US 20250261743A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0261743 A1**

Aidan (43) **Pub. Date: Aug. 21, 2025**

(54) **SMART MAKEUP COMPACT**

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(21) Appl. No.: **18/444,343**

(22) Filed: **Feb. 16, 2024**

Publication Classification

(51) **Int. Cl.**

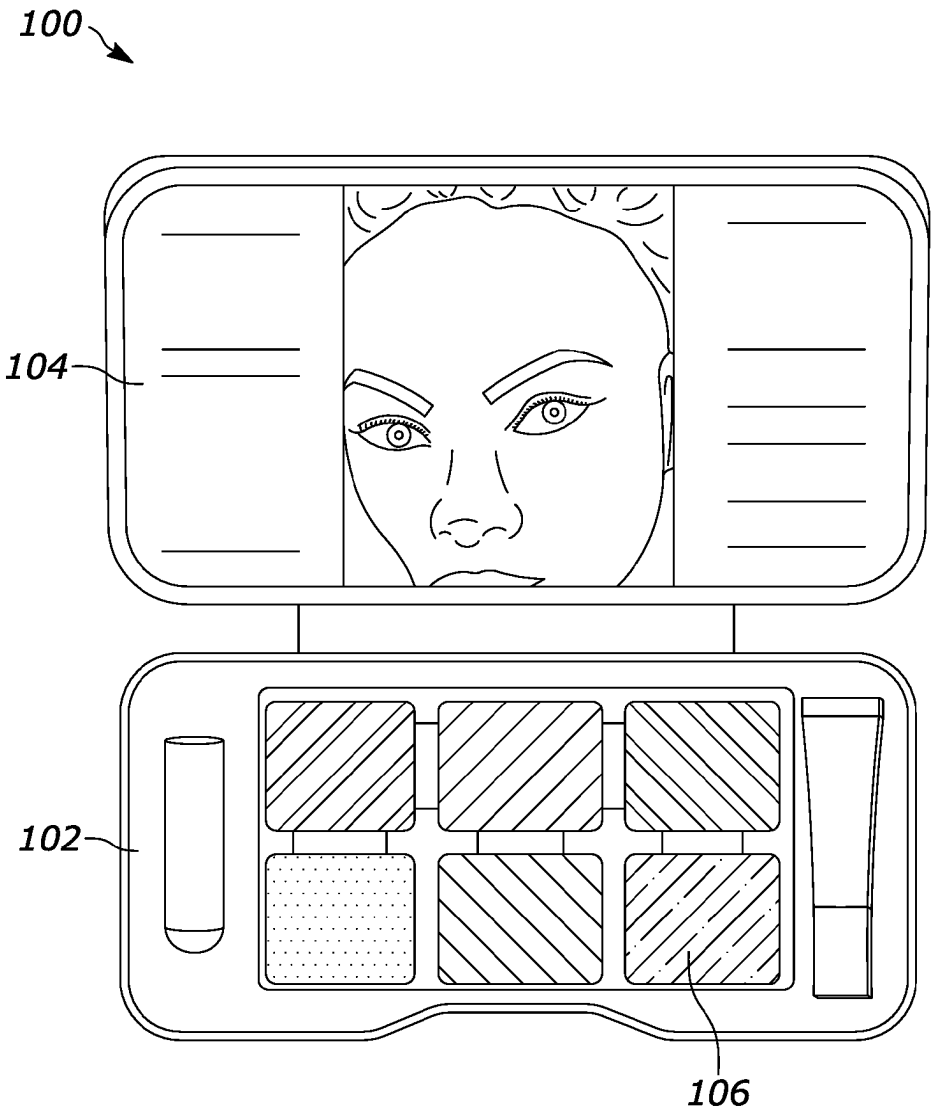
A45D 44/00	(2006.01)
A45D 40/18	(2006.01)
A45D 40/22	(2006.01)
A45D 40/24	(2006.01)

(52) **U.S. Cl.**

CPC ***A45D 44/005*** (2013.01); ***A45D 40/18*** (2013.01); ***A45D 40/22*** (2013.01); ***A45D 40/24*** (2013.01); *A45D 2200/05* (2013.01); *A45D 2200/25* (2013.01)

(57) **ABSTRACT**

An intelligent cosmetic compact device, and techniques for operating the device, are provided. The device may include a portable housing comprising: a display that is accessible when the portable cosmetic compact housing is opened; compartments for storing cosmetic products that are accessible when the portable cosmetic compact housing is opened; a user interface; sensors configured to capture real-time data associated with a user's face. The device may receive an indication of a makeup look selected by the user, analyze the real-time data associated with the user's face in order to generate a three-dimensional map associated with the user's face; identify facial features of the user's face on the three-dimensional map associated with the user's face; and provide, via the user interface, guidance associated with applying cosmetic products to the user's facial features in order to achieve the makeup look selected by the user.



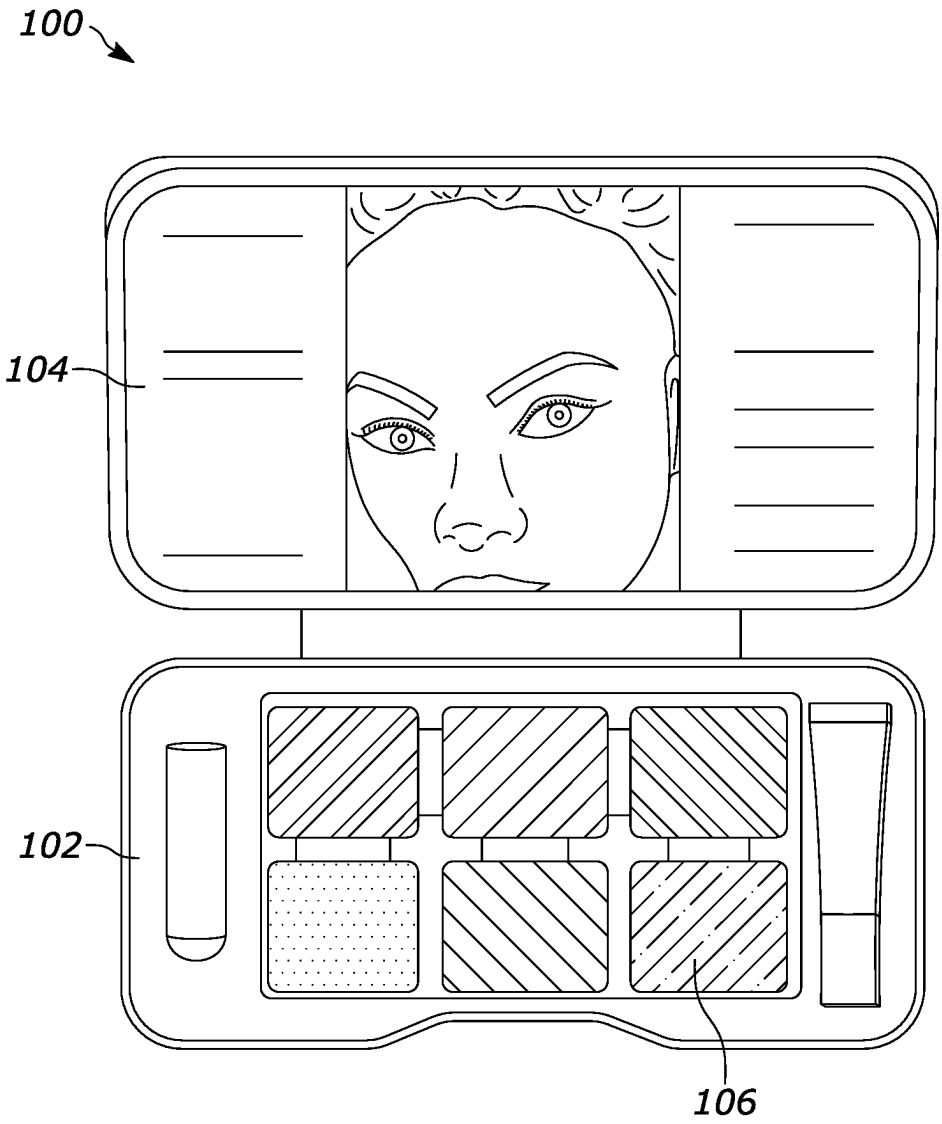


FIG. 1A

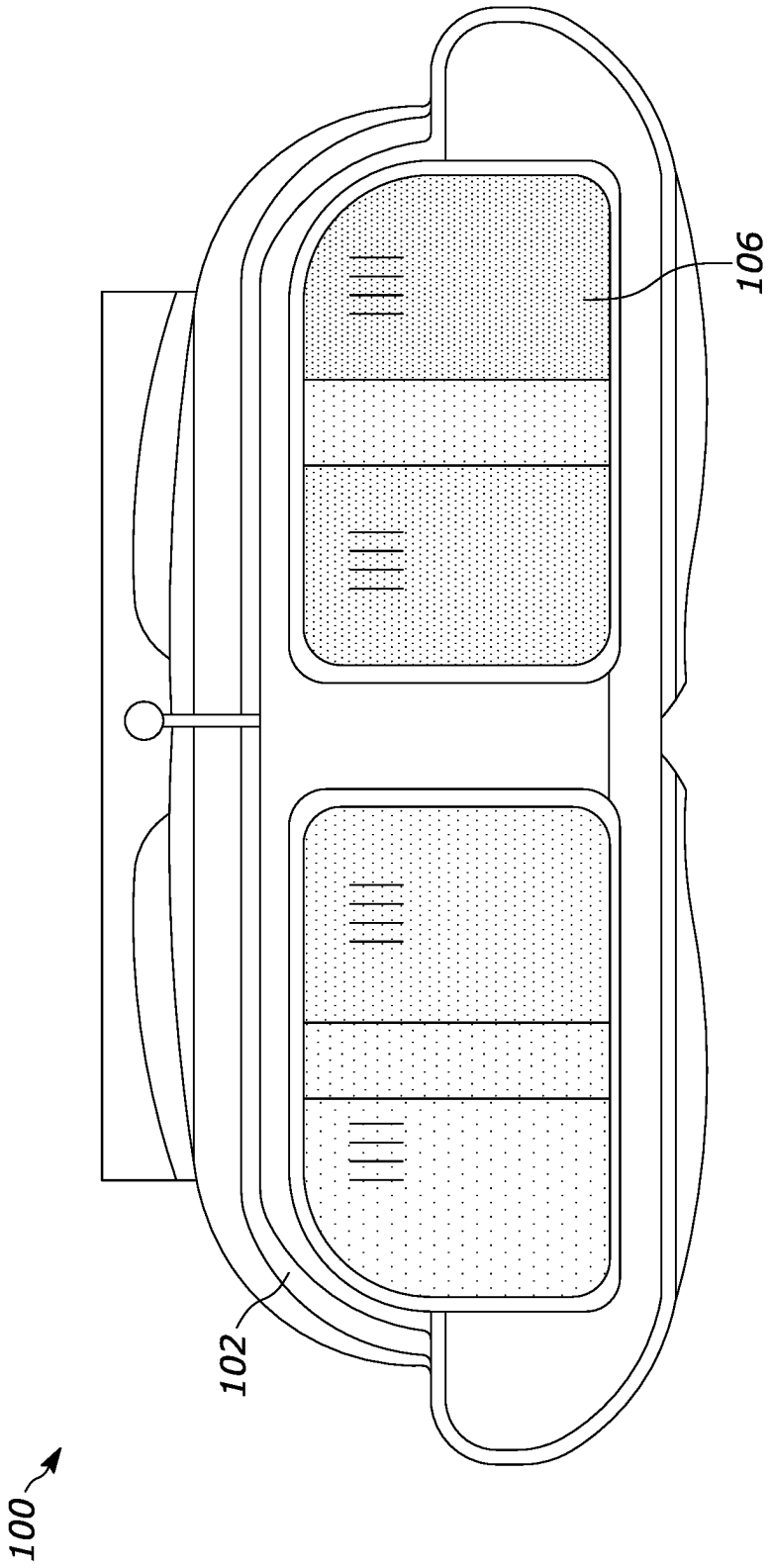


FIG. 1B

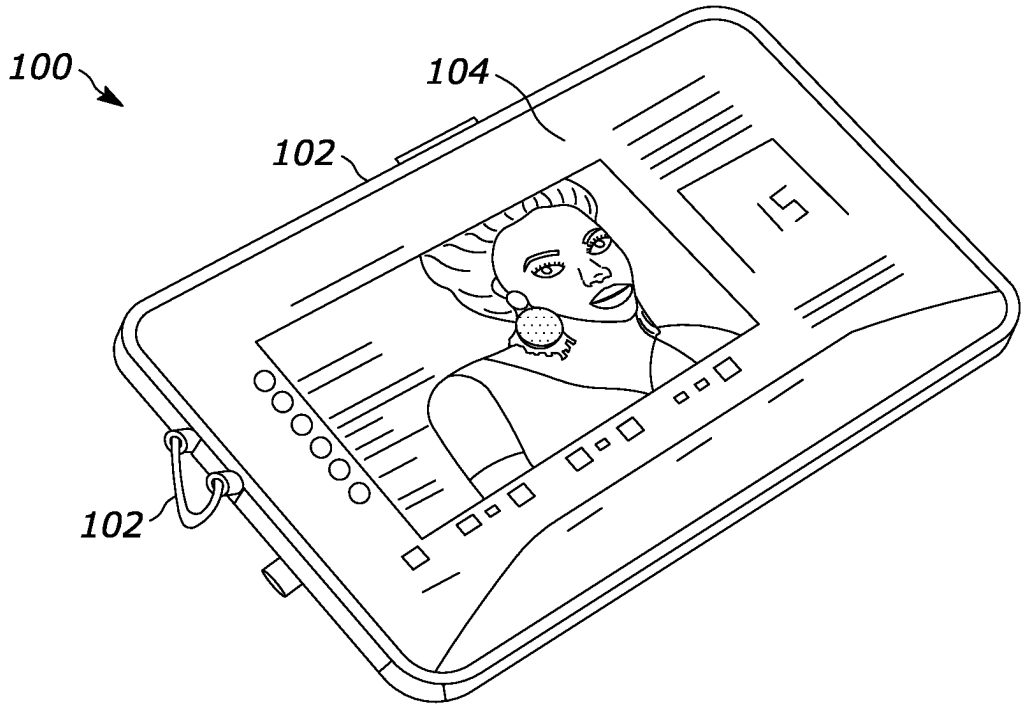


FIG. 1C

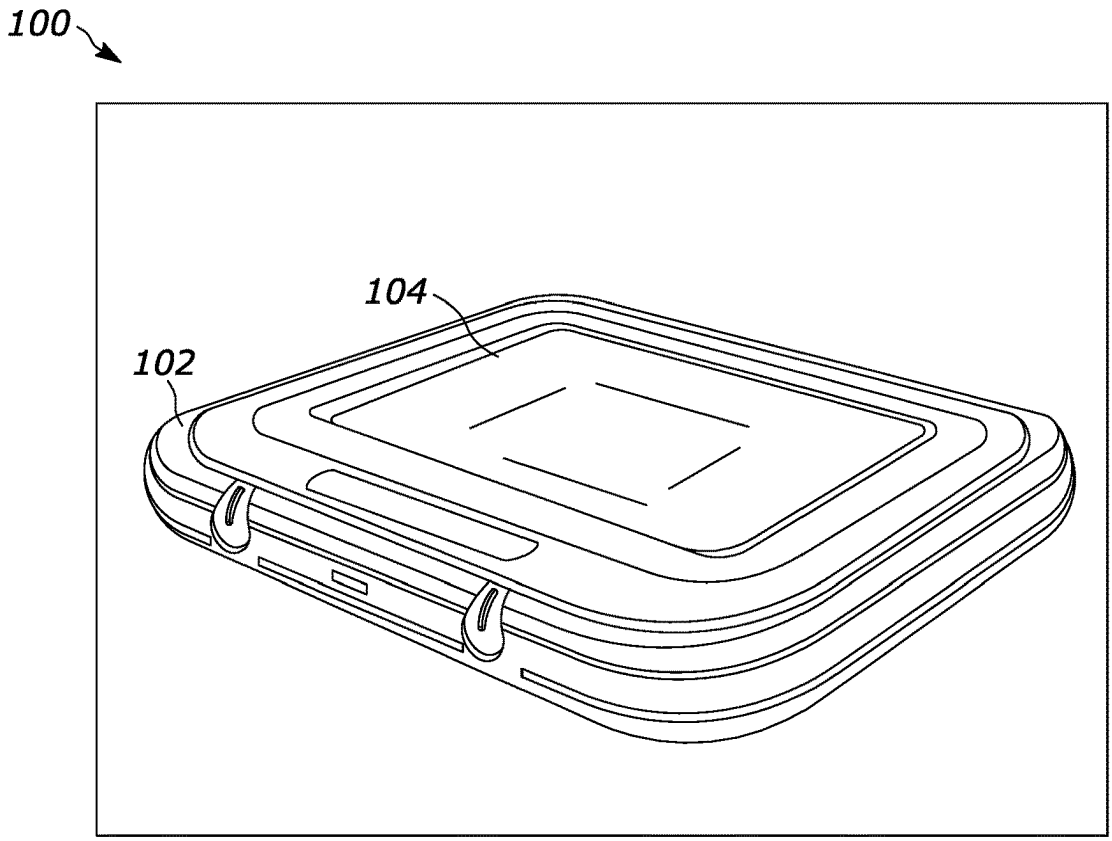


FIG. 1D

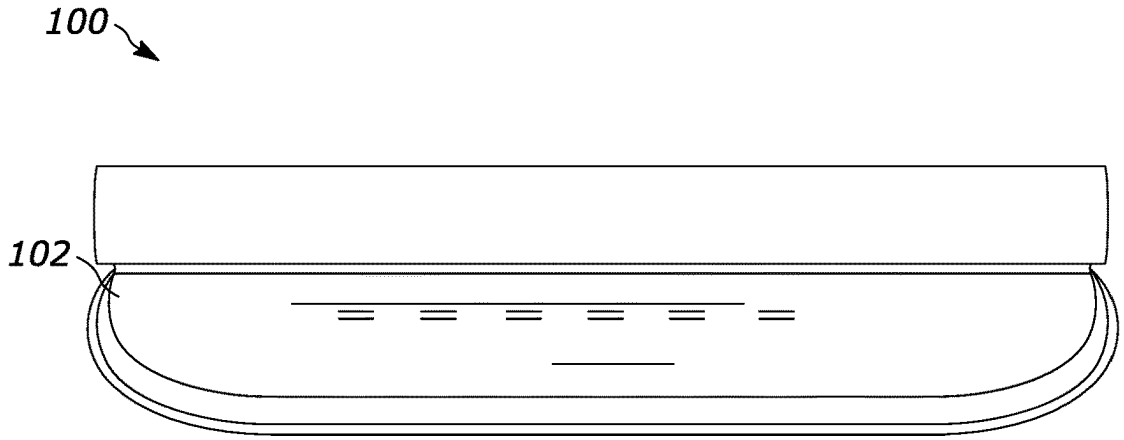


FIG. 1E

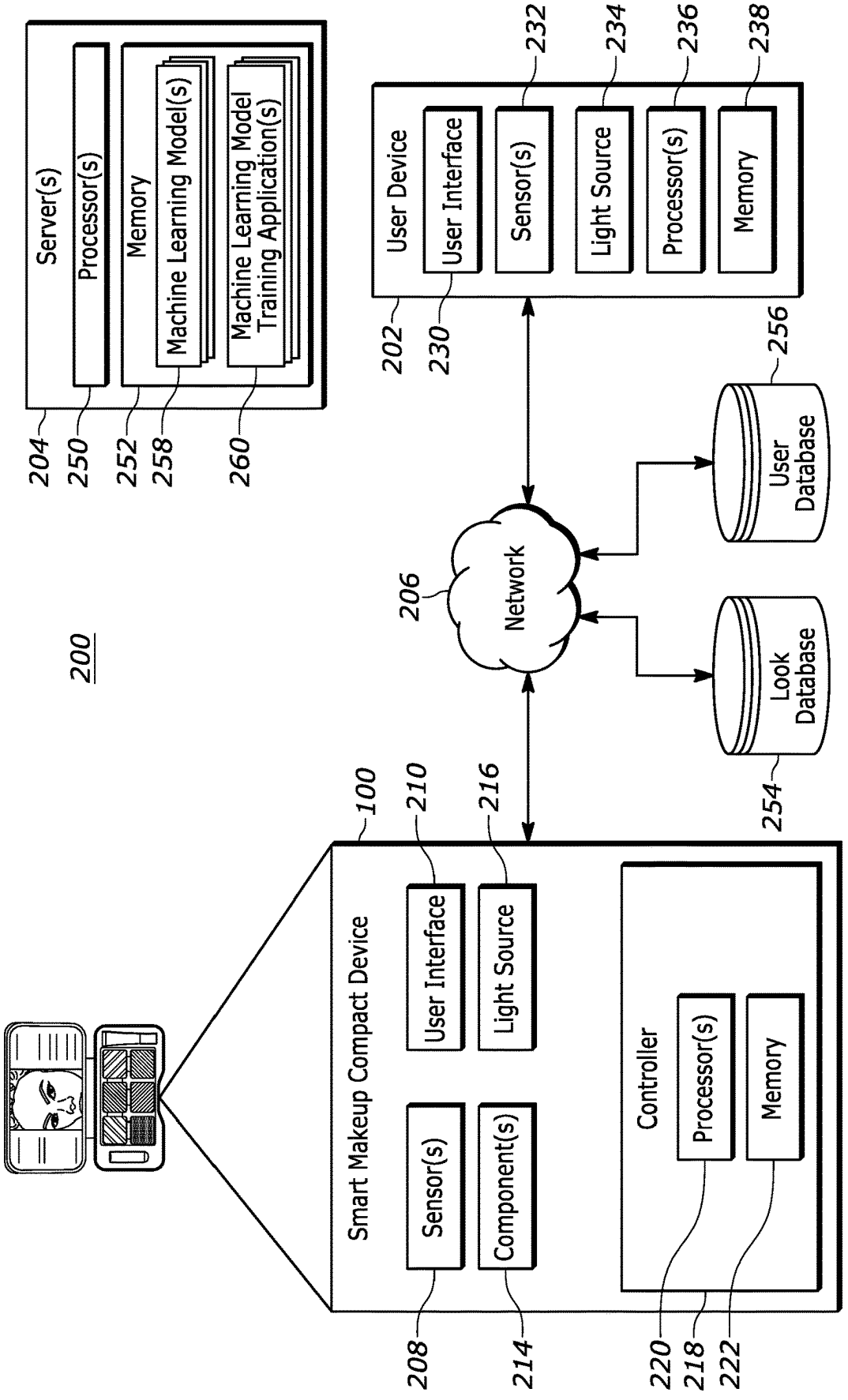

200
Server(s)
Processor(s)
Memory
Machine Learning Model(s)
Machine Learning Model Training Application(s)
204
250
252
258
260
User Device
User Interface
Sensor(s)
Light Source
Processor(s)
Memory
202
230
232
234
236
238
256
User Database
Network
206
Look Database
254
100
210
216
Smart Makeup Compact Device
User Interface
Light Source
Sensor(s)
Component(s)
Controller
Processor(s)
Memory
208
214
220
218
222

FIG. 2

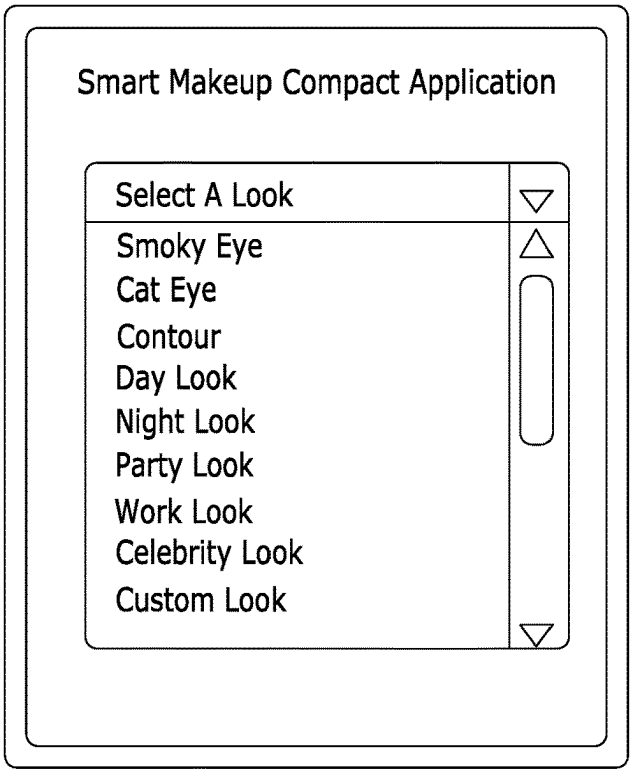

Smart Makeup Compact Application
Select A Look
Smoky Eye
Cat Eye
Contour
Day Look
Night Look
Party Look
Work Look
Celebrity Look
Custom Look

FIG. 3A

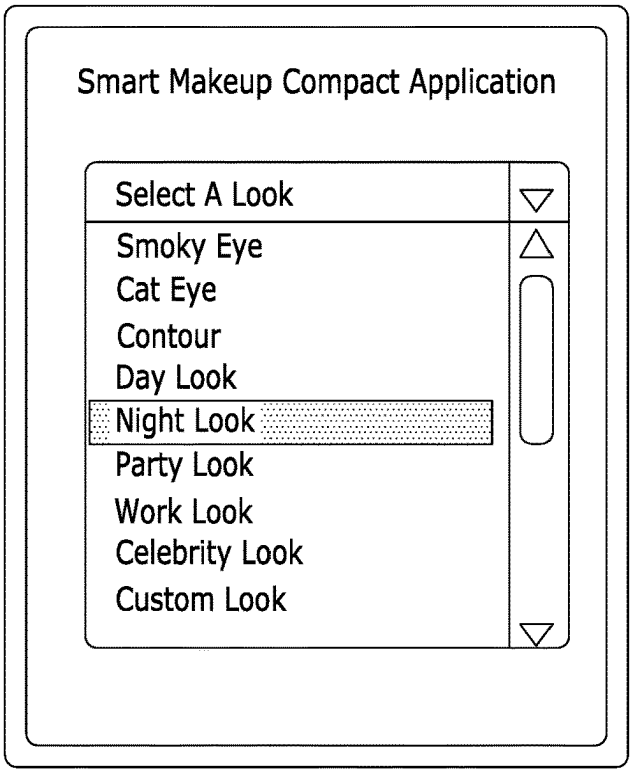

Smart Makeup Compact Application
Select A Look
Smoky Eye
Cat Eye
Contour
Day Look
Night Look
Party Look
Work Look
Celebrity Look
Custom Look

FIG. 3B

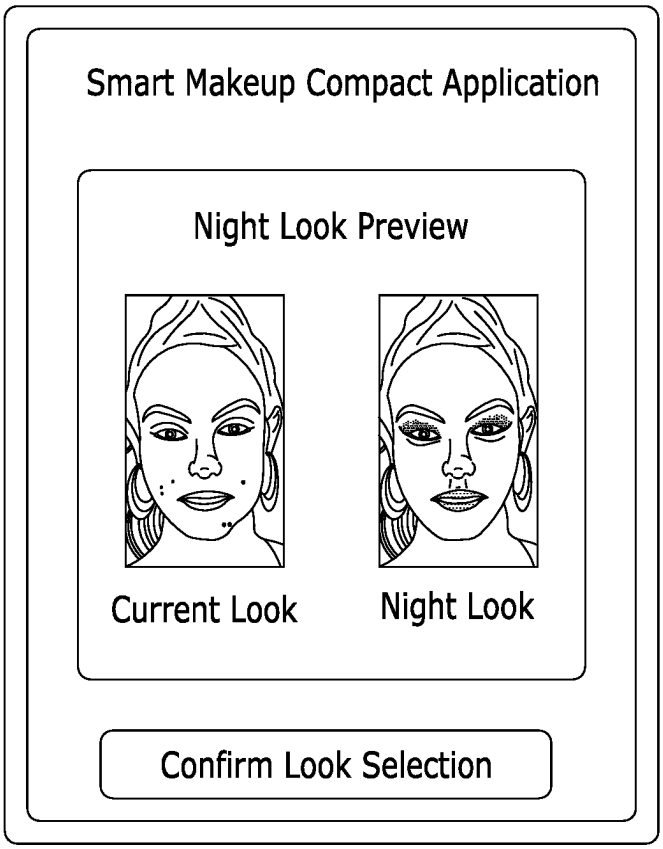

Smart Makeup Compact Application
Night Look Preview
Current Look
Night Look
Confirm Look Selection

FIG. 3C

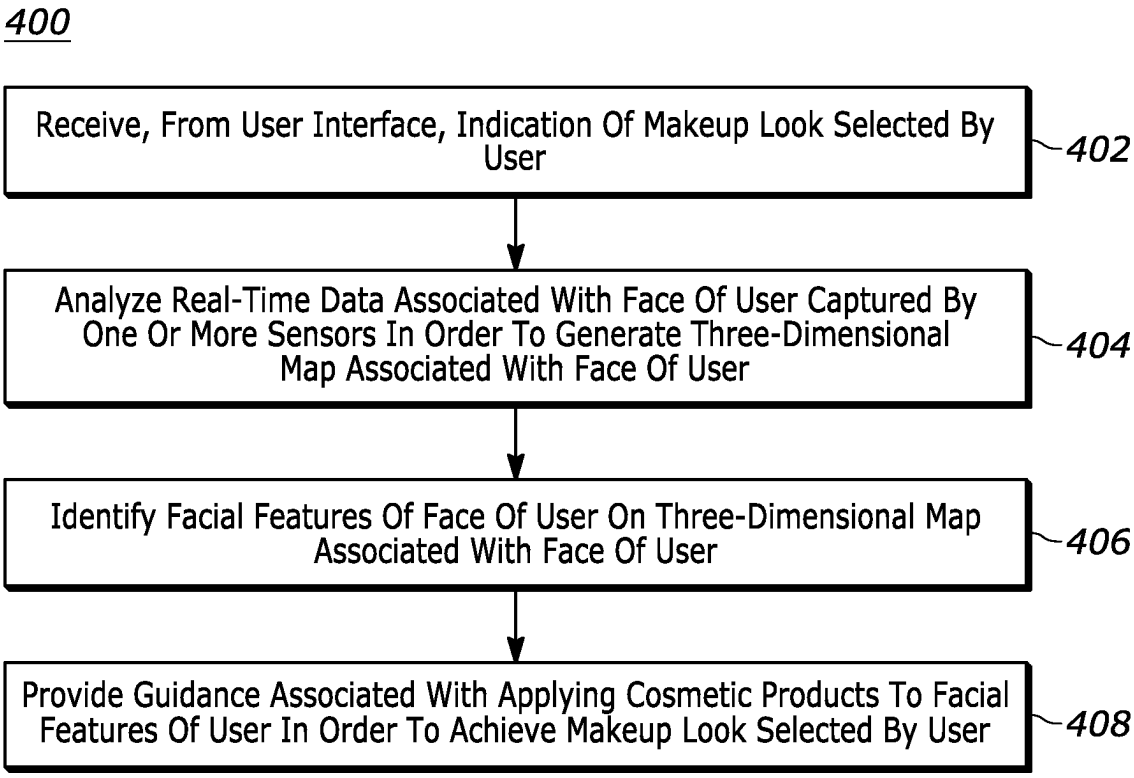

400
Receive, From User Interface, Indication Of Makeup Look Selected By User
402
Analyze Real-Time Data Associated With Face Of User Captured By One Or More Sensors In Order To Generate Three-Dimensional Map Associated With Face Of User
404
Identify Facial Features Of Face Of User On Three-Dimensional Map Associated With Face Of User
406
Provide Guidance Associated With Applying Cosmetic Products To Facial Features Of User In Order To Achieve Makeup Look Selected By User
408

FIG. 4

SMART MAKEUP COMPACT

FIELD OF THE INVENTION

[0001] The present invention relates generally to the field of cosmetics and, more particularly, to a smart makeup compact with a touch-sensitive display that utilizes machine learning (ML), artificial intelligence (Al), augmented reality (AR), and/or haptic feedback, and may be integrated with smart devices and smart packaging.

BACKGROUND

[0002] The background description provided herein is for the purpose of generally presenting the context of the disclosure. Work of the presently named inventors, to the extent it is described in this background section, as well as aspects of the description that may not otherwise qualify as prior art at the time of filing, are neither expressly nor impliedly admitted as prior art against the present disclosure.

[0003] Traditional makeup compacts offer limited functionality and do not adequately meet the needs of modern, tech-savvy users. There is a lack of interactivity, personalization, and connectivity to digital platforms in conventional makeup compacts. Traditional makeup compacts are limited in functionality and often require users to manually choose and apply makeup shades. The process can be time-consuming and may not produce the best results, as people may not be aware of the most suitable colors and techniques for their specific features or desired look.

SUMMARY

[0004] In one aspect, an intelligent cosmetic compact device is provided, comprising: a portable cosmetic compact housing configured to be opened and closed, the portable housing comprising: a display that is accessible when the portable cosmetic compact housing is opened; one or more compartments for storing cosmetic products that are accessible when the portable cosmetic compact housing is opened; a user interface; one or more sensors configured to capture real-time data associated with a face of a user; one or more processors; and one or more non-transitory memories storing computer-readable instructions. The computer-readable instructions, when executed by the one or more processors of the controller, may cause the one or more processors to: receive an indication of a makeup look selected by the user; analyze the real-time data associated with the face of the user in order to generate a three-dimensional map associated with the face of the user; identify one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and provide, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user. The intelligent cosmetic compact device may include additional, less, or alternate elements, including those discussed elsewhere herein.

[0005] In another aspect, a computer-implemented method for operating an intelligent cosmetic compact device is provided. The method may include receiving, by one or more processors, an indication of a makeup look selected by the user via a user interface; analyzing, by the one or more processors, real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user; identifying, by the one or more processors, one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and providing, by the one or more processors, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user. The method may include additional, less, or alternate actions, including those discussed elsewhere herein.

[0006] In still another aspect, a non-transitory computer-readable storage medium storing instructions for operating an intelligent cosmetic compact device is provided. The computer-readable instructions, when executed by one or more processors, may cause the one or more processors to perform a method. The method may include receiving an indication of a makeup look selected by the user via a user interface; analyzing real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user; identifying one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and providing, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user. The instructions may direct additional, less, or alternative functionality, including that discussed elsewhere herein.

[0007] Advantages will become more apparent to those of ordinary skill in the art from the following description of the preferred embodiments which have been shown and described by way of illustration. As will be realized, the present embodiments may be capable of other and different embodiments, and their details are capable of modification in various respects. Accordingly, the drawings and description are to be regarded as illustrative in nature and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The figures described below depict various aspects of the system and methods disclosed herein. It should be understood that each figure depicts an embodiment of a particular aspect of the disclosed system and methods, and that each of the figures is intended to accord with a possible embodiment thereof.

[0009] There are shown in the drawings arrangements which are presently discussed, it being understood, however, that the present embodiments are not limited to the precise arrangements and instrumentalities shown, wherein:

[0010] FIGS. **1**A-**1**E depict exemplary intelligent cosmetic compact devices, according to some embodiments;

[0011] FIG. **2** depicts an exemplary computer system associated with an intelligent cosmetic compact device, according to some embodiments;

[0012] FIGS. **3**A-**3**C depict examples of displays as may be provided by a user interface associated with an intelligent cosmetic compact device, according to some embodiments; and

[0013] FIG. **4** depicts a flow diagram of an exemplary computer-implemented method for operating an intelligent cosmetic compact device according to some embodiments.

[0014] While the systems and methods disclosed herein is susceptible of being embodied in many different forms, it is shown in the drawings and will be described herein in detail

specific exemplary embodiments thereof, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the systems and methods disclosed herein and is not intended to limit the systems and methods disclosed herein to the specific embodiments illustrated. In this respect, before explaining at least one embodiment consistent with the present systems and methods disclosed herein in detail, it is to be understood that the systems and methods disclosed herein is not limited in its application to the details of construction and to the arrangements of components set forth above and below, illustrated in the drawings, or as described in the examples.

[0015] Methods and apparatuses consistent with the systems and methods disclosed herein are capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein, as well as the abstract included below, are for the purposes of description and should not be regarded as limiting.

DETAILED DESCRIPTION

Overview

[0016] The present disclosure provides a smart makeup compact (also referred to as an "intelligent cosmetic compact device," or a "smart compact" herein) with advanced technological features. The smart compact may include a touch-sensitive display that may employ machine learning (ML) and/or artificial intelligence (Al) to personalize user experiences and offer makeup recommendations. The smart makeup compact may use AR for virtually trying on makeup looks and haptic feedback for guiding makeup application. The smart compact may also be integrated with smart devices and smart packaging for enhanced functionality, and may include a feature for users to subscribe to, download, and share makeup looks on social media platforms.

[0017] The smart makeup compact may include a touch-sensitive display and associated electronics, a processor, memory, a camera, haptic feedback mechanisms, and/or wireless communication hardware. The compact's software may include an operating system, application programming interfaces (APIs), ML and Al algorithms, AR software, and/or social media integration capabilities.

[0018] The ML and Al algorithms may be designed to learn the user's preferences, skin type, and face shape, among other factors, to provide personalized makeup recommendations. The algorithms may be trained and updated over time to improve their accuracy and functionality. The AR software may enable users to virtually try on different makeup looks before applying them. The AR software may use the smart compact's camera and the user's facial data to create a realistic virtual model of the user's face, onto which different makeup looks can be projected.

[0019] The haptic feedback mechanisms may be designed to guide the user's makeup application by providing tactile feedback. For example, the smart compact vibrate in a specific pattern to guide the user to apply blush in the correct area of the face.

[0020] The smart compact may communicate with smart devices and smart packaging via wireless communication protocols, which may enable the smart compact to, for example, automatically update its ML and Al algorithms based on data from the smart devices or smart packaging, or to alert the user when they are running low on a particular type of makeup.

[0021] In some examples, users may subscribe to, download, and/or share makeup looks on social media platforms directly from the smart compact. These features may be facilitated by the smart compact's wireless communication hardware and social media APIs.

[0022] The user interface of the smart compact may be designed to be intuitive and user-friendly, with clear, easy-to-understand icons and menus. The interface may allow users to easily navigate through the compact's features and settings, and may include options for adjusting the compact's ML, Al, and AR settings, among others.

Example Intelligent Cosmetic Compact Device

[0023] FIGS. **1**A-**1**E depict exemplary intelligent cosmetic compact devices **100**, according to some embodiments. As discussed in greater detail below with respect to FIG. **2**, an intelligent cosmetic compact device **100** may include sensors configured to capture real-time data associated with a user's face as well as a user interface configured to receive an indication of a makeup look selected by a user and provide guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user, based on the real-time data captured by the sensors.

[0024] The intelligent compact device **102** may include a housing **102** that is configured to be opened or closed by a user (e.g., via a hinge). In some examples, the housing **102** may include a display (which may be a touch screen display), various compartments and/or dispensers for cosmetic products and/or applicators thereof, and/or a mirror, that are accessible to the user only when the housing **102** is opened. In other examples, the housing **102** may additionally, or alternatively, include one or more exterior/external displays, various compartments and/or dispensers for cosmetic products and/or applicators thereof, and/or mirrors that are accessible to the user when the housing **102** is closed.

[0025] In the embodiment shown in FIG. **1**A, the housing **102** is opened to reveal an interior display **104** of a user interface of the intelligent cosmetic compact device **100**, as well as compartments **106** (and/or dispensers) for cosmetic products, and/or applicators for cosmetic products. As shown in FIG. **1**B, the housing **102** of the intelligent cosmetic compact device **100** is closed, such that the interior display **104** is not visible. In the embodiment shown in FIG. **1**B, the housing **102** includes one or more exterior compartments **106** (and/or dispensers) for cosmetic products. Moreover, in the embodiments shown in FIG. **1**C and **1**D, the housing **102** of the intelligent cosmetic compact device **100** is closed, and includes an exterior display **104** of a user interface of the intelligent cosmetic compact device **100**. Additionally, in the embodiment shown in FIG. **1**E, the housing **102** of the intelligent cosmetic compact device **100** is closed, without any exterior displays **104** and/or compartments.

Example System

[0026] FIG. **2** depicts an exemplary computer system **200** for operating an intelligent cosmetic compact device, according to one embodiment. The high-level architecture

illustrated in FIG. **2** may include both hardware and software applications, as well as various data communications channels for communicating data between the various hardware and software components, as is described below.

[0027] The system **200** may include an intelligent cosmetic compact device **100** as well as, in some cases, one or more user computing devices **202** (which may include, e.g., smart phones, smart watches or fitness tracker devices, tablets, laptops, virtual reality headsets, smart or augmented reality glasses, wearables, etc.), and/or one or more server(s) **204**. The intelligent cosmetic compact device **100**, user device(s) **202**, and/or server(s) **204** may be configured to communicate with one another via a wired or wireless computer network **206**, and/or via short range signals, such as BLUETOOTH signals.

[0028] Although one intelligent cosmetic compact device **100**, one user device **202**, one server **204**, and one network **206** are shown in FIG. **2**, any number of such intelligent cosmetic compact devices **100**, user devices **202**, servers **204**, and networks **206** may be included in various embodiments. To facilitate such communications, the intelligent cosmetic compact device **100**, user devices **202**, and/or servers **204** may each respectively comprise a wireless transceiver to receive and transmit wireless communications.

[0029] The intelligent cosmetic compact device **100** may include one or more sensors **208**, one or more user interfaces **210**, one or more components **214**, and/or one or more light sources **216** configured to provide light to the face of the user. Additionally, the intelligent cosmetic compact device **100** may include a controller **218**, including one or more processor(s) **220**, as well as one or more computer memories **222**.

[0030] Generally speaking, the sensors **208** may be configured to capture real-time data associated with the face of a user before, during, and/or after a user applies a cosmetic product to the user's face. The sensors **208** may include, for instance, a camera and/or a depth sensor configured to capture data associated with the user's face, data associated with various cosmetic products to be applied to the user's face and/or their packaging, etc. Moreover, the sensors **208** may include sensors (e.g., the camera and/or the depth sensor, or additional or alternative sensors) configured to capture biometric data associated with the user, such as facial recognition data, fingerprint recognition data, iris recognition data, etc.

[0031] The user interface **210** may be configured to receive inputs and selections from the user of the intelligent cosmetic compact device **100**, and/or to provide audible or visual feedback to the user of the intelligent cosmetic compact device **100**, including instructions, guidance, tutorials, etc., associated with the user applying cosmetic products to the user's face for a particular makeup look selected by the user.

[0032] For instance, the user interface **210** may provide interactive displays via which users may select a desired makeup look to be applied to the face of the user. Examples of such displays are shown at FIGS. **3**A-**3**C below. The user may select a pre-existing look or may create a custom look. The selected look may be associated with various parameters and/or specifications that the intelligent cosmetic compact device **100** may use to provide guidance to the user so that the user can apply cosmetic products to his or her face to achieve the selected look. Additionally, the user may provide an image or a social media link which may be analyzed to determine the parameters and/or specifications that the intelligent cosmetic compact device **100** may use to provide guidance to the user so that the user can apply cosmetic products to his or her face to achieve the selected look. For instance, these specifications may include types of makeup applied to each area of the face, heaviness of makeup applied to each area of the face, particular patterns, shapes, or borders of makeup applied to each area of the face, layers of makeup applied to each area of the face, etc. The intelligent cosmetic compact device **100** may provide step-by-step audible and/or visual guidance to the user indicating, for instance, which cosmetic product to use, which applicator to use, where the cosmetic product should be applied (for instance, including a visual indication of a location on the face of the user where the cosmetic product should be applied), how many coats should be applied, how the cosmetic product should be blended with other products, patterns/shapes/motions to be used when applying the cosmetic product, etc. In some examples, this step-by-step guidance may be provided in real-time as the user applies or attempts to apply the cosmetic products to his or her face.

[0033] Moreover, in some examples, the intelligent cosmetic compact device **100** may analyze the sensor data to determine that the user has completed a step, and may accordingly automatically proceed to a subsequent step in the guidance. Additionally, in some examples, the intelligent cosmetic compact device **100** may determine that a user is having difficulty completing a step (e.g., based on the way that the cosmetic products are applied to the user's face, and/or based on the way that the user is attempting to apply the cosmetic products to the user's face), and may accordingly provide additional guidance (e.g., additional guidance for removing an incorrectly applied cosmetic product, additional guidance regarding recommended techniques, additional guidance regarding adjustments to actions being performed by the user, additional guidance for selecting a less challenging look, etc.).

[0034] In some examples, the user interface **210** may further include an augmented reality (AR) component configured to generate and display an AR rendering of three-dimensional map of the user's face, and/or a selected makeup look as predicted to appear when applied to the user's face. For example, in some cases, the AR rendering may be overlaid upon an image or video of the user's face as captured in real-time by the sensors **208** or **232**, to illustrate the appearance of the selected makeup look as applied to the user's face. In some examples, the guidance may be provided via the AR component, e.g., such that an overlay upon an area of the user's face may be highlighted to illustrate that a cosmetic product should be applied to that area. For example, a trace of a cat-eye look may be overlaid upon the user's eyes via the AR component, such that the user may apply an eyeliner product over the trace in order to apply the eyeliner product to the user's eyes to achieve the cat-eye look. As another example, certain areas of the user's cheekbones, chin, forehead, nose, etc., may be highlighted in an overlay provided via the AR component, such that the user may apply a contouring product, such as a blush or bronzer, in the areas shown in the overlay to achieve a contoured look.

[0035] Moreover, in some examples, the user interface **210** may be configured to receive feedback from a user associated with a selected makeup look after the selected

makeup look is applied by the user. Furthermore, the user interface **210** may provide additional alerts, notifications, communications, etc., as discussed elsewhere herein.

[0036] Furthermore, the one or more components **214** may include, for instance, an accelerometer (or other motion detector) component **214**. The intelligent cosmetic compact device **100** may analyze the data captured by the accelerometer or other motion detector component **214** in order to determine an orientation of the intelligent cosmetic compact device **100**, and may accordingly adjust the orientation of the visual displays provided via the user interface **210** (including, in some cases, the AR displays).

[0037] Additionally or alternatively, the one or more components **214** may include, for instance, a haptic feedback component. The haptic feedback component **214** may be configured to vibrate, provide pressure, or otherwise provide feedback to a user of the intelligent cosmetic compact device **100**, based on commands/instructions provided by the controller **218**.

[0038] Moreover, the one or more components **214** may include, for instance, one or more compartments or dispensers for cosmetic products, configured to dispense various cosmetic products, based on commands/instructions provided by the controller **218**. For example, the dispensers may dispense particular cosmetic products to particular applicators associated with such products (e.g. a mascara dispenser may dispense mascara to a mascara brush applicator, a blush dispenser may dispense blush powder to a brush applicator, etc.). Furthermore, the one or more components **214** may include, for example, one or more temperature control components configured to maintain temperature associated with the various cosmetic products stored in the various dispensers.

[0039] Furthermore, the one or more components **214** may include, for instance, one or more cleaning components configured to clean and/or disinfect other of the components **214** (such as, e.g., the dispensers, the user interface, etc.), and/or the housing **102**, of the intelligent cosmetic compact device **100**, based on commands/instructions provided by the controller **218**.

[0040] The memories **222** may include one or more forms of volatile and/or non-volatile, fixed and/or removable memory, such as read-only memory (ROM), electronic programmable read-only memory (EPROM), random access memory (RAM), erasable electronic programmable read-only memory (EEPROM), and/or other hard drives, flash memory, MicroSD cards, and others. Memorie(s) **222** may store an operating system (OS) (e.g., iOS, Microsoft Windows, Linux, UNIX, etc.) capable of facilitating the functionalities, apps, methods, or other software as discussed herein.

[0041] Generally speaking, the memorie(s) **222** may store instructions that, when executed by the processor(s) **220**, cause the processors **220** to receive an indication of a makeup look selected by a user (e.g., from a user interface **210** of the intelligent cosmetic compact device **100**, or from a user interface **230** of an associated user device **202**), and instructions that, when executed by the controller **218**, cause the intelligent cosmetic compact device **100** to provide guidance via a user interface, and/or haptic feedback, for a user to apply a cosmetic product based on the selected makeup look.

[0042] Furthermore, the memorie(s) **222** may store instructions that, when executed by the processor(s) **220**, cause the processor(s) **220** to analyze images associated with cosmetic products to identify particular cosmetic products or characteristics thereof. For instance, the memorie(s) **222** may store instructions that, when executed by the processor (s) **220**, cause the processor(s) **220** to capture image data (e.g., via the sensors **208** and/or sensors **232**) associated with packaging of various cosmetic products (i.e., cosmetic products to be added to integrated dispensers of the intelligent cosmetic compact device, and/or cosmetic products stored separately from the intelligent cosmetic compact device), and analyze the image data associated with the packaging of the various cosmetic products to identify respective cosmetic products based on their packaging. For instance, in some examples, this analysis may include using object recognition techniques to identify a likely type of cosmetic product and/or likely properties associated with the cosmetic product based on the image. Moreover, in some examples, this analysis may include analyzing an image of the cosmetic product packaging using optical character recognition techniques to identify one or more letters, numbers, words, codes, etc., on the cosmetic product packaging, and accessing a database associated with cosmetic products to match any identified letters, numbers, words, codes, etc., on the cosmetic product packaging with particular cosmetic products and/or particular properties associated therewith. As another example, this analysis may include analyzing an image of the cosmetic product packaging to identify and/or decode a barcode, QR code, etc. For instance, the payload of the barcode, QR code, etc., may include an identification or indication of the cosmetic product and/or properties associated therewith.

[0043] The memorie(s) **222** may store instructions that, when executed by the processor(s) **220**, cause the processor (s) **220** to identify an available cosmetic product that is appropriate for a particular element of the selected look, and the memorie(s) **222** may store instructions that, when executed by the processor(s) **220**, cause the controller **218** to control one or more dispenser components **214** to dispense a particular cosmetic product to a particular applicator, and/or instructions that, when executed by the processor(s) **220**, such that an appropriate cosmetic product is applied to a particular attached applicator.

[0044] In particular, the instructions stored on the memorie(s) **222** may cause the processors **220** to analyze real-time sensor data captured by the sensors **208** (and/or external sensors, such as sensors **232** of a user device **202**) in order to generate a three-dimensional map associated with the user's face and identify the locations of one or more facial features (e.g., eyes, eyelids, eyebrows, eyelashes, cheeks, cheekbones, nose, lips, chin, etc.) of the user's face on the three-dimensional map.

[0045] Furthermore, the instructions stored on the memorie(s) **222** may cause the controller **218** to provide haptic feedback (e.g., via a haptic feedback component **214**) in real-time as the user holds a cosmetic applicator the user's face, to guide the user to hold or move the applicator in accordance with a selected makeup look. For instance, the instructions stored on the memorie(s) **222** may cause the controller **218** to control a haptic feedback component **214** to provide one type of haptic feedback (or to not provide haptic feedback) when the user's placement movement of the intelligent cosmetic compact device **100** is in accordance with the selected makeup look, and to provide another type of haptic feedback (or to provide haptic feedback) when the

user's placement movement of the intelligent cosmetic compact device **100** is not in accordance with the selected makeup look. As another example, the instructions stored on the memorie(s) **222** may cause the controller **218** to control a haptic feedback component **214** located on one side of the housing **102** to provide haptic feedback to indicate that the user should start (or stop) moving the intelligent cosmetic compact device **100** in that direction, in accordance with a selected makeup look.

[0046] For instance, the instructions stored on the memorie(s) **222** may cause the controller **218** to control a haptic feedback component **214** to provide one type of haptic feedback (and/or the absence of haptic feedback) when the intelligent cosmetic compact device **100** draws a straight line across a user's eyelid for a cat eye look, and another type of haptic feedback (and/or the presence of haptic feedback) when the intelligent cosmetic compact device **100** begins to draw a crooked line or otherwise veer from an initial straight line based on the way the user is moving or holding the applicator. As another example, the instructions stored on the memorie(s) **222** may cause the controller **218** to control a haptic feedback component **214** to provide a first type of haptic feedback when the user holds an applicator too close to the eye to apply mascara, a second type of haptic feedback (or the same type of haptic feedback as the first type of haptic feedback) when the applicator is held too far from the eye to apply mascara, and a third type of haptic feedback (or the absence of haptic feedback) when the applicator is held the correct distance from the eye to apply mascara. As still another example, the instructions stored on the memorie(s) **222** may cause the controller **218** to control a haptic feedback component **214** to provide one type of haptic feedback when the applicator is pressed too hard on the lips to apply lipstick in accordance with the selected look, and another type of haptic feedback (or the absence of haptic feedback) when the applicator is pressed to the lips with the correct level of pressure to apply lipstick in accordance with the selected look.

[0047] In addition to or as an alternative to the haptic feedback, the instructions stored on the memorie(s) **222** may cause a user interface **210** to provide audible or visible feedback, guidance, or tutorials to the user in real-time as the user applies the makeup look, or may send such feedback, guidance, or tutorials to another device (such as the user device **202**) for display via the user interface of that device (e.g., the user interface **230**).

[0048] Moreover, the instructions stored on the memorie (s) **222** may cause the controller **218** to adjust the haptic feedback provided by the haptic feedback components **214**, based on conditions associated with the user's skin as detected in real-time, e.g., based on data captured by the sensors **208** or sensors **232**. For instance, the instructions stored on the memorie(s) **222** may cause the processor(s) **220** to analyze image data captured by the sensors **208** or sensors **232** to detect blemishes of the user's skin, and may, for instance, cause the controller **218** to adjust the haptic feedback provided by the haptic feedback components **214**, such that additional cosmetic products or additional coats of cosmetic products, and/or special cosmetic products specifically designed for blemishes, are applied to the affected area. Furthermore, in some examples, the instructions stored on the memorie(s) **222** may cause the processor(s) **220** to analyze image data captured by the sensors **208** or sensors **232** to detect skin health conditions, injuries, reactions, etc., of the user's skin, and may, in some cases, cause the controller **218** to adjust the haptic feedback provided by the haptic feedback components **214**, to guide the user to cease applying the cosmetic products or applies the cosmetic products in a manner to avoid further irritating or injuring any detected skin health conditions, injuries, reactions etc. Furthermore, in some examples, the instructions stored on the memorie(s) **222** may cause the processor(s) **220** to generate an alert based on the detected skin health condition, injury, reaction, etc., and provide the alert, e.g., via a user interface **210** and/or via the user interface **230**.

[0049] Furthermore, in some examples, the instructions stored on the memorie(s) **222** may cause the processor(s) **220** and/or the controller **218** to perform any or all of the steps of the method **400** discussed below with respect to FIG. **4**.

[0050] The user device **202** may include, or may be configured to communicate with, a user interface **230**, which may receive input from users and may provide audible or visible output to users in a similar manner as discussed above with respect to the user interface **210** of the intelligent cosmetic compact device **100**. Furthermore, the user device **202** may include, or may be configured to communicate with, one or more respective sensors **232**, which may include similar sensors and/or sensor functionality as discussed above with respect to the sensors **208** of the intelligent cosmetic compact device **100**. Additionally, the user device **202** may include, or may be configured to communicate with one or more light sources **234** configured to provide light to the face of the user of the intelligent cosmetic compact device **100**. Furthermore, in some examples, the user device **202** may include one or more components **233**. For instance, these components **233** may include haptic feedback components which may operate similarly to the haptic feedback component(s) **214** discussed above, in order to provide haptic feedback to the user as the user applies cosmetic products to his or her face. For instance, the intelligent cosmetic compact device **100** may send generated guidance to the user device **202**, and the user device **202** (e.g., a wearable user device such as a smart watch or fitness tracker) may provide haptic feedback to the user's wrist as the user applies cosmetic products to his or her face in order to provide the guidance to the user.

[0051] Moreover, the user device **202** may include one or more processor(s) **236**, as well as one or more computer memories **238**. Memories **238** may include one or more forms of volatile and/or non-volatile, fixed and/or removable memory, such as read-only memory (ROM), electronic programmable read-only memory (EPROM), random access memory (RAM), erasable electronic programmable read-only memory (EEPROM), and/or other hard drives, flash memory, MicroSD cards, and others. Memorie(s) **238** may store an operating system (OS) (e.g., iOS, Microsoft Windows, Linux, UNIX, etc.) capable of facilitating the functionalities, apps, methods, or other software as discussed herein. The memorie(s) **238** may store instructions that, when executed by the processor(s) **236**, cause the processor (s) **236** to receive input from a user as provided via the user interface **230** (e.g., via interactive user interface display screens discussed below with respect to FIGS. **3**A-**3**C), and send the received user input to the intelligent cosmetic compact device **100** (e.g., via the network **206**), in some cases responsive to a request for such user input from the intelligent cosmetic compact device **100**. Moreover, in some

examples, the memorie(s) **238** may store instructions that, when executed by the processor(s) **236**, cause the processor (s) **236** to receive, from the smart makeup compact device **100** (and/or from the server(s) **204**), indications of guidance (and/or associated haptic feedback) to be provided to the user for applying one or more cosmetic products to achieve a look selected by the user, and may in turn provide the received guidance audible and/or visibly via the user interface **230**, and/or as haptic feedback via the component(s) **233**. Furthermore, in some examples, the memorie(s) **238** may store instructions that, when executed by the processor (s) **236**, cause the processor(s) **236** to capture sensor data via one or more sensors **232**, in some cases responsive to a request for particular sensor data from the intelligent cosmetic compact device **100**, and may send the captured sensor data to the intelligent cosmetic compact device **100**. Moreover, in some examples, the memorie(s) **238** may store instructions that, when executed by the processor(s) **236**, cause the processor(s) **236** to provide light to the face of the user via a light source **234**, in some cases responsive to a request from the intelligent cosmetic compact device **100** to provide light to the face of the user. In some examples, the request may include a request for a particular lighting parameters, such as a particular level/intensity of light, or a particular warmth or color of light, and the processor(s) **236** may in turn cause the light source **234** to provide the requested level/intensity, color, warmth, etc. of light to the face of the user.

[0052] Furthermore, in some examples, the instructions stored on the memorie(s) **238** may cause the processor(s) **236** to perform any or all of the steps of the method **400** discussed below with respect to FIG. **4**.

[0053] In some embodiments the server **204** may comprise one or more servers, which may comprise multiple, redundant, or replicated servers as part of a server farm. In still further aspects, such server(s) **204** may be implemented as cloud-based servers, such as a cloud-based computing platform. For example, such server(s) **204** may be any one or more cloud-based platform(s) such as MICROSOFT AZURE, AMAZON AWS, or the like. Such server(s) **204** may include one or more processor(s) **250** (e.g., CPUs) as well as one or more computer memories **252**.

[0054] The memories **252** may include one or more forms of volatile and/or non-volatile, fixed and/or removable memory, such as read-only memory (ROM), electronic programmable read-only memory (EPROM), random access memory (RAM), erasable electronic programmable read-only memory (EEPROM), and/or other hard drives, flash memory, MicroSD cards, and others. Memorie(s) **252** may store an operating system (OS) (e.g., Microsoft Windows, Linux, UNIX, etc.) capable of facilitating the functionalities, apps, methods, or other software as discussed herein. The memorie(s) **252** may store one or more machine learning models **258**, and/or one or more respective machine learning model training applications **260**. These machine learning models **258** may include, for instance, a machine learning model trained to analyze data associated with a user's face and/or a three-dimensional map associated with the user's face to identify facial features thereon, a machine learning model trained to analyze images associated with makeup looks to identify cosmetic products and/or techniques used to create the makeup looks, a machine learning model trained to analyze data associated with the user's skin to identify a skin type or a skin health condition associated with the user, a machine learning model trained to analyze data associated with previous makeup looks selected by a user to predict additional makeup looks for the user, etc.

[0055] Additionally, or alternatively, the memorie(s) **252** may store makeup look data, and/or user data. The makeup look data may include, for instance, guidance, tutorials, haptic feedback, etc., associated with various makeup looks, and may also be stored in a look database **254** (or in multiple such databases), which may be accessible or otherwise communicatively coupled to the server **204**. The user data may include previous makeup looks worn by the user, user preferences, and various other data associated with the user, and may also be stored in a user database **256** (or in multiple such databases), which may be accessible or otherwise communicatively coupled to the server **204**. Furthermore, in some examples, the makeup look data and the user data may be stored in the same database, which may be accessible or otherwise communicatively coupled to the server **204**.

[0056] Furthermore, the memorie(s) **252** may store instructions that, when executed by the processors **250**, cause the processors **250** to receive data from various databases such as the databases **254** and **256**, and/or data from the intelligent cosmetic compact device **100** and/or the user device **202** (e.g., via the network **206**). The data from the intelligent cosmetic compact device **100** and/or the user device **202** may include, for instance, data captured by the sensors **208** of the intelligent cosmetic compact device **100** and/or data captured by the sensors **232** of the user device **202**, data input by a user via a user interface **210** of the intelligent cosmetic compact device and/or data input by a user via the user interface **230** of the user device **202**, etc. The instructions stored on the memorie(s) **252**, when executed by the processors **250**, may cause the processors **250** to analyze data received from the database, and/or the intelligent cosmetic compact device **100** and/or the user device **202** in order to make an identification or a prediction based on the received data, and subsequently send the identification and/or prediction to the intelligent cosmetic compact device **100** and/or the user device **202**. For instance, this analysis and identification and/or prediction may be based upon applying a trained machine learning model **258** to the data received from the databases and/or the intelligent cosmetic compact device **100** and/or the user device **202**.

[0057] In some examples, one or more machine learning model(s) **258** may be executed on the server **204**, while in other examples one or more machine learning model(s) **258** may be executed on another computing system, separate from the server **204**. For instance, the server **204** may send data to another computing system, where a trained machine learning model **258** is applied to the data, and the other computing system may send a prediction or identification, based upon applying the trained machine learning model **258** to the data, to the server **204**. Moreover, in some examples, one or more machine learning model **258** (s) may be trained by respective machine learning model training application(s) **260** executing on the server **204**, while in other examples, one or more machine learning model(s) **258** may be trained by respective machine learning model training application(s) executing on another computing system, separate from the server **204**.

[0058] Whether the machine learning model(s) **258** are trained on the server **204** or elsewhere, the machine learning model(s) **258** may be trained by respective machine learning

model training application(s) **260** using training data (including historical data in some cases), and the trained machine learning model(s) **258** may then be applied to new/current data that is separate from the training data in order to determine, e.g., predictions and/or identifications related to the new/current data.

[0059] For example, a machine learning model **258** trained to analyze data associated with a user's face and/or a three-dimensional map associated with the user's face to identify facial features thereon may be trained by a machine learning model training application **260** using training data including images of various faces and/or three-dimensional maps associated with the various faces, and indications of locations of facial features in the images and/or three-dimensional maps. For instance, each image and/or three-dimensional map may be labeled to indicate locations of facial features such as the eyes, eyelids, eyebrows, eyelashes, cheeks, cheekbones, nose, lips, chin, etc. on the face, and these labeled images and/or three-dimensional maps may be used as training data. Once sufficiently trained using this training data, such a machine learning model **258** may be applied to a new image, video, and/or three-dimensional map associated with a user's face (e.g., an image or video captured by the sensors **208**, **232**, etc., in real-time), and may identify likely locations of various facial features of the user's face.

[0060] As another example, a machine learning model **258** trained to analyze images associated with makeup looks to identify cosmetic products and/or techniques used to create the makeup looks may be trained by a machine learning model training application **260** using training data including images of individuals with various makeup looks applied, and indications of cosmetic products and/or techniques that were used to create the looks shown in the images. For instance, an image of an individual wearing a particular makeup look may be labeled with a particular color or brand of mascara, blush, lipstick, foundation, etc., used to create the look, as well as types of applicators used to create the look, number of coats/layers of each cosmetic product, techniques such as motions, patterns, shapes, or lines used to create the look, etc., and these labeled images may be used as training data. Once sufficiently trained using this training data, such a machine learning model **258** may be applied to a new image, such as an image provided by a user via a user interface **210** and/or a user interface **230**, or an image from a social media link provided by the user via the user interface **210** and/or a user interface **230**, and may identify/predict cosmetic products and/or techniques that may be used to replicate the makeup look shown in the image. In some examples, the machine learning model **258** may further generate guidance, including step-by-step guidance, to be used by the intelligent cosmetic compact device **100** when providing guidance, instructions, tutorials, haptic feedback, etc., for replicating the makeup look shown in the image.

[0061] Moreover, as another example, a machine learning model **258** trained to analyze data associated with the user's skin to identify a skin type or a skin health condition associated with the user may be trained by a machine learning model training application **260** using training data including images or other sensor data associated with various individuals' skin, and indications of skin types, skin health conditions, or other skin characteristics associated with the various individuals' skin. For instance, images of individuals having various skin types may be labeled with the respective skin types shown in each image. Similarly, images of individuals having various skin health conditions may be labeled with an indication of the health condition, the location of visual indicators associated with the health condition shown in the image, etc. Furthermore, images of individuals having various skin characteristics may be labeled with the respective skin characteristics. These labeled images may be used as training data, and once sufficiently trained using this training data, such a machine learning model **258** may be applied to a new image, video, and/or three-dimensional map associated with a user's face (e.g., an image or video captured by the sensors **208**, **232**, etc., in real-time), and may identify/predict a skin type, skin health condition, and/or other skin characteristic associated with the user's face.

[0062] Additionally, as another example, a machine learning model **258** trained to analyze data associated with previous makeup looks selected by a user to predict additional makeup looks for the user may be trained by a machine learning application **260** using training data including makeup looks selected by previous users, characteristics of the previous users, input/feedback from the previous users about the makeup looks, once applied by an intelligent cosmetic compact device **100**, etc. For instance, various makeup looks may be labeled with indications of characteristics of users who gave positive feedback regarding the makeup looks, indications of other looks receiving positive feedback from the same users, etc. Once sufficiently trained using this training data, such a machine learning model **258** may be applied to a user, the user's characteristics, and previous makeup looks selected/liked by the user, and may predict/suggest other makeup looks that the user may enjoy.

[0063] In various aspects, the machine learning model(s) **258** may comprise machine learning programs or algorithms that may be trained by and/or employ neural networks, which may include deep learning neural networks, or combined learning modules or programs that learn in one or more features or feature datasets in particular area(s) of interest. The machine learning programs or algorithms may also include natural language processing, semantic analysis, automatic reasoning, regression analysis, support vector machine (SVM) analysis, decision tree analysis, random forest analysis, K-Nearest neighbor analysis, naïve Bayes analysis, clustering, reinforcement learning, and/or other machine learning algorithms and/or techniques.

[0064] In some embodiments, the artificial intelligence and/or machine learning based algorithms used to train the machine learning model(s) **258** may comprise a library or package executed on the server **204** (or other computing devices not shown in FIG. **2**). For example, such libraries may include the TENSORFLOW based library, the PYTORCH library, and/or the SCIKIT-LEARN Python library.

[0065] Machine learning may involve identifying and recognizing patterns in existing data (such as training a model based upon historical data) in order to facilitate making predictions or identification for subsequent data (such as using the machine learning model on new/current data order to determine a prediction or identification related to the new/current data).

[0066] Machine learning model(s) may be created and trained based upon example data (e.g., "training data") inputs or data (which may be termed "features" and

"labels") in order to make valid and reliable predictions for new inputs, such as testing level or production level data or inputs. In supervised machine learning, a machine learning program operating on a server, computing device, or otherwise processor(s), may be provided with example inputs (e.g., "features") and their associated, or observed, outputs (e.g., "labels") in order for the machine learning program or algorithm to determine or discover rules, relationships, patterns, or otherwise machine learning "models" that map such inputs (e.g., "features") to the outputs (e.g., labels), for example, by determining and/or assigning weights or other metrics to the model across its various feature categories. Such rules, relationships, or otherwise models may then be provided subsequent inputs in order for the model, executing on the server, computing device, or otherwise processor(s), to predict, based upon the discovered rules, relationships, or model, an expected output.

[0067] In unsupervised machine learning, the server, computing device, or otherwise processor(s), may be required to find its own structure in unlabeled example inputs, where, for example multiple training iterations are executed by the server, computing device, or otherwise processor(s) to train multiple generations of models until a satisfactory model, e.g., a model that provides sufficient prediction accuracy when given test level or production level data or inputs, is generated. The disclosures herein may use one or both of such supervised or unsupervised machine learning techniques.

[0068] In addition, memories **252** may also store additional machine readable instructions, including any of one or more application(s), one or more software component(s), and/or one or more application programming interfaces (APIs), which may be implemented to facilitate or perform the features, functions, or other disclosure described herein, such as any methods, processes, elements or limitations, as illustrated, depicted, or described for the various flowcharts, illustrations, diagrams, figures, and/or other disclosure herein. For instance, in some examples, the computer-readable instructions stored on the memory **252** may include instructions for carrying out any of the steps of the method **400** via an algorithm executing on the processors **250**, which is described in greater detail below with respect to FIG. **4**. It should be appreciated that one or more other applications may be envisioned and that are executed by the processor(s) **252**. It should be appreciated that given the state of advancements of mobile computing devices, any or all of the processes functions and steps described herein may be present together on a mobile computing device, such as the user device **202**, or the intelligent cosmetic compact device **100**.

Example User Interface Displays

[0069] FIGS. **3**A-**3**C depict exemplary user interface displays as may be provided by a user interface of the intelligent cosmetic compact device (e.g., the user interface **210** of the intelligent cosmetic compact device **100**) and/or of an associated user device (e.g., the user interface **230** of the user device **202**). For instance, FIG. **3**A illustrates an example user interface display via which a user may select a makeup look, and FIG. **3**B illustrates an example user interface display via which a user has already selected a makeup look. For instance, the user may select between pre-set options such as "smoky eye," "cat eye," "contour," "day look," "night look," "party look," "work look," "celebrity look," etc. In some examples, the pre-set options may differ based on, for instance, whether a user is subscribed to a makeup look subscription service, or whether the user is operating the intelligent cosmetic compact device **100** in a "professional" mode compared to an "amateur" mode. Some of these options may include still-further options (not shown)-for instance, a user may select a specific celebrity for a "celebrity look," or may select options for each facial feature to create a custom look. These options may include, for instance, types of products applied, how heavily each of the products are applied to each facial area, etc. Furthermore, in some examples, the user may be prompted to upload an image of a desired look, or a link to a social media post including a desired look, which may be analyzed to generate tutorials, instructions, haptic feedback, etc., associated with the desired look for use by the intelligent cosmetic compact device **100** when providing guidance to the user for applying the desired look.

[0070] FIG. **3**C illustrates an example preview of the look selected by the user at FIG. **3**B. In some examples, the preview may be a generalized preview, e.g., illustrating examples of other individuals to whom the look has been applied, or illustrating examples of a three-dimensional rendering of the look as applied to a three-dimensional model of a face. As shown in FIG. **3**C, the preview includes a rendering of the user's current look and a rendering of a predicted look including a prediction of the selected makeup look as applied to the user's face. Furthermore, as shown in FIG. **3**C, the preview includes an option to confirm the selected look. Upon confirming the selected look, the specifications associated with the selected look may be sent to the intelligent cosmetic compact device **100** so that the intelligent cosmetic compact device **100** may provide guidance for the user to apply the selected look to the user's face.

Example Method

[0071] FIG. **4** depicts a flow diagram of an exemplary computer-implemented method for operating an intelligent cosmetic compact device, according to one embodiment. One or more steps of the method **400** may be implemented as instructions stored on a computer-readable memory (e.g., memory **222**, memory **238**, memory **252**, etc.) and executable on one or more processors (e.g., processor **220**, processor **236**, processor **250**, etc.).

[0072] The method **400** may include receiving (block **402**), from a user interface (e.g., the user interface **210** and/or the user interface **230** discussed with respect to FIG. **2**) associated with the intelligent cosmetic compact device, an indication of a makeup look selected by the user. In some examples, the user interface (e.g., the user interface **210**) may be integrated into the intelligent cosmetic compact device, while in other examples, the user interface (e.g., the user interface **230**) may be part of a separate device, such as a user device (e.g., the user device **202**, as discussed with respect to FIG. **2**), and/or another separate device. In embodiments in which the user interface is part of a separate device, receiving the indication of the makeup look selected by the user may include the intelligent cosmetic compact device receiving the indication of the makeup look selected by the user at a communication interface of the intelligent cosmetic compact device, e.g., via a network (e.g., network **206**), via a short range signal between the separate device and the intelligent cosmetic compact device, and/or via a

wired connection between the separate device and the intelligent cosmetic compact device.

[0073] For instance, the user interface may provide a listing of possible makeup looks from which the user may select a makeup look. In some examples, the listing of possible makeup looks may include an indication of which makeup looks have previously been selected by the user. Moreover, in some examples, the listing of possible makeup looks may be modified (to include more looks, fewer looks, or otherwise different looks) based on whether the user is subscribed to a makeup look subscription service. Additionally, in some examples, the listing of possible makeup looks may include an indication of one or more suggested makeup looks for the user. For example, the method **400** may include providing suggested makeup looks for the user based on previous looks selected by the user, based on current trends associated with one or more makeup looks, based on a mood of the user, based on preferences indicated by the user, based on an indication, from the user, of an event or setting at which the user will be wearing the makeup look, based on a time of day or year, etc.

[0074] In some examples, providing suggested makeup looks for the user based on previous looks selected by the user may include applying a trained machine learning model to previously selected looks in order to identify a suggested look for the user. For instance, the method **400** may include training a machine learning model using historical data associated with makeup looks selected by other users, and feedback associated therewith. Once trained, the machine learning model may be capable of predicting a makeup look for a user based on previous makeup looks selected by the user.

[0075] In some examples, prior to proceeding to the further steps of the method **400**, the method **400** may include analyzing biometric data associated with the user (e.g., as captured by one or more integrated sensors, or sensors of a separate device) in order to determine whether the user is an authorized user of the intelligent cosmetic compact device. If the user is an authorized user of the intelligent cosmetic compact device, the method **400** may proceed, but if the user is not an authorized user of the intelligent cosmetic compact device, the method **400** may not proceed further, i.e., such that the operation of the intelligent cosmetic compact device is restricted to only authorized users.

[0076] Furthermore, the method **400** may include analyzing (block **404**) real-time data associated with the face of the user captured by one or more sensors in order to generate a three-dimensional map associated with the face of the user. For instance, the sensors may include integrated sensors of the intelligent cosmetic compact device (e.g., sensors **208**, as discussed with respect to FIG. **2**). Additionally, the sensors may include sensors of a separate device, such as a user device (e.g., sensors **232** of the user device **202**, as discussed with respect to FIG. **2**), and/or another separate device. The sensors may include, for instance, cameras or depth sensors, or other suitable sensors.

[0077] In embodiments in which the sensors include sensors that are part of a separate device, the intelligent cosmetic compact device may request sensor data from, and/or receive sensor data captured by, the sensors of the separate device via a communication interface of the intelligent cosmetic compact device, e.g., via a network (e.g., network **206**), via a short range signal between the separate device and the intelligent cosmetic compact device, and/or via a wired connection between the separate device and the intelligent cosmetic compact device.

[0078] Additionally, in some examples, the intelligent cosmetic compact device, and/or a separate device, may include one or more light sources (e.g., light source **216**, and/or the light source **234**). In such examples, the method **400** may include controlling light sources integrated into the intelligent cosmetic compact device to provide light to the face of the user as the sensor data is being captured, or sending a request to the separate device to cause the separate device to activate a light source to provide light to the face of the user as the sensor data is being captured, e.g., via a network (e.g., network **206**), via a short range signal between the separate device and the intelligent cosmetic compact device, and/or via a wired connection between the separate device and the intelligent cosmetic compact device. For instance, in some examples, the method **400** may include determining optimized lighting parameters, such as an optimized level, warmth, and/or direction of light to be provided based on the selected makeup look, based on a particular cosmetic product being used, based on a particular step within the process of the selected makeup look being applied, and/or based on ambient lighting conditions in an area where the intelligent cosmetic compact device is being used, and may control an integrated light source to provide the optimized light level, warmth, and/or direction of light, or send a request to the separate device to provide the optimized light level, warmth, and/or direction of light.

[0079] In some examples, the method **400** may include generating an augmented reality (AR) version of the three-dimensional map of the face of the user, and displaying the AR version of the three-dimensional map of the face of the user via a user interface associated with the intelligent cosmetic compact device. As discussed above, in some examples, the user interface may be integrated into the intelligent cosmetic compact device, and the AR version of the three-dimensional map of the face of the user may be displayed via the user interface of the intelligent cosmetic compact device. In embodiments in which the user interface is part of a separate device, displaying the AR version of the three-dimensional map of the face of the user may include sending the AR version of the three-dimensional map of the face of the user to the separate device to be displayed by the user interface of the separate device, e.g., via a network (e.g., network **206**), via a short range signal between the separate device and the intelligent cosmetic compact device, and/or via a wired connection between the separate device and the intelligent cosmetic compact device.

[0080] Additionally, the method **400** may include identifying (block **406**) one or more facial features of the face of the user on the three-dimensional map associated with the face of the user. In some examples, this analysis may include applying a trained machine learning model to the three-dimensional map associated with the face of the user to identify the facial features. For instance, the method **400** may include training a machine learning model using historical three-dimensional maps associated with other faces, and corresponding portions of the three-dimensional maps associated with facial features of the other faces, and, once trained, the machine learning model may be capable of identifying such facial features on three-dimensional maps associated with new faces. That is, the trained machine learning model may be configured to recognize facial geometry associated with particular facial features on the three-

dimensional map associated with a face. Certain facial geometry on a particular location of the face may correspond to the eyes of the face, while other facial geometry at another location of the face may correspond to the lips of the face, etc.

[0081] Moreover, in some examples, the method **400** may include generating a preview of the makeup look selected by the user as applied to facial features of the face of the user on the three-dimensional map associated with the face of the user. For instance, the method **400** may include generating an AR preview of the makeup look selected by the user as applied to facial features of the face of the user on the three-dimensional map associated with the face of the user. Furthermore, the method **400** may include generating an AR preview of the steps of the application process of the makeup look selected by the user to the facial features of the face of the user. For instance, the AR preview of the steps of the application process may include images associated with each step of the application process, and/or videos associated with each step of the application process. The method **400** may further include displaying the AR preview of the selected makeup look, and/or the AR preview of the steps of the application process for the selected makeup look, via an integrated user interface of the intelligent cosmetic compact device. In embodiments in which the user interface is part of a separate device, the method **400** may include sending the AR preview to the separate device to be displayed by the user interface of the separate device, e.g., via a network (e.g., network **206**), via a short range signal between the separate device and the intelligent cosmetic compact device, and/or via a wired connection between the separate device and the intelligent cosmetic compact device.

[0082] Furthermore, the method **400** may include providing (block **408**) guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

[0083] For instance, the guidance may include user instructions, support, tutorials, etc., associated with the operation of the intelligent cosmetic compact device, and may include an indication of one or more steps of a cosmetic application process, including which cosmetic products (types of products, brands, colors, etc.) should be used at each step, which applicators should be used at each step, a recommended motion to be used for each step, a number of layers to be used at each step, etc. Furthermore, the guidance may include audible guidance, visual guidance (including AR guidance), and/or haptic guidance, and may be provided via a user interface of the intelligent compact device and/or via another associated user interface (such as a user interface of an associated mobile device).

[0084] The applicators may include, for instance, a brush applicator, a sponge applicator, a puff applicator, a pencil applicator, a felt tip applicator, a marker applicator, a crayon applicator, a lip stick applicator, a lip gloss applicator, a roller applicator, a mascara wand applicator, and/or any other suitable applicator for applying cosmetic products to the face of the user.

[0085] For instance, the method **400** may further include analyzing the sensor data in real-time to identify properties of the skin of the user, properties of the environment of the user, and/or properties of the one or more cosmetic products being applied, and automatically adjusting the haptic feedback provided based on one or more of: a skin type associated with the user, a skin health condition associated with the user, a hydration level of the skin of the user, a skin tone associated with the user, current temperature conditions, current humidity conditions, current precipitation conditions, current lighting conditions, a current time of day, and/or one or more properties associated with the one or more cosmetic products being applied. In some examples, this analysis may include applying a trained machine learning model to the sensor data to identify the properties of the skin of the user, the properties of the environment of the user, and/or the properties of the one or more cosmetic products being applied. For instance, the method **400** may include training a machine learning model using historical sensor data associated with skin properties, environmental properties, cosmetic product properties, etc., and, once trained, the machine learning model may be capable of identifying such properties based on new sensor data.

[0086] Additionally or alternatively, in some examples, the method **400** may include automatically controlling a haptic feedback component of the intelligent cosmetic compact device to provide haptic feedback as guidance to a user holding the intelligent cosmetic compact device. For example, the method **400** may include providing haptic feedback in real-time as a user applies a cosmetic product, indicating one or more improvements or corrections suggested for the user.

[0087] In some examples, for instance, the haptic feedback may be provided when the user has moved an applicator outside of a range associated with the makeup look selected by the user, such that the user may be alerted to move the applicator within the range associated with the selected makeup look. For instance, one type of haptic feedback (and/or the absence of haptic feedback) may be provided when the user uses the applicator to draws a straight line across a user's eyelid for a cat eye look, and another type of haptic feedback (and/or the presence of haptic feedback) may be provided when the user begins to draw a crooked line or otherwise veers from an initial straight line. As another example, a first type of haptic feedback may be provided when the user holds an applicator too close to the eye to apply mascara, a second type of haptic feedback (or the same type of haptic feedback as the first type of haptic feedback) may be provided when the user holds the applicator too far from the eye to apply mascara, and a third type of haptic feedback (or the absence of haptic feedback) may be provided when the user holds the applicator the correct distance from the eye to apply mascara. As still another example, one type of haptic feedback may be provided when the user presses an applicator too hard on the lips to apply lipstick in accordance with the selected look, and another type of haptic feedback (or the absence of haptic feedback) may be provided when the user presses the applicator to the lips with the correct level of pressure to apply lipstick in accordance with the selected look.

[0088] Furthermore, in some examples, the haptic feedback may be provided on a particular side or portion of the intelligent cosmetic compact device to indicate that the user should move the intelligent cosmetic compact device in a particular direction. For instance, haptic feedback provided on the left side of the intelligent cosmetic compact device may indicate that the user should move the applicator to the left to apply the cosmetic product across the face of the user.

[0089] Moreover, in some examples, the method **400** may further include analyzing the sensor data in real-time to identify blemishes of the skin of the user, and automatically

adjusting the haptic feedback, based on identified blemishes, i.e., beyond the initial parameters of the selected makeup look. For instance, the method **400** may include adjusting the guidance to such that the user applies a different amount of particular cosmetic product, e.g., to add more foundation or concealer, to an area of the user's face including a blemish, in order to cover the blemish with the cosmetic product. Furthermore, in some examples, the method **400** may include analyzing the sensor data in real-time to determine whether the blemish is sufficiently covered based on an initial application of the cosmetic product, and may include automatically adjusting the guidance and/or haptic feedback such that the user adds additional cosmetic product as needed until the blemish is sufficiently covered.

[0090] Additionally, in some examples, the method **400** may further include analyzing the sensor data in real-time to identify skin reactions of the skin of the user, and automatically generating alerts or notifications based on any identified skin reactions. For instance, the method **400** may include presenting such generated alerts via an integrated user interface, and/or sending such generated alerts to a separate device to be displayed via a user interface of the separate device.

[0091] Furthermore, in some examples, the method **400** may include ceasing the automatic haptic feedback, in order to operate in a "manual mode" based on, e.g., identifying a skin reaction, and/or based on input from a user. For instance, the user may select a manual mode via a user interface of the intelligent cosmetic compact device, and/or via a user interface of a separate device (from which the intelligent cosmetic compact device may in turn receive an indication of the user selection). Additionally, after operating in the manual mode, the method **400** may include receiving an indication of a selection, from the user, to return to "automatic mode," and may include resuming providing guidance and/or haptic feedback, based on the received indication of the user selection.

[0092] In some examples, the intelligent cosmetic compact device may include integrated dispensers for various cosmetic products, and the method **400** may include controlling the dispensers to dispense the various cosmetic products as needed during the application of the makeup look to the face of the user. Furthermore, the intelligent cosmetic compact device may include temperature control components (e.g., heating elements, cooling elements, fans, etc.) for the dispensers for the various cosmetic products, and the method **400** may include controlling the temperature control components for each dispenser based on a particular range of temperatures associated with the cosmetic product with each dispenser. Additionally, the method **400** may include tracking the dispensing of the cosmetic products via the integrated dispensers, and determining, based on the tracking, when refills of one or more of the cosmetic products are required. For instance, the method **400** may include generating a notification indicating that a refill is required for one of the cosmetic products. For example, the method **400** may include providing the notification via an integrated user interface, or sending the notification to a separate device to be provided via a user interface of the separate device.

[0093] Furthermore, in some examples, the method **400** may include capturing data associated with packaging of various cosmetic products (i.e., cosmetic products to be added to integrated dispensers of the intelligent cosmetic compact device, and/or cosmetic products stored separately from the intelligent cosmetic compact device), and analyzing the data associated with he packaging of the various cosmetic products to identify respective cosmetic products based on their packaging. For instance, in some examples, this analysis may include capturing an image of a cosmetic product package and using object recognition techniques to identify a likely type of cosmetic product and/or likely properties associated with the cosmetic product based on the image. Moreover, in some examples, this analysis may include analyzing an image of the cosmetic product packaging using optical character recognition techniques to identify one or more letters, numbers, words, codes, etc., on the cosmetic product packaging, and accessing a database associated with cosmetic products to match any identified letters, numbers, words, codes, etc., on the cosmetic product packaging with particular cosmetic products and/or particular properties associated therewith. As another example, this analysis may include analyzing an image of the cosmetic product packaging to identify and/or decode a barcode, QR code, etc. For instance, the payload of the barcode, QR code, etc., may include an identification or indication of the cosmetic product and/or properties associated therewith. Moreover, in some examples, the method **400** may include identifying a cosmetic product and/or properties associated therewith based on input provided by a user (e.g., input provided via an integrated user interface of the intelligent cosmetic compact device, and/or via a user interface of a separate device that is sent to the intelligent cosmetic compact device). The method **400** may further include adjusting the guidance and/or the haptic feedback based on particular cosmetic products being applied, and/or properties associated therewith.

[0094] Additionally, in some examples, the intelligent cosmetic compact device may include a cleaning component configured to clean and/or disinfect one or more components of the intelligent cosmetic compact device (such as, e.g., the display, the dispensers, the exterior of the intelligent cosmetic compact device, etc.), and the method **400** may include controlling the cleaning component to clean and/or disinfect the one or more components of the intelligent cosmetic compact device (e.g., at regular intervals, at the request of the user, etc.).

[0095] In some examples, the method **400** may further include receiving feedback associated with the makeup look from the user (e.g., via a user interface) subsequent to the application of the one or more cosmetic products to the face of the user, and storing the feedback associated with the makeup look. For instance, the method **400** may update one or more aspects of the makeup look in future applications based on feedback provided by the user.

Additional Considerations

[0096] The following additional considerations apply to the foregoing discussion. Throughout this specification, plural instances may implement operations or structures described as a single instance. Although individual operations of one or more methods are illustrated and described as separate operations, one or more of the individual operations may be performed concurrently, and nothing requires that the operations be performed in the order illustrated. These and other variations, modifications, additions, and improvements fall within the scope of the subject matter herein.

[0097] Unless specifically stated otherwise, discussions herein using words such as "processing," "computing," "calculating," "determining," "presenting," "displaying," or the like may refer to actions or processes of a machine (e.g., a computer) that manipulates or transforms data represented as physical (e.g., electronic, magnetic, or optical) quantities within one or more memories (e.g., volatile memory, non-volatile memory, or a combination thereof), registers, or other machine components that receive, store, transmit, or display information.

[0098] As used herein any reference to "one embodiment" or "an embodiment" or "some embodiments" means that a particular element, feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment. The appearances of the phrase "in one embodiment" or "in some embodiments" in various places in the specification are not necessarily all referring to the same embodiment.

[0099] As used herein, the terms "comprises," "comprising," "includes," "including," "has," "having" or any other variation thereof, are intended to cover a non-exclusive inclusion. For example, a process, method, article, or apparatus that comprises a list of elements is not necessarily limited to only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. Further, unless expressly stated to the contrary, "or" refers to an inclusive or and not to an exclusive or. For example, a condition A or B is satisfied by any one of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

[0100] In addition, use of "a" or "an" is employed to describe elements and components of the embodiments herein. This is done merely for convenience and to give a general sense of the invention. This description should be read to include one or at least one and the singular also includes the plural unless it is obvious that it is meant otherwise.

[0101] Upon reading this disclosure, those of skill in the art will appreciate still additional alternative structural and functional designs for an intelligent cosmetic compact device, and/or systems, methods, and/or techniques associated therewith. Thus, while particular embodiments and applications have been illustrated and described, it is to be understood that the disclosed embodiments are not limited to the precise construction and components disclosed herein. Various modifications, changes and variations, which will be apparent to those skilled in the art, may be made in the arrangement, operation and details of the method and apparatus disclosed herein without departing from the spirit and scope defined in the appended claims.

Aspects

[0102] 1. An intelligent cosmetic compact device, comprising: a portable cosmetic compact housing configured to be opened and closed, the portable housing comprising: a display that is accessible when the portable cosmetic compact housing is opened; one or more compartments for storing cosmetic products that are accessible when the portable cosmetic compact housing is opened; a user interface; one or more sensors configured to capture real-time data associated with a face of a user; one or more processors; and one or more memories storing non-transitory computer-readable instructions that, when executed by the one or more processors, cause the one or more processors to: receive an indication of a makeup look selected by the user; analyze the real-time data associated with the face of the user in order to generate a three-dimensional map associated with the face of the user; identify one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and provide, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

[0103] 2. The intelligent cosmetic compact device of aspect 1, wherein the one or more sensors include one or more of a camera or a depth sensor.

[0104] 3. The intelligent cosmetic compact device of any one of aspects 1-2, wherein the user interface includes a haptic feedback component, and wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing haptic guidance via the haptic feedback component.

[0105] 4. The intelligent cosmetic compact device of aspect 3, wherein the haptic guidance includes patterns of haptic feedback associated with applying respective cosmetic products to the respective facial features of the user.

[0106] 5. The intelligent cosmetic compact device of aspect 1, wherein the user interface includes an audio component, and wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing audio guidance via the audio component.

[0107] 6. The intelligent cosmetic compact device of any one of aspects 1-5, wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing visual guidance via the display.

[0108] 7. The intelligent cosmetic compact device of aspect 6, further comprising an accelerometer, and wherein providing the visual guidance via the display includes adjusting an orientation of the visual guidance provided via the display based on data captured by the accelerometer.

[0109] 8. The intelligent cosmetic compact device of any one of aspects 1-7, further comprising a communication interface configured to communicate with a mobile device, external to the intelligent cosmetic compact device.

[0110] 9. The intelligent cosmetic compact device of aspect 8, wherein the communication interface is a wired communication interface.

[0111] 10. The intelligent cosmetic compact device of aspect 8, wherein the communication interface is a wireless communication interface.

[0112] 11. The intelligent cosmetic compact device of any one of aspects 1-10, wherein the user interface includes an augmented reality (AR) component configured to generate and display an AR version of the three-dimensional map associated with the face of the user.

[0113] 12. The intelligent cosmetic compact device of aspect 11, wherein the non-transitory computer-readable instructions, when executed by the one or more

processors, further cause the one or more processors to generate a three-dimensional preview of the makeup look selected by the user as applied to the three-dimensional map associated with the face of the user, and wherein the AR component is further configured to generate and display an AR version of the three-dimensional preview of the makeup look selected by the user as applied to the three-dimensional map associated with the face of the user.

[0114] 13. The intelligent cosmetic compact device of aspect 12, wherein the three-dimensional preview of the makeup look selected by the user includes a three-dimensional preview of the application process of the makeup look selected by the user.

[0115] 14. The intelligent cosmetic compact device of any one of aspects 1-13, further comprising one or more temperature control components configured to control temperatures associated with the one or more compartments for storing the one or more cosmetic products within a particular range of temperatures.

[0116] 15. The intelligent cosmetic compact device of any one of aspects 1-14, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: track the usage of the one or more cosmetic products from the one or more compartments; determine, based on tracking the usage of the one or more cosmetic products from the one or more compartments, that a refill of one or more of the cosmetic products is required; and provide a notification indicating that the refill of one or more of the cosmetic products is required, via the user interface.

[0117] 16. The intelligent cosmetic compact device of any one of aspects 1-15, further comprising a cleaning component configured to one or more of: clean or disinfect one or more components of the intelligent cosmetic compact device.

[0118] 17. The intelligent cosmetic compact device of any one of aspects 1-16, further comprising a light source configured to provide light to the face of the user.

[0119] 18. The intelligent cosmetic compact device of aspect 17, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to control the light source to provide particular lighting conditions while the one or more cosmetic products are applied to the facial features of the user.

[0120] 19. The intelligent cosmetic compact device of any one of aspects 1-18, wherein the instructions, when executed by the one or more processors, further cause the one or more processors to identify one or more blemishes of the face of the user on the three-dimensional map associated with the face of the user, and wherein providing, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user is further based on the identified one or more blemishes of the face of the user.

[0121] 20. The intelligent cosmetic compact device of any one of aspects 1-19, wherein providing, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user is further based on a skin type associated with the user, a skin health condition associated with the user, a hydration level of the skin of the user, a skin tone associated with the user, current temperature conditions, current humidity conditions, current precipitation conditions, current lighting conditions, a current time of day, or one or more properties associated with the one or more cosmetic products.

[0122] 21. The intelligent cosmetic compact device of any one of aspects 1-20, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: analyze the real-time data associated with the face of a user to identify a skin reaction associated with the application of the one or more cosmetic products; and provide an alert, via the user interface, based on the identified skin reaction.

[0123] 22. The intelligent cosmetic compact device of any one of aspects 1-21, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to analyze one or more of: the real-time data associated with the face of the user captured by the one or more sensors, or previously-captured data associated with the face of the user captured by the one or more sensors, in order to determine one or more of a skin type or skin health condition associated with the user.

[0124] 23. The intelligent cosmetic compact device of aspect 22, wherein analyzing one or more of: the real-time data associated with the face of the user captured by the one or more sensors, or previously-captured data associated with the face of the user captured by the one or more sensors, in order to determine one or more of the skin type or the skin health condition associated with the user, includes applying a trained machine learning model to one or more of the real-time data associated with the face of the user captured by the one or more sensors, or previously-captured data associated with the face of the user captured by the one or more sensors, to determine one or more of the skin type or the skin health condition associated with the user.

[0125] 24. The intelligent cosmetic compact device of aspect 23, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: obtain training data including data associated with faces of individuals as captured by one or more sensors, and corresponding skin types and/or skin health conditions associated with the respective individuals; and train a machine learning model, using the training data, to identify one or more of a skin type or a skin health condition associated with a new individual based on data associated with the face of the new individual as captured by one or more sensors, resulting in the trained machine learning model.

[0126] 25. The intelligent cosmetic compact device of any one of aspects 1-24, wherein identifying the one or more facial features of the face of the user on the three-dimensional map associated with the face of the user includes applying a trained machine learning model to the three-dimensional map associated with the face of the user to identify the one or more facial features of the face of the user.

[0127] 26. The intelligent cosmetic compact device of aspect 25, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: obtain training data including three-dimensional maps associated with faces of individuals and corresponding facial features of the faces of the respective individuals; and train a machine learning model, using the training data, to identify one or more facial features of a face of a new individual based on a three-dimensional map associated with the face of the new individual, resulting in the trained machine learning model.

[0128] 27. The intelligent cosmetic compact device of any one of aspects 1-26, wherein the one or more sensors are further configured to capture data associated with packaging of the one or more cosmetic products, and wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to analyze the data associated with the packaging of the one or more cosmetic products to identify the one or more cosmetic products.

[0129] 28. The intelligent cosmetic compact device of aspect 27, wherein identifying the one or more cosmetic products includes determining one or more properties associated with the one or more cosmetic products.

[0130] 29. The intelligent cosmetic compact device of any one of aspects 1-28, wherein the one or more memories are further configured to store one or more makeup looks previously selected by the user.

[0131] 30. The intelligent cosmetic compact device of any one of aspects 1-29, wherein receiving an indication of a makeup look selected by the user includes receiving an indication of a makeup look selected by the user from a plurality of makeup looks provided by a subscription service.

[0132] 31. The intelligent cosmetic compact device of any one of aspects 1-30, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to generate one or more suggested makeup looks for the user based on current trends associated with one or more makeup looks.

[0133] 32. The intelligent cosmetic compact device of any one of aspects 1-31, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to generate one or more suggested makeup looks for the user based on a mood and/or setting of the user.

[0134] 33. The intelligent cosmetic compact device of aspect 32, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to determine the mood of the user based on data associated with one or more of facial expressions, voice tone, or other behavioral cues, of the user, captured by the one or more sensors.

[0135] 34. The intelligent cosmetic compact device of any one of aspects 1-33, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to generate one or more suggested makeup looks for the user based on one or more makeup looks previously selected by the user.

[0136] 35. The intelligent cosmetic compact device of any one of aspects 1-34, wherein generating one or more suggested makeup looks for the user based on one or more makeup looks previously selected by the user includes applying a trained machine learning model to the one or more makeup looks previously selected by the user to generate one or more suggested makeup looks for the user.

[0137] 36. The intelligent cosmetic compact device of aspect 35, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: obtain training data including data associated with makeup looks previously selected by individuals, and corresponding subsequent makeup looks selected by respective individuals; and train a machine learning model, using the training data, to identify a suggested makeup look for a new individual based on data associated with makeup looks previously selected by the individual, resulting in the trained machine learning model.

[0138] 37. The intelligent cosmetic compact device of aspect 36, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: receive feedback associated with the makeup look, subsequent to the application of the one or more cosmetics products to the facial features of the user, from the user, via the user interface, wherein feedback associated with a makeup look is included in the data associated with the makeup look.

[0139] 38. The intelligent cosmetic compact device of any one of aspects 1-37, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to generate reminders associated with one or more of cleaning or maintenance of the intelligent cosmetic compact device, and to provide the reminders via the user interface.

[0140] 39. The intelligent cosmetic compact device of any one of aspects 1-38, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: analyze biometric data associated with the user captured by the one or more sensors in order to determine whether the user is an authorized user; and restrict operation of the intelligent cosmetic compact device to authorized users only.

[0141] 40. The intelligent cosmetic compact device of any one of aspects 1-39, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to provide one or more user instructions, guidance, support, or tutorials associated with the operation of the intelligent cosmetic compact device, via the user interface.

[0142] 41. The intelligent cosmetic compact device of any one of aspects 1-40, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to: generate, via the user interface, real-time feedback to the user as the one or more cosmetic

products are applied to the facial features of the user, the real-time feedback including one or more improvements or corrections associated with the application of the one or more cosmetics products to the facial features of the user.

[0143] 42. The intelligent cosmetic compact device of any one of aspects 1-41, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to operate in one or more modes associated with respective users or types of users.

[0144] 43. A computer-implemented method for operating an intelligent cosmetic compact device, the method comprising: receiving, by one or more processors, an indication of a makeup look selected by the user via a user interface; analyzing, by the one or more processors, real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user; identifying, by the one or more processors, one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and providing, by the one or more processors, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

[0145] 44. A non-transitory computer-readable medium storing instructions for operating an intelligent cosmetic compact device that, when executed by one or more processors, cause the one or more processors to perform a method comprising: receiving an indication of a makeup look selected by the user via a user interface; analyzing real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user; identifying one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and providing, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

1. An intelligent cosmetic compact device, comprising:

a portable cosmetic compact housing configured to be opened and closed, the portable housing comprising:

a display that is accessible when the portable cosmetic compact housing is opened;

one or more compartments for storing cosmetic products that are accessible when the portable cosmetic compact housing is opened;

a user interface;

one or more sensors configured to capture real-time data associated with a face of a user;

one or more processors; and

one or more memories storing non-transitory computer-readable instructions that, when executed by the one or more processors, cause the one or more processors to:

receive an indication of a makeup look selected by the user;

analyze the real-time data associated with the face of the user in order to generate a three-dimensional map associated with the face of the user;

identify one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and

provide, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

2. The intelligent cosmetic compact device of claim **1**, wherein the one or more sensors include one or more of a camera or a depth sensor.

3. The intelligent cosmetic compact device of claim **1**, wherein the user interface includes a haptic feedback component, and wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing haptic guidance via the haptic feedback component.

4. The intelligent cosmetic compact device of claim **3**, wherein the haptic guidance includes patterns of haptic feedback associated with applying respective cosmetic products to the respective facial features of the user.

5. The intelligent cosmetic compact device of claim **1**, wherein the user interface includes an audio component, and wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing audio guidance via the audio component.

6. The intelligent cosmetic compact device of claim **1**, wherein providing guidance associated with applying the one or more cosmetic products to the facial features of the user includes providing visual guidance via the display.

7. The intelligent cosmetic compact device of claim **6**, further comprising an accelerometer, and wherein providing the visual guidance via the display includes adjusting an orientation of the visual guidance provided via the display based on data captured by the accelerometer.

8. The intelligent cosmetic compact device of claim **1**, further comprising a communication interface configured to communicate with a mobile device, external to the intelligent cosmetic compact device.

9. The intelligent cosmetic compact device of claim **8**, wherein the communication interface is a wired communication interface.

10. The intelligent cosmetic compact device of claim **8**, wherein the communication interface is a wireless communication interface.

11. The intelligent cosmetic compact device of claim **1**, wherein the user interface includes an augmented reality (AR) component configured to generate and display an AR version of the three-dimensional map associated with the face of the user.

12. The intelligent cosmetic compact device of claim **11**, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to generate a three-dimensional preview of the makeup look selected by the user as applied to the three-dimensional map associated with the face of the user, and wherein the AR component is further configured to generate and display an AR version of the three-dimensional preview of the makeup look selected by the user as applied to the three-dimensional map associated with the face of the user.

13. The intelligent cosmetic compact device of claim **12**, wherein the three-dimensional preview of the makeup look

selected by the user includes a three-dimensional preview of the application process of the makeup look selected by the user.

14. The intelligent cosmetic compact device of claim **1**, further comprising one or more temperature control components configured to control temperatures associated with the one or more compartments for storing the one or more cosmetic products within a particular range of temperatures.

15. The intelligent cosmetic compact device of claim **1**, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to:

track the usage of the one or more cosmetic products from the one or more compartments;

determine, based on tracking the usage of the one or more cosmetic products from the one or more compartments, that a refill of one or more of the cosmetic products is required; and

provide a notification indicating that the refill of one or more of the cosmetic products is required, via the user interface.

16. The intelligent cosmetic compact device of claim **1**, further comprising a cleaning component configured to one or more of: clean or disinfect one or more components of the intelligent cosmetic compact device.

17. The intelligent cosmetic compact device of claim **1**, further comprising a light source configured to provide light to the face of the user.

18. The intelligent cosmetic compact device of claim **17**, wherein the non-transitory computer-readable instructions, when executed by the one or more processors, further cause the one or more processors to control the light source to provide particular lighting conditions while the one or more cosmetic products are applied to the facial features of the user.

19.-**42**. (canceled)

43. A computer-implemented method for operating an intelligent cosmetic compact device, the method comprising:

receiving, by one or more processors, an indication of a makeup look selected by the user via a user interface;

analyzing, by the one or more processors, real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user;

identifying, by the one or more processors, one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and

providing, by the one or more processors, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

44. A non-transitory computer-readable medium storing instructions for operating an intelligent cosmetic compact device that, when executed by one or more processors, cause the one or more processors to perform a method comprising:

receiving an indication of a makeup look selected by the user via a user interface;

analyzing real-time data, captured by one or more sensors, associated with the face of the user, in order to generate a three-dimensional map associated with the face of the user;

identifying one or more facial features of the face of the user on the three-dimensional map associated with the face of the user; and

providing, via the user interface, guidance associated with applying one or more cosmetic products to the facial features of the user in order to achieve the makeup look selected by the user.

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