is present in a field of view of camera 2. Images captured by camera 2 may be transmitted to processing system 4. Processing system 4 may use images from camera 2 to determine a location, perspective, and size characteristics of user 6. Processing system 4 may determine an image to present via AR display 3 such that the image is presented at least partially overlapping the reflection of user. Processing system 4 may locally store or have access to a remote database that includes images of various articles of clothing, such as pants, shirts, jackets, hats, belts, shoes, scarfs, etc. Processing system 4 may also store measurements of the user (and possibly of one or more additional users), such as height, chest width, waist width, etc.

As user 6 moves, processing system 4 may observe such movement via images received from camera 2 and may adjust the projected or otherwise displayed image from AR display 3 such that the image is moved and/or adjusted in size and perspective to account for the movement of user 6. Processing system 4 may also occasionally or periodically make and store

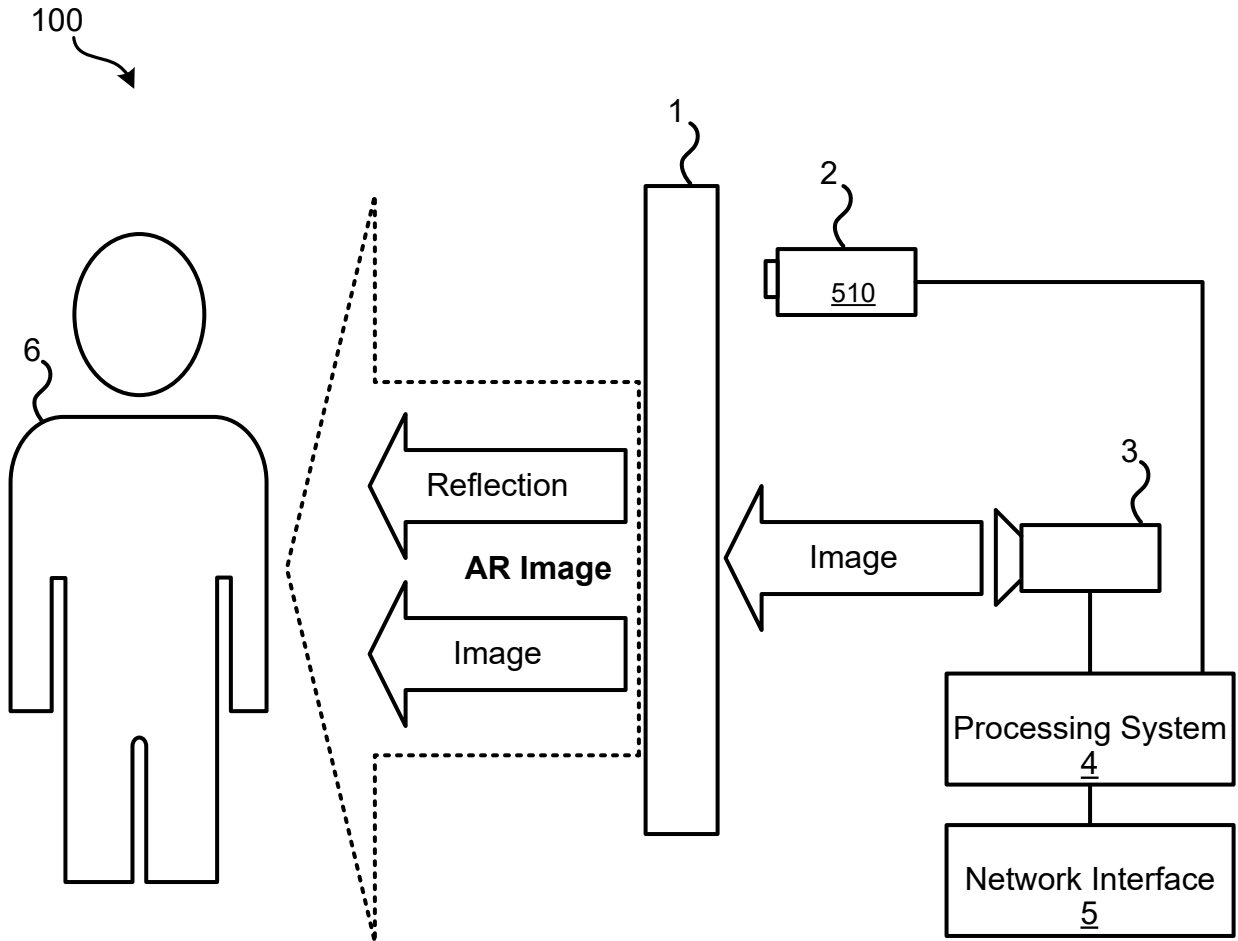
new measurements of the user's size characteristics. Processing system 4, such as once per week, may assess whether the user's size has increased or decreased and may inform the user as to a particular (or multiple) items of clothing that no longer are expected to fit.

In some embodiments, processing system 4 may communicate with network interface 5. Network interface 5 may be used to access the Internet, a remote cloud server, and/or remote database. The remote cloud server and/or the remote database may be used to access various images of articles of clothing and/or to determine the make/model of a particular article of clothing requested or being worn by user 6. Processing system 4, may use network interface 5 to order a particular article of clothing from a clothing retailer. Additionally or alternatively, processing system 4 may be able to download measurements of particular items of clothing, which may be used in combination with the measurements made of the size characteristics of the user to determine if the article of clothing will likely fit. In other embodiments, the fit may be based on visual characteristics observed by using camera 2, such as whether the fabric of the article of clothing is stretched or has too many folds in it (indicative of hanging loosely).

## ABSTRACT

An augmented reality (AR) mirror can allow a reflection of a user to be augmented with additional visual data. An AR mirror may allow a user to view his or her reflection and have the reflection modified using one or more stored or accessed digital images and/or one or more stored or accessed video streams. Such an arrangement can allow for the user's reflection to be overlaid or otherwise modified by a still or video image of a particular clothing article. For instance, the user can view himself in the mirror to see how he would look if he wore a particular shirt. The AR mirror may inform the user whether an article of clothing fits, does not fit, or no longer fits the user, such as due to the user gaining or losing weight. The AR mirror may be able to coordinate ordering of the article of clothing in a size that does fit the user.

### Smart Home Mirror



**FIG. 1**