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Heikkinen et al.

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(54) **ENCODED IMAGE BASED MESSAGING SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(65) **Prior Publication Data**

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Related U.S. Application Data

(63) Continuation of application No. 17/964,687, filed on Oct. 12, 2022, now Pat. No. 11,822,766, which is a (Continued)

(51) **Int. Cl.**
G06F 3/048 (2013.01)
G06F 3/0482 (2013.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G06F 3/0482*** (2013.01); ***G06F 3/04842*** (2013.01); ***G06F 3/04847*** (2013.01); ***G06F 9/451*** (2018.02); ***G06F 16/9554*** (2019.01)

(58) **Field of Classification Search**
CPC G06F 3/0482; G06F 3/04842; G06F 3/04847; G06F 9/451; G06F 16/9554
See application file for complete search history.

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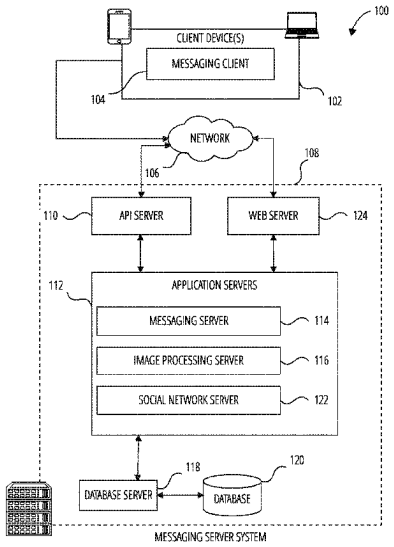
(57) **ABSTRACT**

A system to provide users with a means for accessing media content directly, by performing operations that include: causing display of a media item within a graphical user interface at a client device, the graphical user interface including a set of graphical elements; receiving a selection of a graphical element from among the set of graphical elements within the graphical user interface; generating a reference to the media item based on the selection of the graphical element; encoding a matrix barcode with the reference to the media item; and generating a presentation of the media item that includes a display of the matrix barcode at a position within the media item.

14 Claims, 13 Drawing Sheets



Related U.S. Application Data

continuation of application No. 16/946,133, filed on Jun. 8, 2020, now Pat. No. 11,543,939.

(51) **Int. Cl.**

G06F 3/04842	(2022.01)
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G06F 9/451	(2018.01)
G06F 16/955	(2019.01)

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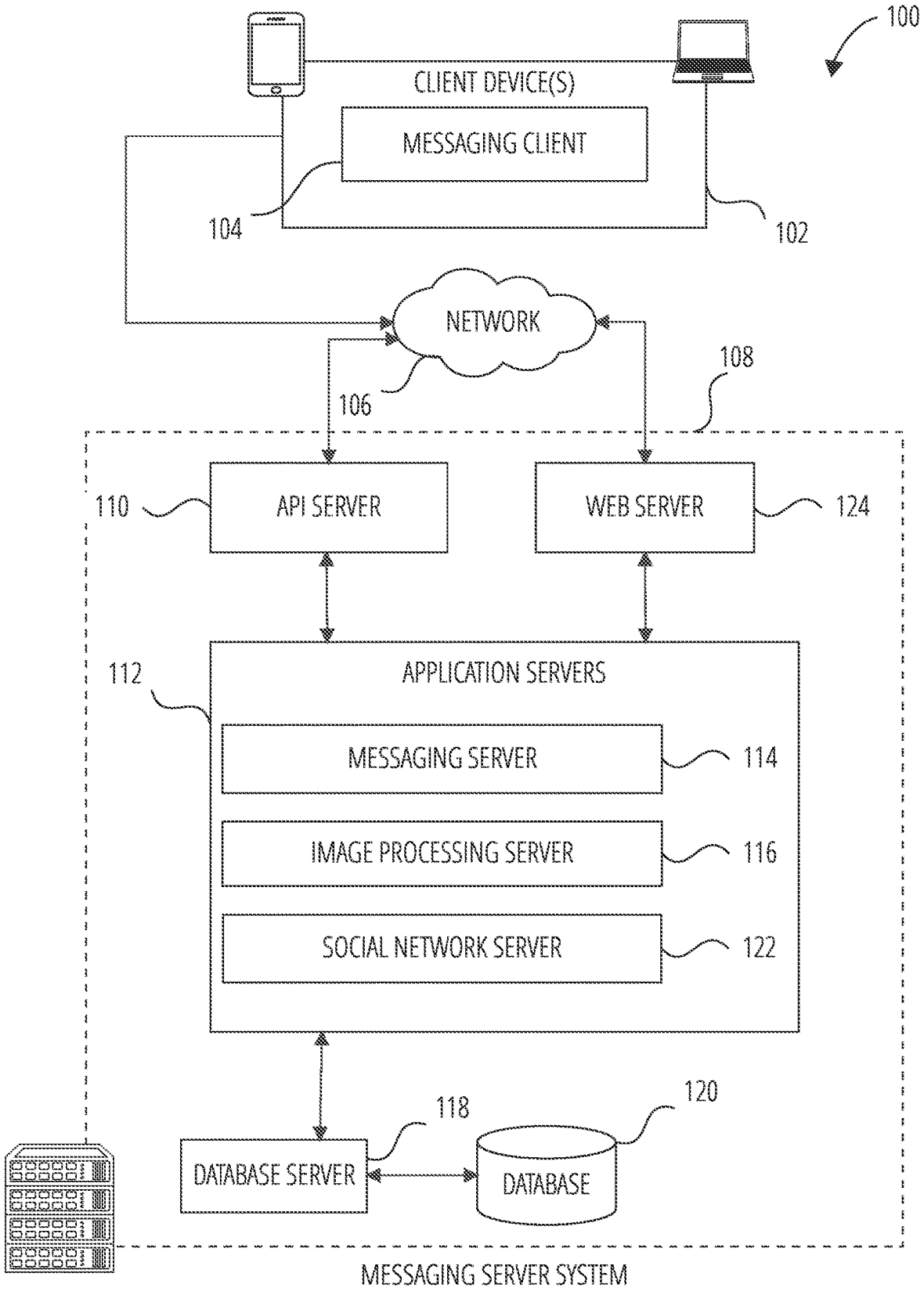
100
CLIENT DEVICE(S)
MESSAGING CLIENT
104
102
NETWORK
106
108
110
API SERVER
WEB SERVER
124
112
APPLICATION SERVERS
MESSAGING SERVER
114
IMAGE PROCESSING SERVER
116
SOCIAL NETWORK SERVER
122
118
120
DATABASE SERVER
DATABASE
MESSAGING SERVER SYSTEM

FIG. 1

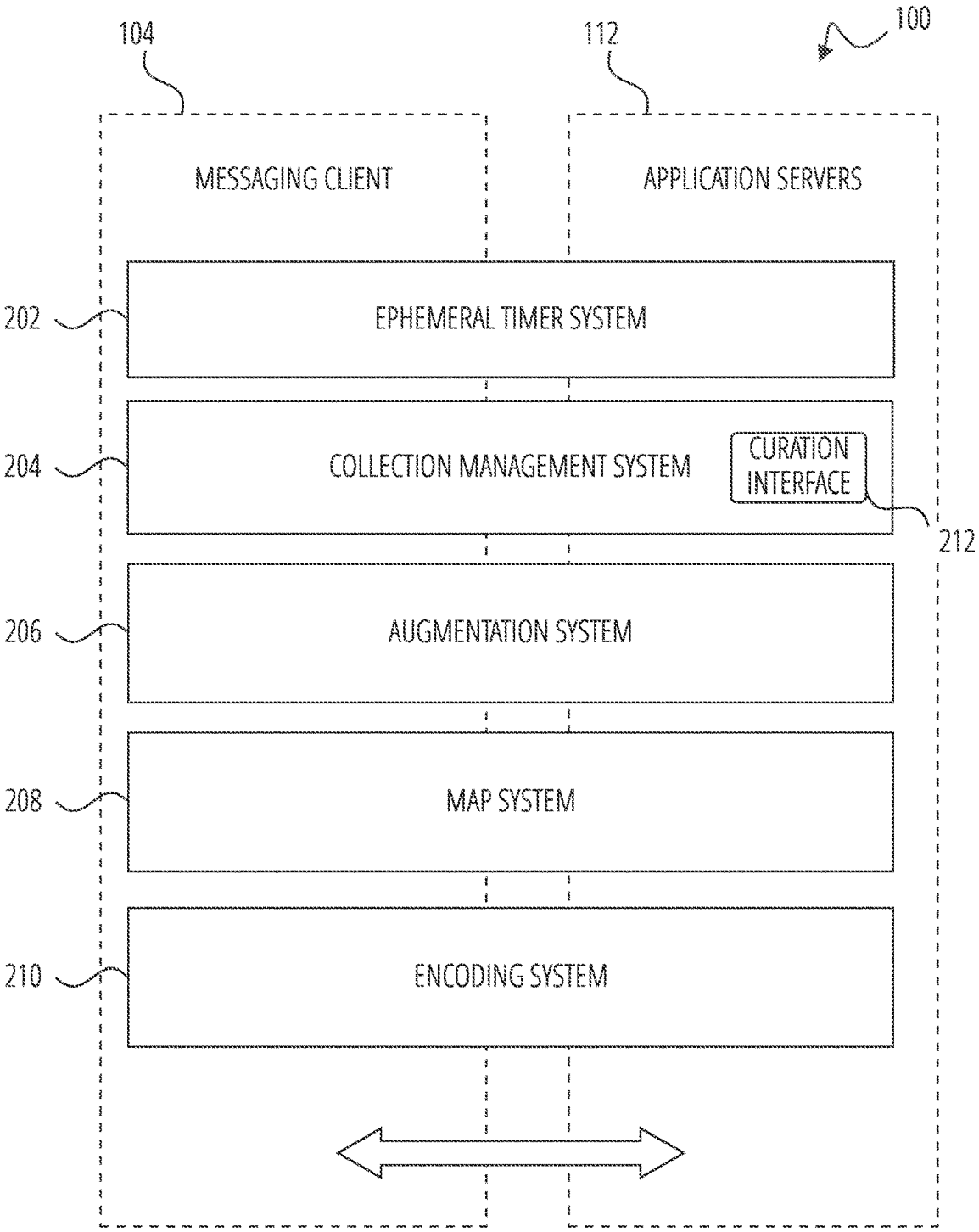
104
112
100
MESSAGING CLIENT
APPLICATION SERVERS
202
EPHEMERAL TIMER SYSTEM
204
COLLECTION MANAGEMENT SYSTEM
CURATION INTERFACE
212
206
AUGMENTATION SYSTEM
208
MAP SYSTEM
210
ENCODING SYSTEM

FIG. 2

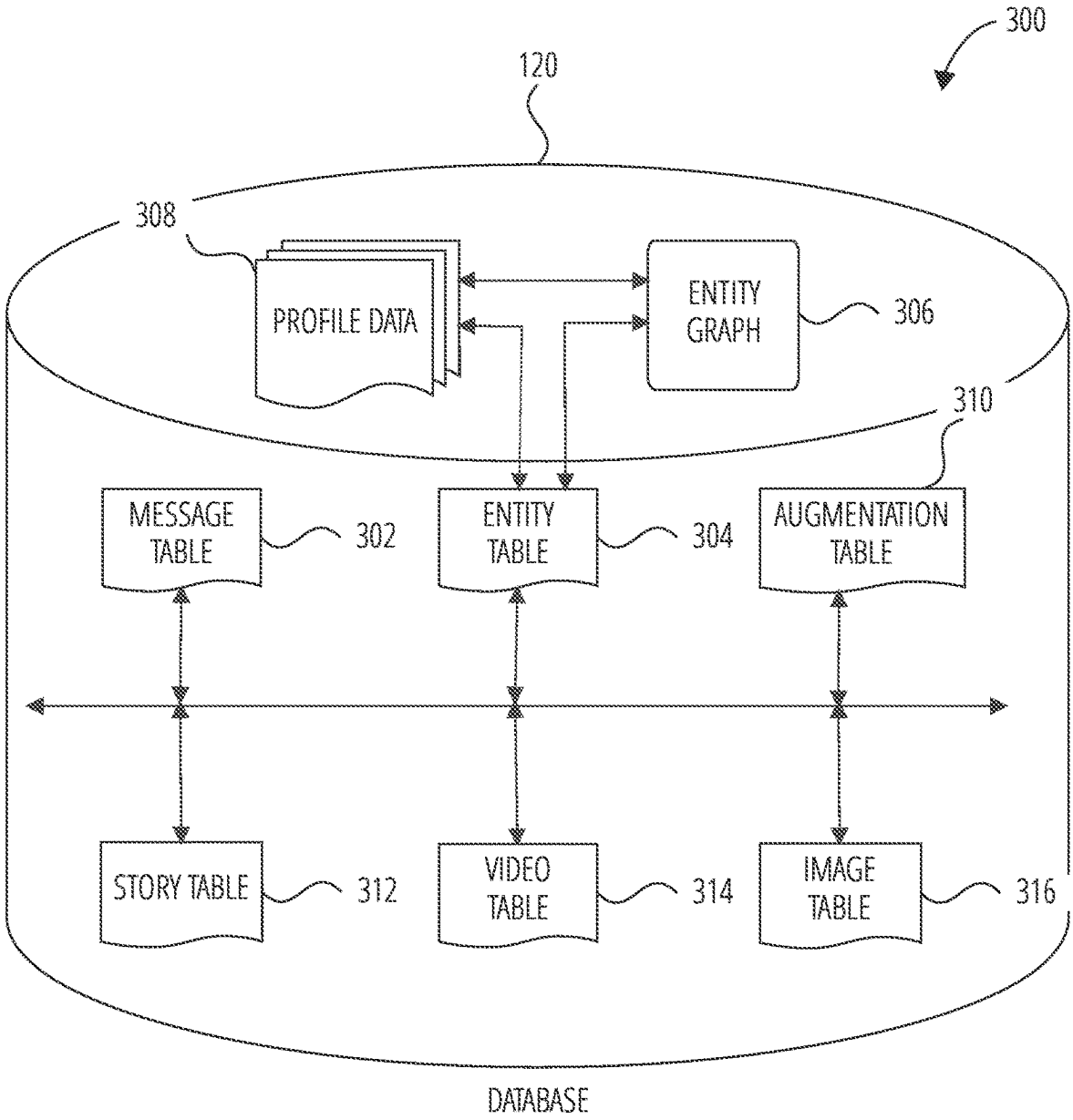
300
120
308
PROFILE DATA
ENTITY GRAPH
306
310
MESSAGE TABLE
302
ENTITY TABLE
304
AUGMENTATION TABLE
STORY TABLE
312
VIDEO TABLE
314
IMAGE TABLE
316
DATABASE

FIG. 3

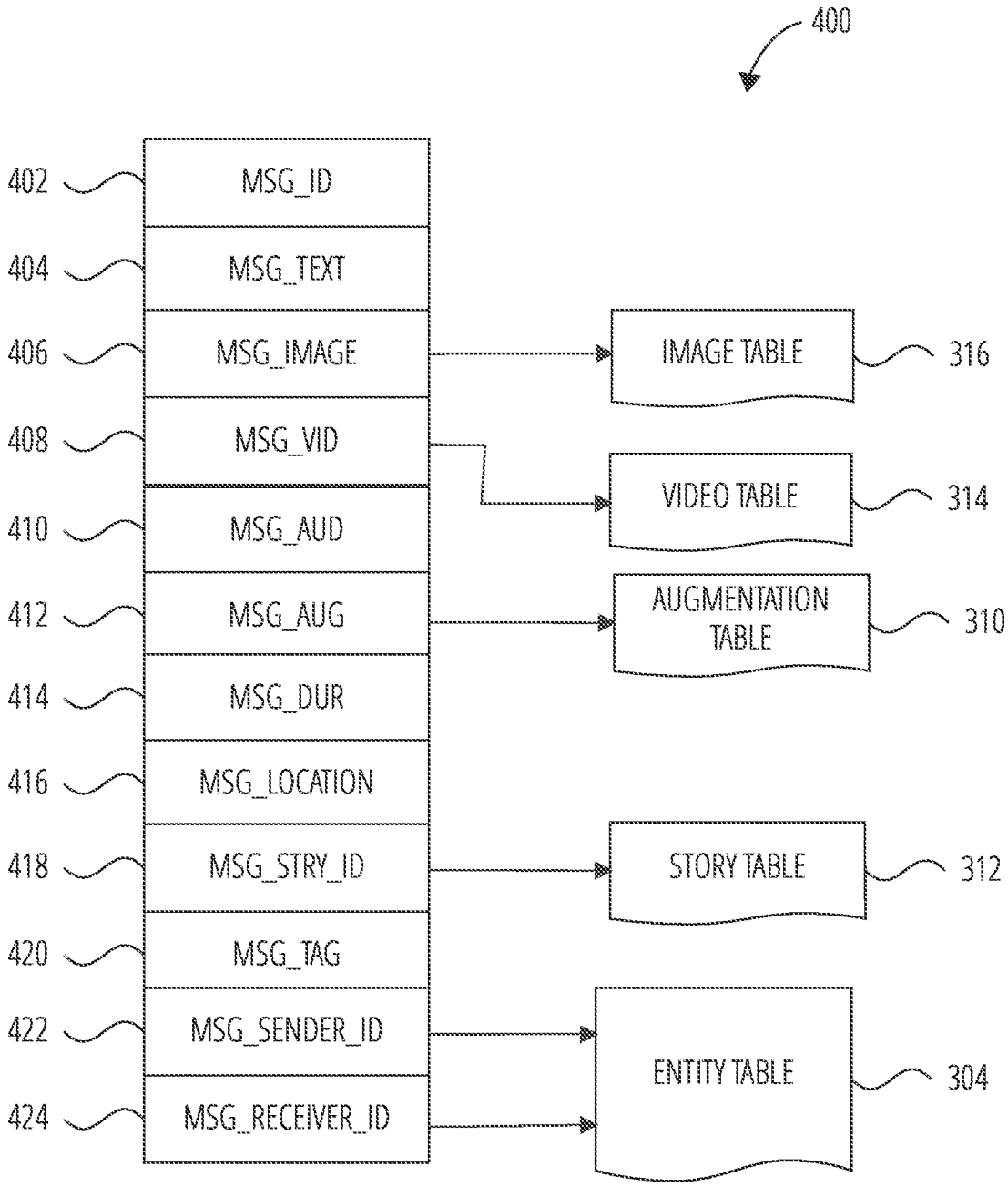
400
402
MSG_ID
404
MSG_TEXT
406
MSG_IMAGE
408
MSG_VID
410
MSG_AUD
412
MSG_AUG
414
MSG_DUR
416
MSG_LOCATION
418
MSG_STRY_ID
420
MSG_TAG
422
MSG_SENDER_ID
424
MSG_RECEIVER_ID
IMAGE TABLE
316
VIDEO TABLE
314
AUGMENTATION TABLE
310
STORY TABLE
312
ENTITY TABLE
304

FIG. 4

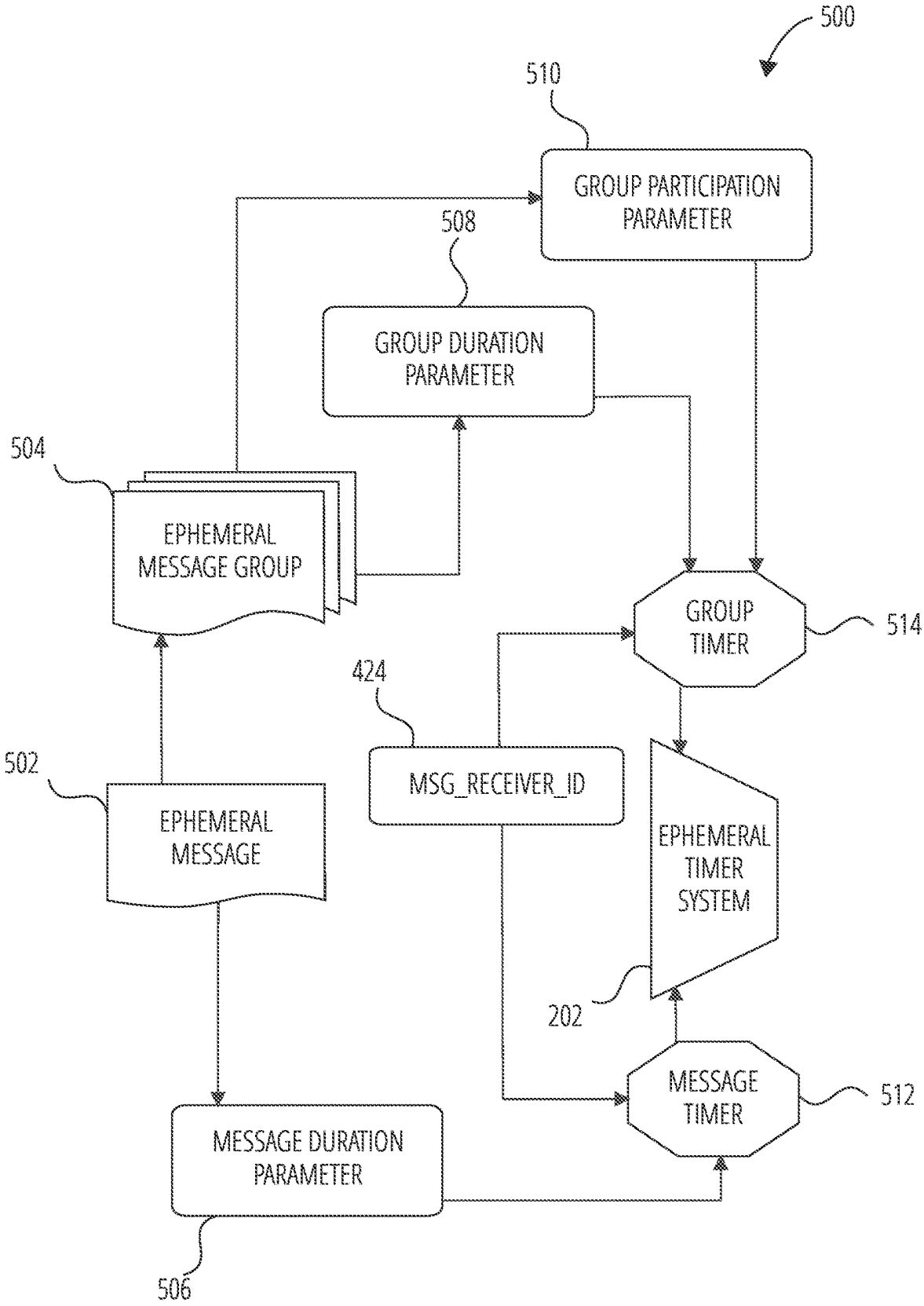
500
510
GROUP PARTICIPATION PARAMETER
508
GROUP DURATION PARAMETER
504
EPHEMERAL MESSAGE GROUP
GROUP TIMER
514
424
MSG_RECEIVER_ID
502
EPHEMERAL MESSAGE
EPHEMERAL TIMER SYSTEM
202
MESSAGE TIMER
512
MESSAGE DURATION PARAMETER
506

FIG. 5

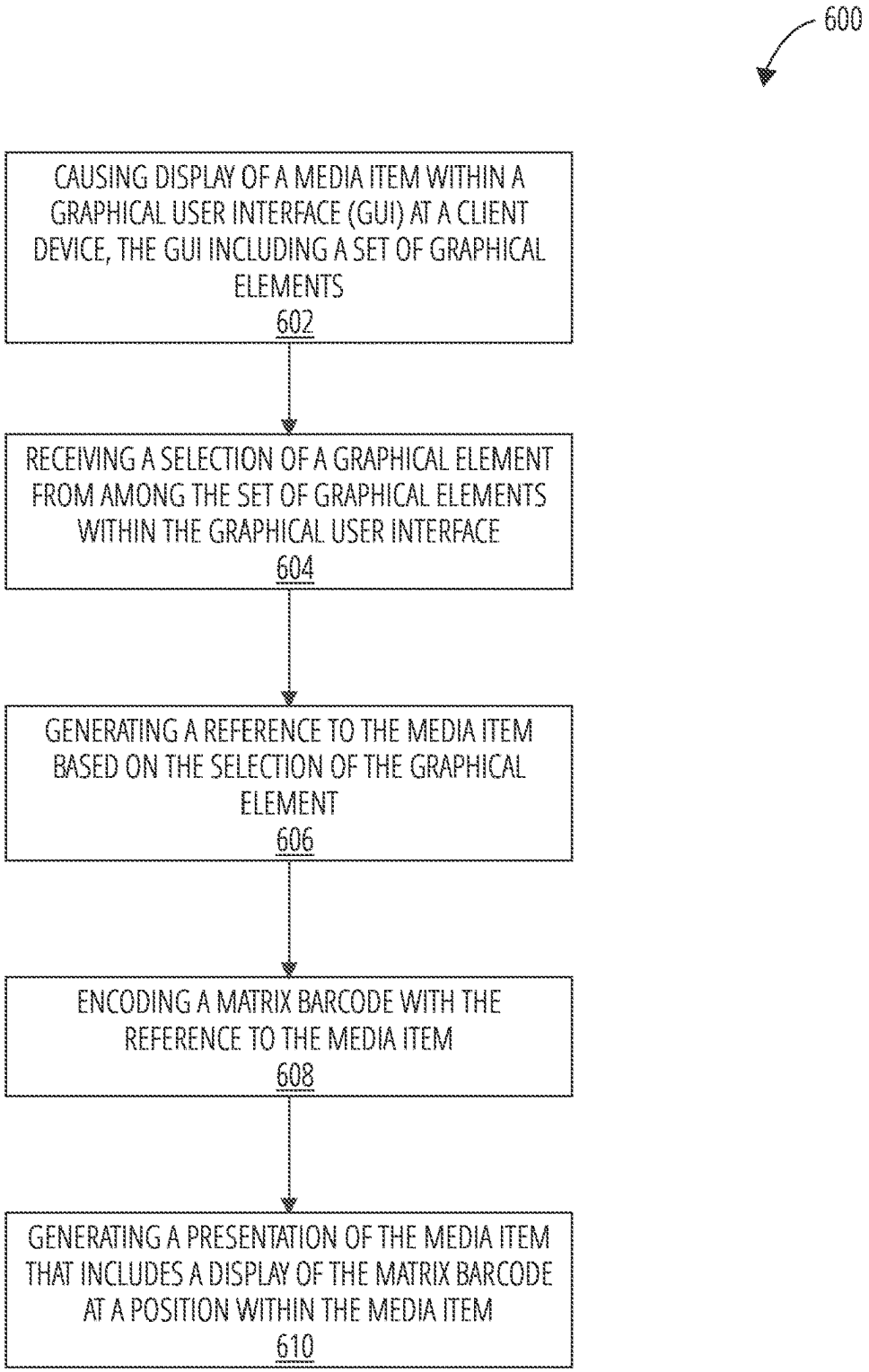
600
CAUSING DISPLAY OF A MEDIA ITEM WITHIN A GRAPHICAL USER INTERFACE (GUI) AT A CLIENT DEVICE, THE GUI INCLUDING A SET OF GRAPHICAL ELEMENTS
602
RECEIVING A SELECTION OF A GRAPHICAL ELEMENT FROM AMONG THE SET OF GRAPHICAL ELEMENTS WITHIN THE GRAPHICAL USER INTERFACE
604
GENERATING A REFERENCE TO THE MEDIA ITEM BASED ON THE SELECTION OF THE GRAPHICAL ELEMENT
606
ENCODING A MATRIX BARCODE WITH THE REFERENCE TO THE MEDIA ITEM
608
GENERATING A PRESENTATION OF THE MEDIA ITEM THAT INCLUDES A DISPLAY OF THE MATRIX BARCODE AT A POSITION WITHIN THE MEDIA ITEM
610

FIG. 6

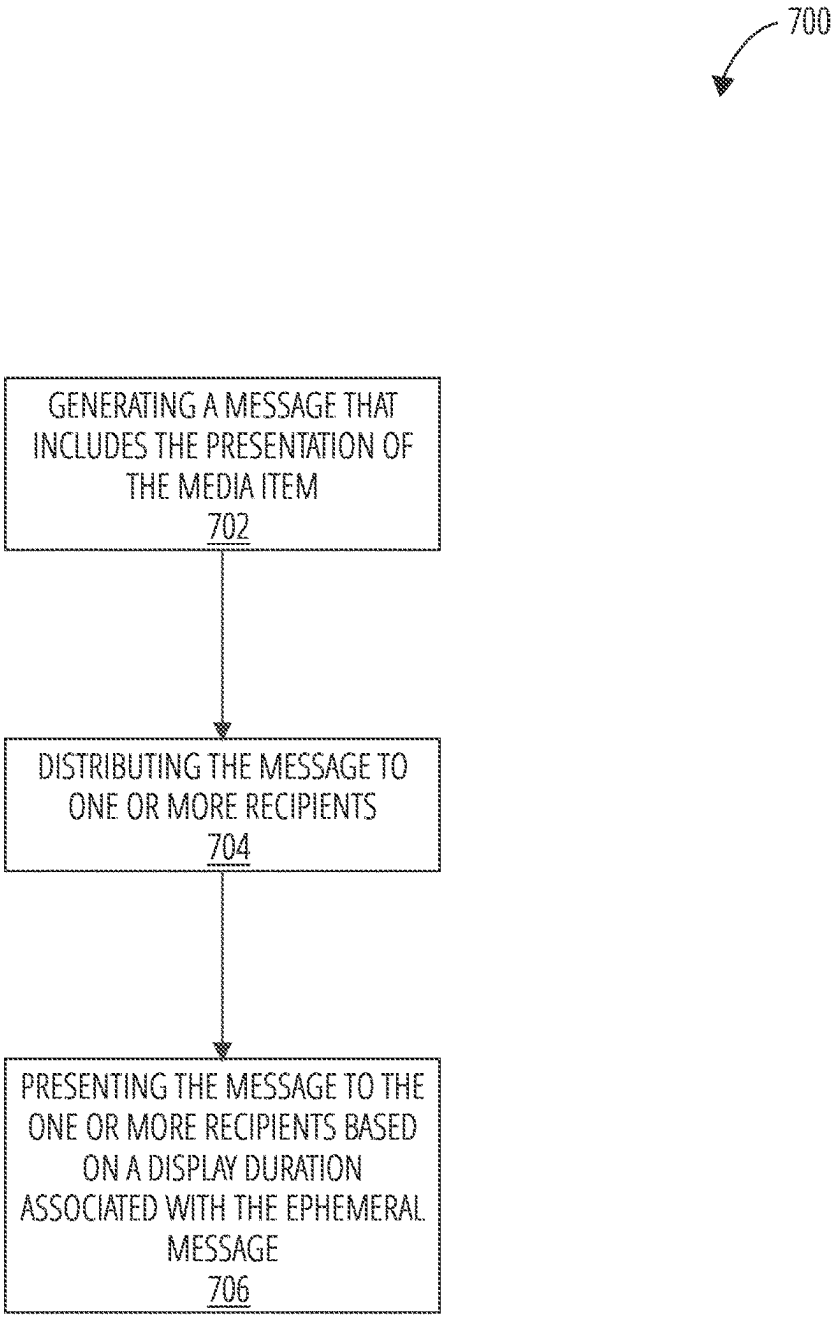
700
GENERATING A MESSAGE THAT INCLUDES THE PRESENTATION OF THE MEDIA ITEM
702
DISTRIBUTING THE MESSAGE TO ONE OR MORE RECIPIENTS
704
PRESENTING THE MESSAGE TO THE ONE OR MORE RECIPIENTS BASED ON A DISPLAY DURATION ASSOCIATED WITH THE EPHEMERAL MESSAGE
706

FIG. 7

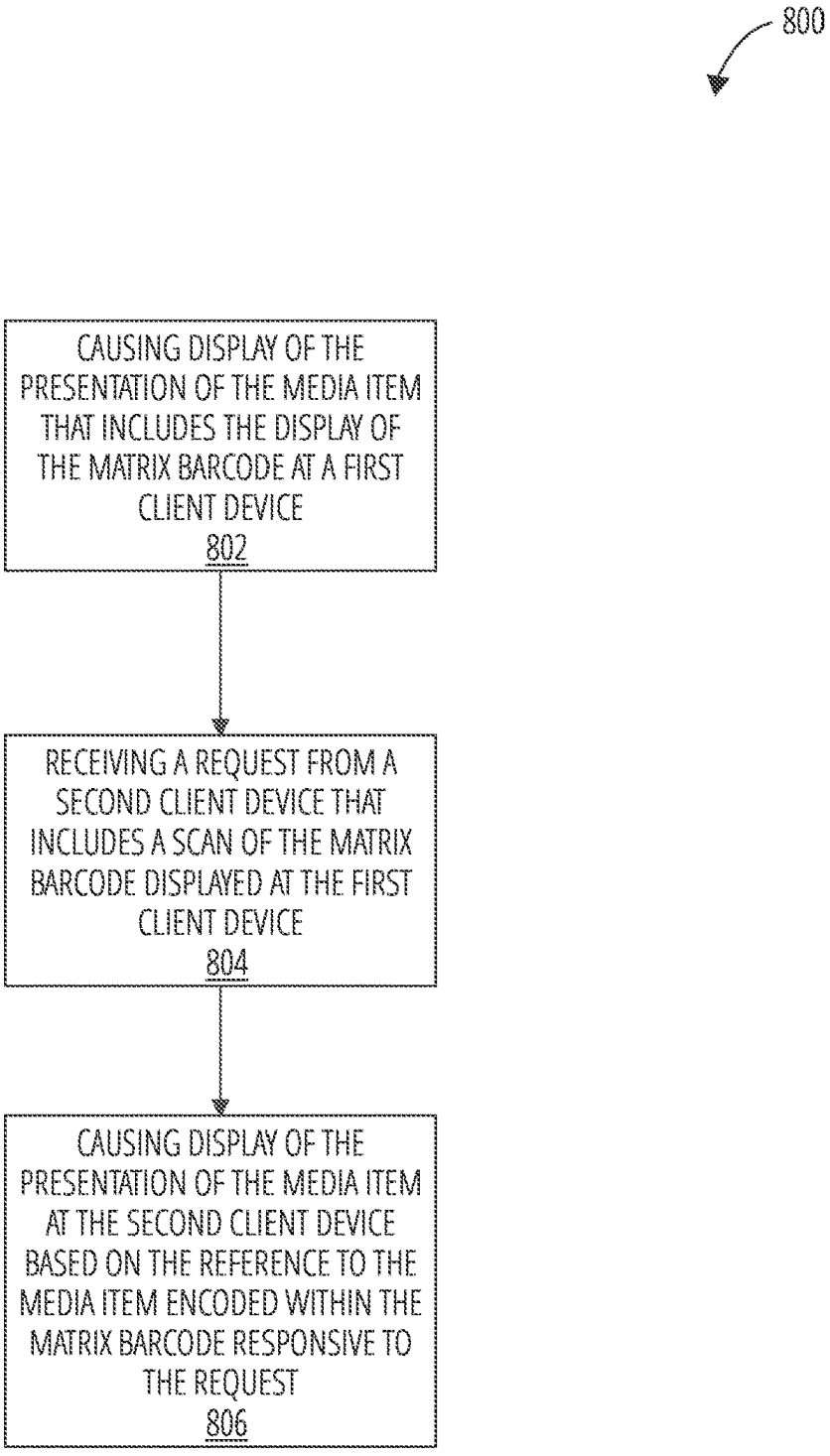
800
CAUSING DISPLAY OF THE PRESENTATION OF THE MEDIA ITEM THAT INCLUDES THE DISPLAY OF THE MATRIX BARCODE AT A FIRST CLIENT DEVICE
802
RECEIVING A REQUEST FROM A SECOND CLIENT DEVICE THAT INCLUDES A SCAN OF THE MATRIX BARCODE DISPLAYED AT THE FIRST CLIENT DEVICE
804
CAUSING DISPLAY OF THE PRESENTATION OF THE MEDIA ITEM AT THE SECOND CLIENT DEVICE BASED ON THE REFERENCE TO THE MEDIA ITEM ENCODED WITHIN THE MATRIX BARCODE RESPONSIVE TO THE REQUEST
806

FIG. 8

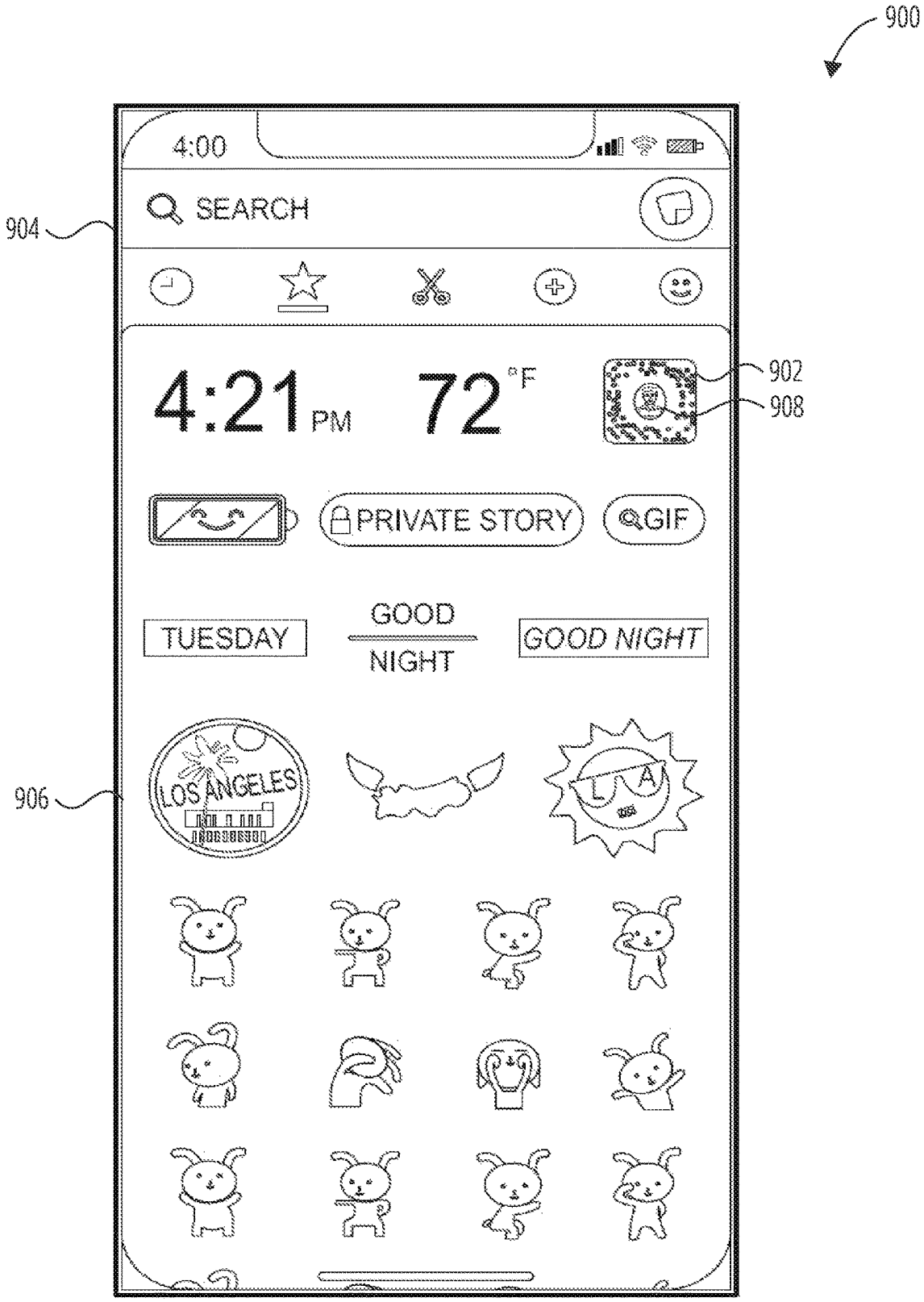
900
4:00
SEARCH
904
4:21 PM
72 °F
902
908
PRIVATE STORY
GIF
TUESDAY
GOOD NIGHT
GOOD NIGHT
906
LOS ANGELES

FIG. 9

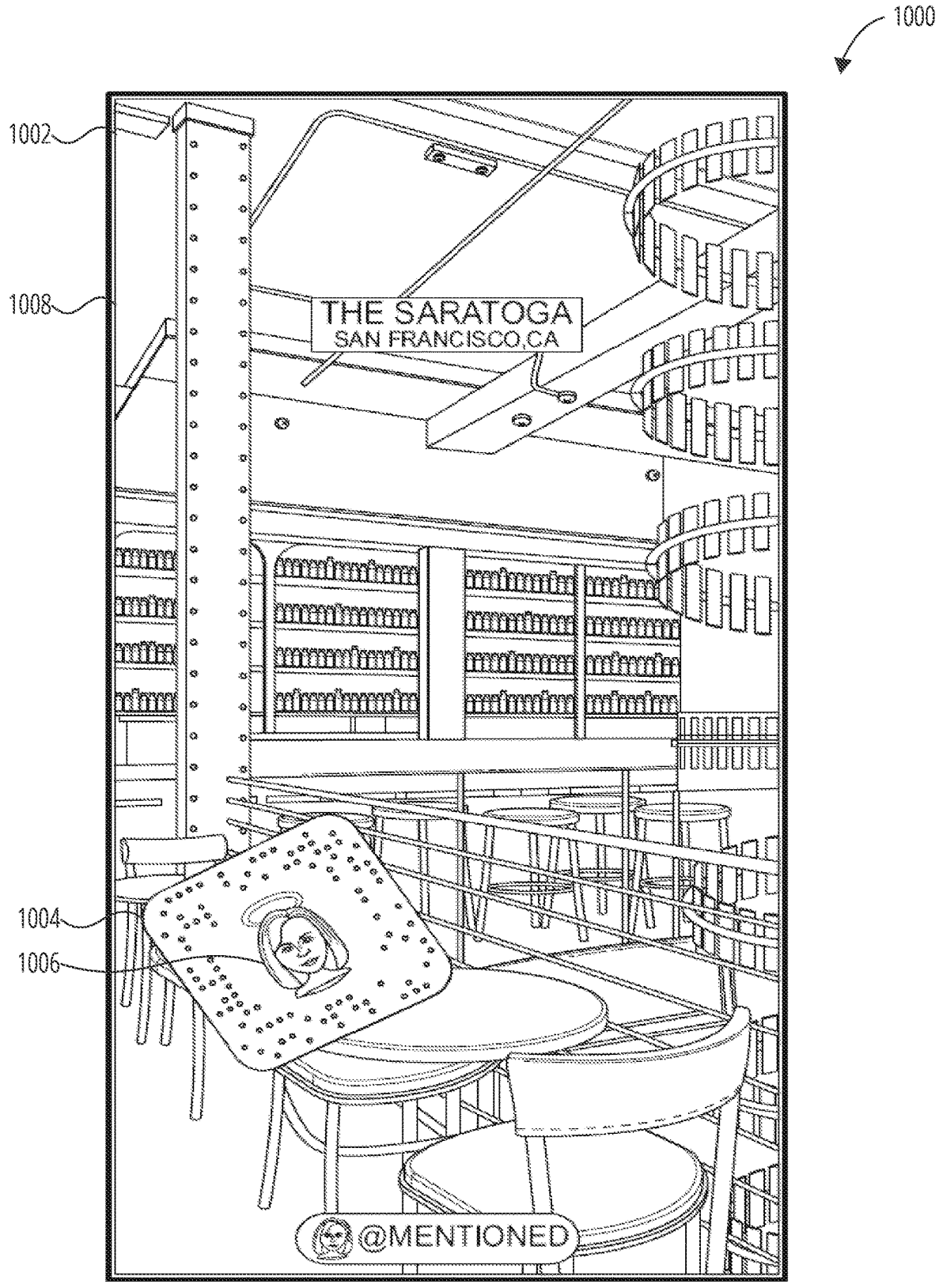
1000
1002
1008
THE SARATOGA
SAN FRANCISCO,CA
1004
1006
@MENTIONED

FIG. 10

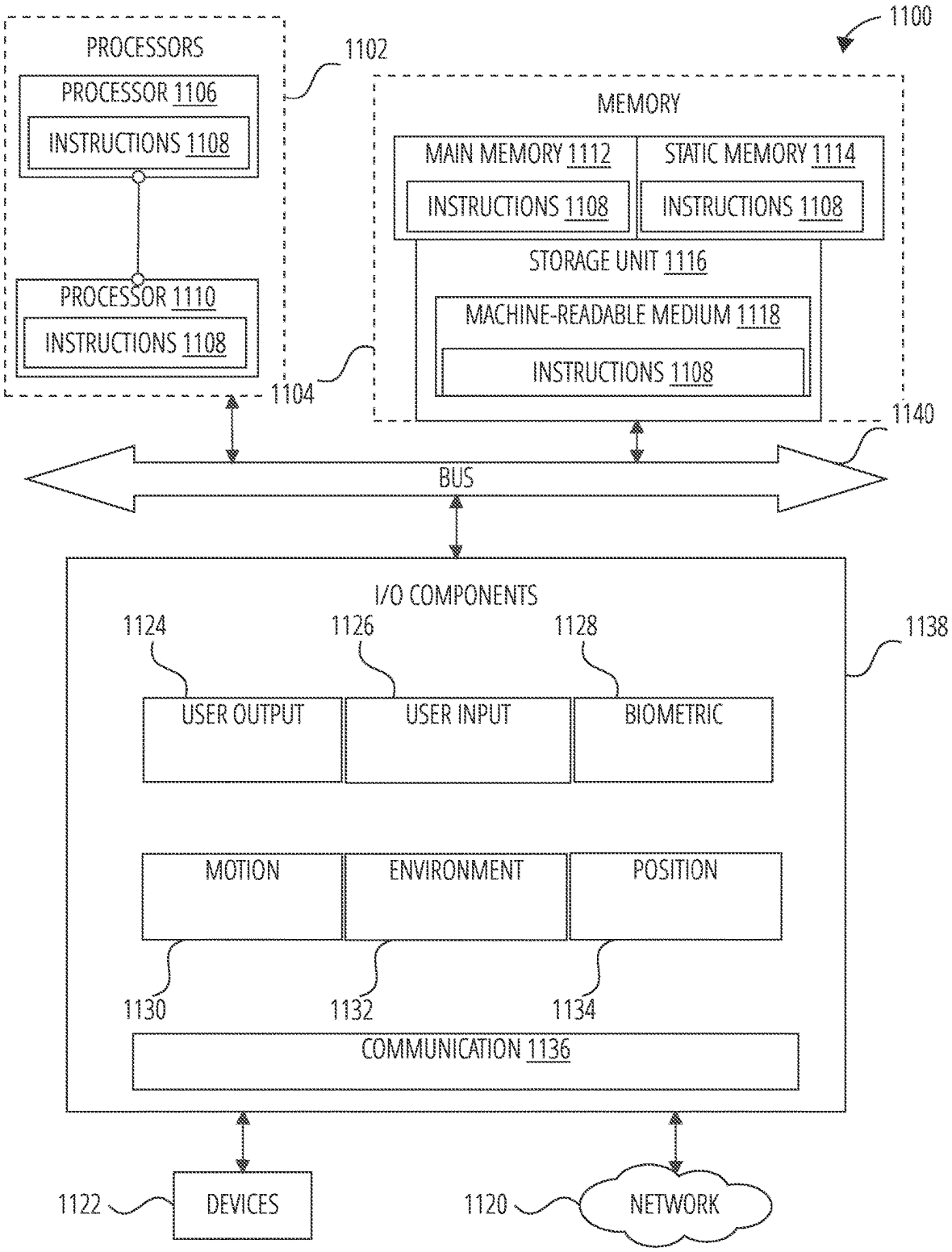
1100
PROCESSORS
1102
PROCESSOR 1106
INSTRUCTIONS 1108
PROCESSOR 1110
INSTRUCTIONS 1108
1104
MEMORY
MAIN MEMORY 1112
INSTRUCTIONS 1108
STATIC MEMORY 1114
INSTRUCTIONS 1108
STORAGE UNIT 1116
MACHINE-READABLE MEDIUM 1118
INSTRUCTIONS 1108
1140
BUS
I/O COMPONENTS
1124
1126
1128
1138
USER OUTPUT
USER INPUT
BIOMETRIC
MOTION
ENVIRONMENT
POSITION
1130
1132
1134
COMMUNICATION 1136
1122
DEVICES
1120
NETWORK

FIG. 11

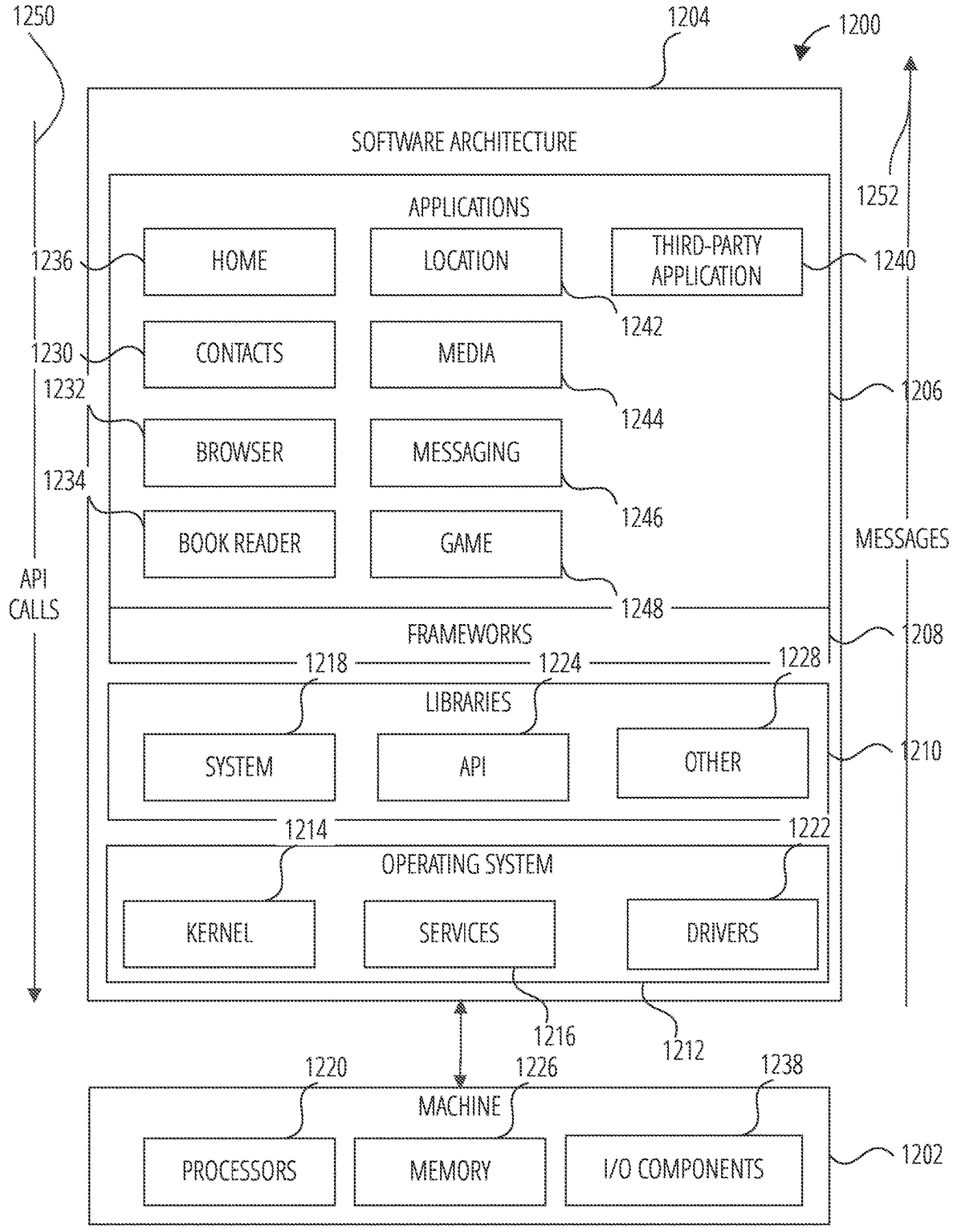
1250
1204
1200
SOFTWARE ARCHITECTURE
1252
APPLICATIONS
1236
HOME
LOCATION
THIRD-PARTY APPLICATION
1240
1242
1230
CONTACTS
MEDIA
1232
1244
1206
BROWSER
MESSAGING
1234
1246
BOOK READER
GAME
MESSAGES
API CALLS
1248
FRAMEWORKS
1208
1218
1224
1228
LIBRARIES
SYSTEM
API
OTHER
1210
1214
1222
OPERATING SYSTEM
KERNEL
SERVICES
DRIVERS
1216
1212
1220
1226
1238
MACHINE
PROCESSORS
MEMORY
I/O COMPONENTS
1202

FIG. 12

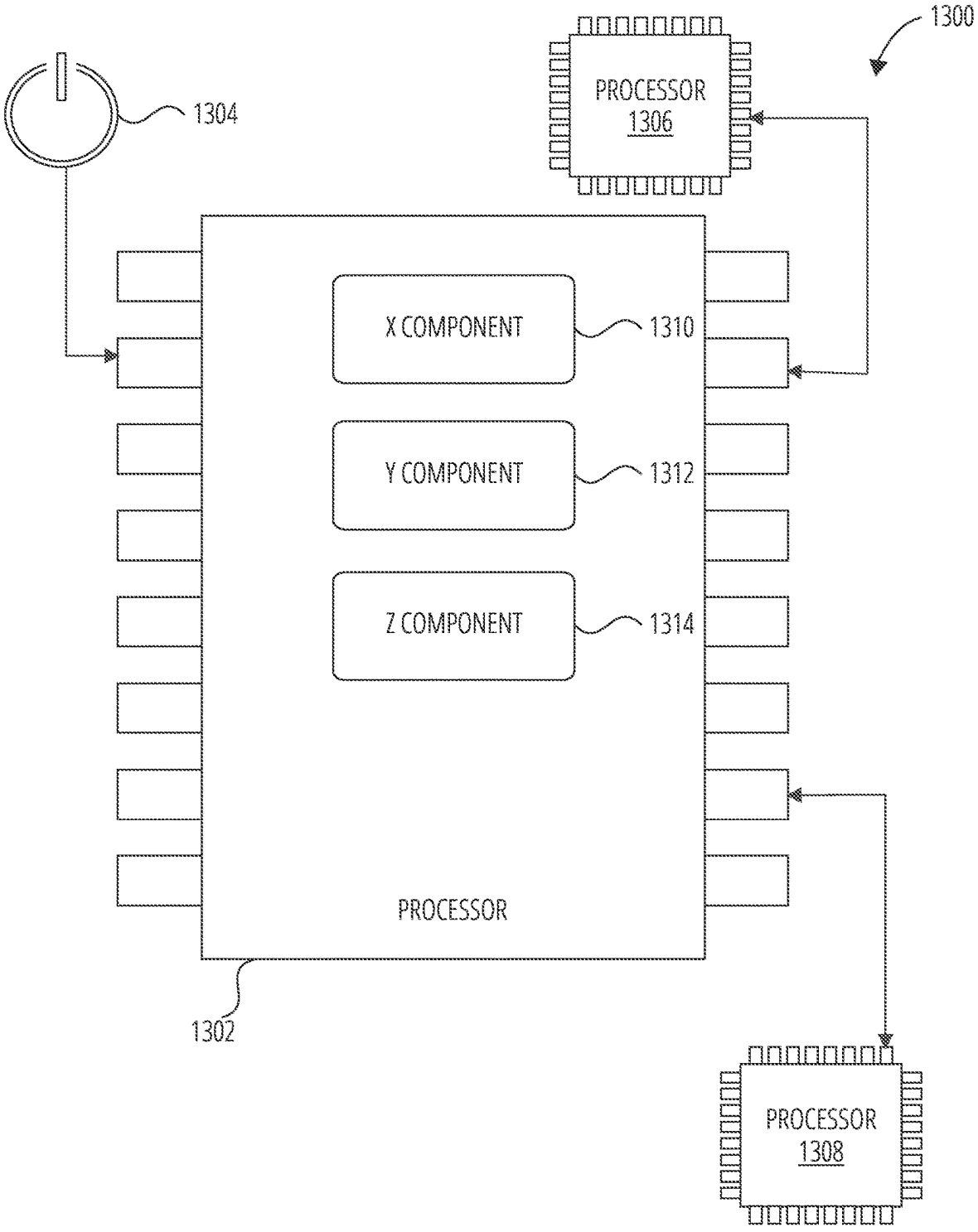
1300
PROCESSOR
1306
1304
X COMPONENT
1310
Y COMPONENT
1312
Z COMPONENT
1314
PROCESSOR
1302
PROCESSOR
1308

FIG. 13

ENCODED IMAGE BASED MESSAGING SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

The application is a continuation of U.S. patent application Ser. No. 17/964,687, filed Oct. 12, 2022, which application is a continuation of U.S. patent application Ser. No. 16/946,133, filed Jun. 8, 2020, now issued as U.S. Pat. No. 11,543,939, all of which are incorporated by reference herein in their entireties.

BACKGROUND

The proliferation of social media platforms demonstrates the appeal of sharing media generally. A common approach is to allow users within a social media platform to post media content, such as images and videos, to a sharing service and then allowing other users to access the media content through the internet or messages distributed by the users to one another. While effective, the existing means of sharing and distributing media content is not exhaustive, and users are always eager to try new ways of sharing media content with one another.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

In the drawings, which are not necessarily drawn to scale, like numerals may describe similar components in different views. To easily identify the discussion of any particular element or act, the most significant digit or digits in a reference number refer to the figure number in which that element is first introduced. Some embodiments are illustrated by way of example, and not limitation, in the figures of the accompanying drawings in which:

FIG. **1** is a diagrammatic representation of a networked environment in which the present disclosure may be deployed, in accordance with some examples.

FIG. **2** is a diagrammatic representation of a messaging system, in accordance with some examples, that has both client-side and server-side functionality.

FIG. **3** is a diagrammatic representation of a data structure as maintained in a database, in accordance with some examples.

FIG. **4** is a diagrammatic representation of a message, in accordance with some examples.

FIG. **5** is a flowchart for an access-limiting process, in accordance with some examples.

FIG. **6** illustrates a method **600** for encoding a matrix barcode with a reference to a media item, in accordance with one embodiment.

FIG. **7** illustrates a method **700** for distributing a message that includes a presentation of a matrix barcode, in accordance with one embodiment.

FIG. **8** illustrates a method **800** for accessing media content via a matrix barcode, in accordance with one embodiment.

FIG. **9** illustrates an interface diagram **900** in accordance with one embodiment.

FIG. **10** illustrates an interface diagram **1000** in accordance with one embodiment.

FIG. **11** is a diagrammatic representation of a machine in the form of a computer system within which a set of instructions may be executed for causing the machine to perform any one or more of the methodologies discussed herein, in accordance with some examples.

FIG. **12** is a block diagram showing a software architecture within which examples may be implemented.

FIG. **13** is a diagrammatic representation of a processing environment, in accordance with some examples.

DETAILED DESCRIPTION

As discussed above, social media platforms enable users to share and distribute various forms of media content with one another. For example, traditional social media platforms enable users to access the various forms of media content through messages received at respective devices, or by navigating to a particular media collection associated with a user profile, by providing a series of inputs to select the user profile from among a plurality of user profiles, navigating to the user profile, and then searching for and finding the desired media content from among the collection of media content associated with the user profile. While these existing methods do provide users with a means of accessing media content, the process of actually getting to the media content is limited or tedious. Furthermore, users are occasionally unable to find a particular user profile or media content within a collection associated with the user profile, because they may not actually know the username, or because the user profile has too many collections of media content to conveniently search through. As a result, users are often dissuaded from even attempting to find the desired media content or user profile.

Accordingly, the disclosed system provides users with a means for quickly and conveniently accessing media content directly, without the need of any explicit user inputs to search for a given user profile or media content associated with the user profile through encoded matrix barcodes (i.e., a scannable image), wherein a matrix barcode, such as a QR code, may be encoded with a reference to a user profile or a location of media content within a media collection associated with the user profile. In certain embodiments, the matrix barcode may be encoded with instructions that cause a client device to generate a request to the system, wherein the request may include a request to add a user profile associated with the matrix barcode to a list of social network connections, or may simply request the system to cause display of media content at the client device.

Reference in the specification to "one embodiment" or "an embodiment" means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present subject matter. Thus, the appearances of the phrase "in one embodiment" or "in an embodiment" appearing in various places throughout the specification are not necessarily all referring to the same embodiment.

For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the present subject matter. However, it will be apparent to one of ordinary skill in the art that embodiments of the subject matter described may be practiced without the specific details presented herein, or in various combinations, as described herein. Furthermore, well-known features may be omitted or simplified in order not to obscure the described embodiments. Various examples may be given throughout this description. These are merely descriptions of specific embodiments. The scope or meaning of the claims is not limited to the examples given.

In certain example embodiments, an encoded image based messaging system (hereinafter referred to as the "system"),

is configured to perform operations that include: causing display of a media item within a graphical user interface at a client device, the graphical user interface including a set of graphical elements; receiving a selection of a graphical element from among the set of graphical elements within the graphical user interface; generating a reference to the media item based on the selection of the graphical element; encoding a matrix barcode with the reference to the media item; and generating a presentation of the media item that includes a display of the matrix barcode at a position within the media item.

In some embodiments, the set of graphical elements may comprise graphical icons, or digital "stickers," which a user may select and position upon a display of media content, such as an image of video, presented within the GUI at the client device. According to certain embodiments, a sticker may include a graphical icon or element which comprises an illustration of a character or object. Users may provide inputs to select and position stickers within media content or messages based on inputs received via the client device **102**. In certain embodiments, the set of graphical elements may include a sticker, or graphical element, that depicts a matrix barcode. A user may provide an input to select the graphical element and "drag and drop" the graphical element at a position within media content presented within the GUI. Responsive to receiving the input that selects and positions the graphical element, the system may generate and encode a matrix barcode with one or more instructions. For example, the one or more instructions may include a reference to the media item (i.e., a URL), wherein the reference to the media item may cause a client device to navigate to a position of the media item among a collection of media items (i.e., a story). In further embodiments, the instructions may cause the client device to generate a request, such as a request to add a user profile associated with the media content to a list of social network connections.

In certain example embodiments, one or more attributes of the matrix barcode may be generated based on user profile data associated with a user profile of the client device. The one or more attributes may include graphical properties. For example, the matrix barcode may include a display of a user identifier associated with the user profile.

Consider an illustrative example from a user perspective. A user at a first client device may provide inputs to display a GUI to configure media content to be added to a media collection, or to be distributed in a message to one or more recipients. The GUI may include a display of the media content, such as an image or video, within one portion of the GUI, and a display of a set of graphical elements within another portion of the GUI. The user may provide an input that selects a graphical element from among the set of graphical elements, wherein selection of the graphical element causes the system to generate a matrix barcode that is encoded with a set of instructions that include at least a reference to the media content.

The user may then distribute a presentation of the media content that includes a display of the matrix barcode at a position within the media content to one or more users via a message, or by adding the presentation of the media content to a media collection.

A user at a second client device may cause display of the presentation of the media content, and allow a third client device to scan the matrix barcode displayed within the presentation of the media content. Responsive to scanning the matrix barcode, the third client device may generate a request to the system, wherein the request includes at least the reference to the media content. The system may then cause display of the media content at the third client device.

Networked Computing Environment

FIG. **1** is a block diagram showing an example messaging system **100** for exchanging data (e.g., messages and associated content) over a network. The messaging system **100** includes multiple instances of a client device **102**, each of which hosts a number of applications, including a messaging client **104**. Each messaging client **104** is communicatively coupled to other instances of the messaging client **104** and a messaging server system **108** via a network **106** (e.g., the Internet).

A messaging client **104** is able to communicate and exchange data with another messaging client **104** and with the messaging server system **108** via the network **106**. The data exchanged between messaging client **104**, and between a messaging client **104** and the messaging server system **108**, includes functions (e.g., commands to invoke functions) as well as payload data (e.g., text, audio, video or other multimedia data).

The messaging server system **108** provides server-side functionality via the network **106** to a particular messaging client **104**. While certain functions of the messaging system **100** are described herein as being performed by either a messaging client **104** or by the messaging server system **108**, the location of certain functionality either within the messaging client **104** or the messaging server system **108** may be a design choice. For example, it may be technically preferable to initially deploy certain technology and functionality within the messaging server system **108** but to later migrate this technology and functionality to the messaging client **104** where a client device **102** has sufficient processing capacity.

The messaging server system **108** supports various services and operations that are provided to the messaging client **104**. Such operations include transmitting data to, receiving data from, and processing data generated by the messaging client **104**. This data may include message content, client device information, geolocation information, media augmentation and overlays, message content persistence conditions, social network information, and live event information, as examples. Data exchanges within the messaging system **100** are invoked and controlled through functions available via user interfaces (UIs) of the messaging client **104**.

Turning now specifically to the messaging server system **108**, an Application Program Interface (API) server **110** is coupled to, and provides a programmatic interface to, application servers **112**. The application servers **112** are communicatively coupled to a database server **118**, which facilitates access to a database **120** that stores data associated with messages processed by the application servers **112**. Similarly, a web server **124** is coupled to the application servers **112**, and provides web-based interfaces to the application servers **112**. To this end, the web server **124** processes incoming network requests over the Hypertext Transfer Protocol (HTTP) and several other related protocols.

The Application Program Interface (API) server **110** receives and transmits message data (e.g., commands and message payloads) between the client device **102** and the application servers **112**. Specifically, the Application Program Interface (API) server **110** provides a set of interfaces (e.g., routines and protocols) that can be called or queried by the messaging client **104** in order to invoke functionality of the application servers **112**. The Application Program Inter-

face (API) server **110** exposes various functions supported by the application servers **112**, including account registration, login functionality, the sending of messages, via the application servers **112**, from a particular messaging client **104** to another messaging client **104**, the sending of media files (e.g., images or video) from a messaging client **104** to a messaging server **114**, and for possible access by another messaging client **104**, the settings of a collection of media data (e.g., story), the retrieval of a list of friends of a user of a client device **102**, the retrieval of such collections, the retrieval of messages and content, the addition and deletion of entities (e.g., friends) to an entity graph (e.g., a social graph), the location of friends within a social graph, and opening an application event (e.g., relating to the messaging client **104**).

The application servers **112** host a number of server applications and subsystems, including for example a messaging server **114**, an image processing server **116**, and a social network server **122**. The messaging server **114** implements a number of message processing technologies and functions, particularly related to the aggregation and other processing of content (e.g., textual and multimedia content) included in messages received from multiple instances of the messaging client **104**. As will be described in further detail, the text and media content from multiple sources may be aggregated into collections of content (e.g., called stories or galleries). These collections are then made available to the messaging client **104**. Other processor and memory intensive processing of data may also be performed server-side by the messaging server **114**, in view of the hardware requirements for such processing.

The application servers **112** also include an image processing server **116** that is dedicated to performing various image processing operations, typically with respect to images or video within the payload of a message sent from or received at the messaging server **114**.

The social network server **122** supports various social networking functions and services and makes these functions and services available to the messaging server **114**. To this end, the social network server **122** maintains and accesses an entity graph **306** (as shown in FIG. **3**) within the database **120**. Examples of functions and services supported by the social network server **122** include the identification of other users of the messaging system **100** with which a particular user has relationships or is "following," and also the identification of other entities and interests of a particular user.

System Architecture

FIG. **2** is a block diagram illustrating further details regarding the messaging system **100**, according to some examples. Specifically, the messaging system **100** is shown to comprise the messaging client **104** and the application servers **112**. The messaging system **100** embodies a number of subsystems, which are supported on the client-side by the messaging client **104** and on the sever-side by the application servers **112**. These subsystems include, for example, an ephemeral timer system **202**, a collection management system **204**, an augmentation system **206**, a map system **208**, and an encoding system **210**.

The ephemeral timer system **202** is responsible for enforcing the temporary or time-limited access to content by the messaging client **104** and the messaging server **114**. The ephemeral timer system **202** incorporates a number of timers that, based on duration and display parameters associated with a message, or collection of messages (e.g., a story), selectively enable access (e.g., for presentation and display) to messages and associated content via the messaging client **104**. Further details regarding the operation of the ephemeral timer system **202** are provided below.

The collection management system **204** is responsible for managing sets or collections of media (e.g., collections of text, image video, and audio data). A collection of content (e.g., messages, including images, video, text, and audio) may be organized into an "event gallery" or an "event story." Such a collection may be made available for a specified time period, such as the duration of an event to which the content relates. For example, content relating to a music concert may be made available as a "story" for the duration of that music concert. The collection management system **204** may also be responsible for publishing an icon that provides notification of the existence of a particular collection to the user interface of the messaging client **104**.

The collection management system **204** furthermore includes a curation interface **212** that allows a collection manager to manage and curate a particular collection of content. For example, the curation interface **212** enables an event organizer to curate a collection of content relating to a specific event (e.g., delete inappropriate content or redundant messages). Additionally, the collection management system **204** employs machine vision (or image recognition technology) and content rules to automatically curate a content collection. In certain examples, compensation may be paid to a user for the inclusion of user-generated content into a collection. In such cases, the collection management system **204** operates to automatically make payments to such users for the use of their content.

The augmentation system **206** provides various functions that enable a user to augment (e.g., annotate or otherwise modify or edit) media content associated with a message. For example, the augmentation system **206** provides functions related to the generation and publishing of media overlays for messages processed by the messaging system **100**. The augmentation system **206** operatively supplies a media overlay or augmentation (e.g., an image filter) to the messaging client **104** based on a geolocation of the client device **102**. In another example, the augmentation system **206** operatively supplies a media overlay to the messaging client **104** based on other information, such as social network information of the user of the client device **102**. A media overlay may include audio and visual content and visual effects. Examples of audio and visual content include pictures, texts, logos, animations, and sound effects. An example of a visual effect includes color overlaying. The audio and visual content or the visual effects can be applied to a media content item (e.g., a photo) at the client device **102**. For example, the media overlay may include text or image that can be overlaid on top of a photograph taken by the client device **102**. In another example, the media overlay includes an identification of a location overlay (e.g., Venice beach), a name of a live event, or a name of a merchant overlay (e.g., Beach Coffee House). In another example, the augmentation system **206** uses the geolocation of the client device **102** to identify a media overlay that includes the name of a merchant at the geolocation of the client device **102**. The media overlay may include other indicia associated with the merchant. The media overlays may be stored in the database **120** and accessed through the database server **118**.

In some examples, the augmentation system **206** provides a user-based publication platform that enables users to select a geolocation on a map and upload content associated with the selected geolocation. The user may also specify circumstances under which a particular media overlay should be

offered to other users. The augmentation system **206** generates a media overlay that includes the uploaded content and associates the uploaded content with the selected geolocation.

In other examples, the augmentation system **206** provides a merchant-based publication platform that enables merchants to select a particular media overlay associated with a geolocation via a bidding process. For example, the augmentation system **206** associates the media overlay of the highest bidding merchant with a corresponding geolocation for a predefined amount of time.

The map system **208** provides various geographic location functions, and supports the presentation of map-based media content and messages by the messaging client **104**. For example, the map system **208** enables the display of user icons or avatars (e.g., stored in profile data **308**) on a map to indicate a current or past location of "friends" of a user, as well as media content (e.g., collections of messages including photographs and videos) generated by such friends, within the context of a map. For example, a message posted by a user to the messaging system **100** from a specific geographic location may be displayed within the context of a map at that particular location to "friends" of a specific user on a map interface of the messaging client **104**. A user can furthermore share his or her location and status information (e.g., using an appropriate status avatar) with other users of the messaging system **100** via the messaging client **104**, with this location and status information being similarly displayed within the context of a map interface of the messaging client **104** to selected users.

The encoding system **210** provides various encoding functions within the context of the messaging client **104**. The messaging client **104** provides an interface to configure and distribute media content by a user within the context of the messaging client **104**. The messaging system **100** further enables a particular user to generate media content that includes a scannable coded image, such as a matrix barcode, wherein scanning the matrix barcode causes a client device **102** to display the media content, or perform some function of the messaging system **100**.

Data Architecture

FIG. **3** is a schematic diagram illustrating data structures **300**, which may be stored in the database **120** of the messaging server system **108**, according to certain examples. While the content of the database **120** is shown to comprise a number of tables, it will be appreciated that the data could be stored in other types of data structures (e.g., as an object-oriented database).

The database **120** includes message data stored within a message table **302**. This message data includes, for any particular one message, at least message sender data, message recipient (or receiver) data, and a payload. Further details regarding information that may be included in a message, and included within the message data stored in the message table **302** is described below with reference to FIG. **4**.

An entity table **304** stores entity data, and is linked (e.g., referentially) to an entity graph **306** and profile data **308**. Entities for which records are maintained within the entity table **304** may include individuals, corporate entities, organizations, objects, places, events, and so forth. Regardless of entity type, any entity regarding which the messaging server system **108** stores data may be a recognized entity. Each entity is provided with a unique identifier, as well as an entity type identifier (not shown).

The entity graph **306** stores information regarding relationships and associations between entities. Such relationships may be social, professional (e.g., work at a common corporation or organization) interested-based or activity-based, merely for example.

The profile data **308** stores multiple types of profile data about a particular entity. The profile data **308** may be selectively used and presented to other users of the messaging system **100**, based on privacy settings specified by a particular entity. Where the entity is an individual, the profile data **308** includes, for example, a user name, telephone number, address, settings (e.g., notification and privacy settings), as well as a user-selected avatar representation (or collection of such avatar representations). A particular user may then selectively include one or more of these avatar representations within the content of messages communicated via the messaging system **100**, and on map interfaces displayed by messaging clients **104** to other users. The collection of avatar representations may include "status avatars," which present a graphical representation of a status or activity that the user may select to communicate at a particular time.

Where the entity is a group, the profile data **308** for the group may similarly include one or more avatar representations associated with the group, in addition to the group name, members, and various settings (e.g., notifications) for the relevant group.

The database **120** also stores augmentation data, such as overlays or filters, in an augmentation table **310**. The augmentation data is associated with and applied to videos (for which data is stored in a video table **314**) and images (for which data is stored in an image table **316**).

Filters, in one example, are overlays that are displayed as overlaid on an image or video during presentation to a recipient user. Filters may be of various types, including user-selected filters from a set of filters presented to a sending user by the messaging client **104** when the sending user is composing a message. Other types of filters include geolocation filters (also known as geo-filters), which may be presented to a sending user based on geographic location. For example, geolocation filters specific to a neighborhood or special location may be presented within a user interface by the messaging client **104**, based on geolocation information determined by a Global Positioning System (GPS) unit of the client device **102**.

Another type of filter is a data filter, which may be selectively presented to a sending user by the messaging client **104**, based on other inputs or information gathered by the client device **102** during the message creation process. Examples of data filters include current temperature at a specific location, a current speed at which a sending user is traveling, battery life for a client device **102**, or the current time.

Other augmentation data that may be stored within the image table **316** includes augmented reality content items (e.g., corresponding to applying Lenses or augmented reality experiences). An augmented reality content item may be a real-time special effect and sound that may be added to an image or a video.

As described above, augmentation data includes augmented reality content items, overlays, image transformations, AR images, and similar terms refer to modifications that may be applied to image data (e.g., videos or images). This includes real-time modifications, which modify an image as it is captured using device sensors (e.g., one or multiple cameras) of a client device **102** and then displayed on a screen of the client device **102** with the modifications.

This also includes modifications to stored content, such as video clips in a gallery that may be modified. For example, in a client device **102** with access to multiple augmented reality content items, a user can use a single video clip with multiple augmented reality content items to see how the different augmented reality content items will modify the stored clip. For example, multiple augmented reality content items that apply different pseudorandom movement models can be applied to the same content by selecting different augmented reality content items for the content. Similarly, real-time video capture may be used with an illustrated modification to show how video images currently being captured by sensors of a client device **102** would modify the captured data. Such data may simply be displayed on the screen and not stored in memory, or the content captured by the device sensors may be recorded and stored in memory with or without the modifications (or both). In some systems, a preview feature can show how different augmented reality content items will look within different windows in a display at the same time. This can, for example, enable multiple windows with different pseudorandom animations to be viewed on a display at the same time.

Data and various systems using augmented reality content items or other such transform systems to modify content using this data can thus involve detection of objects (e.g., faces, hands, bodies, cats, dogs, surfaces, objects, etc.), tracking of such objects as they leave, enter, and move around the field of view in video frames, and the modification or transformation of such objects as they are tracked. In various embodiments, different methods for achieving such transformations may be used. Some examples may involve generating a three-dimensional mesh model of the object or objects, and using transformations and animated textures of the model within the video to achieve the transformation. In other examples, tracking of points on an object may be used to place an image or texture (which may be two dimensional or three dimensional) at the tracked position. In still further examples, neural network analysis of video frames may be used to place images, models, or textures in content (e.g., images or frames of video). Augmented reality content items thus refer both to the images, models, and textures used to create transformations in content, as well as to additional modeling and analysis information needed to achieve such transformations with object detection, tracking, and placement.

Real-time video processing can be performed with any kind of video data (e.g., video streams, video files, etc.) saved in a memory of a computerized system of any kind. For example, a user can load video files and save them in a memory of a device, or can generate a video stream using sensors of the device. Additionally, any objects can be processed using a computer animation model, such as a human's face and parts of a human body, animals, or non-living things such as chairs, cars, or other objects.

In some examples, when a particular modification is selected along with content to be transformed, elements to be transformed are identified by the computing device, and then detected and tracked if they are present in the frames of the video. The elements of the object are modified according to the request for modification, thus transforming the frames of the video stream. Transformation of frames of a video stream can be performed by different methods for different kinds of transformation. For example, for transformations of frames mostly referring to changing forms of object's elements characteristic points for each element of an object are calculated (e.g., using an Active Shape Model (ASM) or other known methods). Then, a mesh based on the characteristic points is generated for each of the at least one element of the object. This mesh used in the following stage of tracking the elements of the object in the video stream. In the process of tracking, the mentioned mesh for each element is aligned with a position of each element. Then, additional points are generated on the mesh. A first set of first points is generated for each element based on a request for modification, and a set of second points is generated for each element based on the set of first points and the request for modification. Then, the frames of the video stream can be transformed by modifying the elements of the object on the basis of the sets of first and second points and the mesh. In such method, a background of the modified object can be changed or distorted as well by tracking and modifying the background.

In some examples, transformations changing some areas of an object using its elements can be performed by calculating characteristic points for each element of an object and generating a mesh based on the calculated characteristic points. Points are generated on the mesh, and then various areas based on the points are generated. The elements of the object are then tracked by aligning the area for each element with a position for each of the at least one element, and properties of the areas can be modified based on the request for modification, thus transforming the frames of the video stream. Depending on the specific request for modification properties of the mentioned areas can be transformed in different ways. Such modifications may involve changing color of areas; removing at least some part of areas from the frames of the video stream; including one or more new objects into areas which are based on a request for modification; and modifying or distorting the elements of an area or object. In various embodiments, any combination of such modifications or other similar modifications may be used. For certain models to be animated, some characteristic points can be selected as control points to be used in determining the entire state-space of options for the model animation.

In some examples of a computer animation model to transform image data using face detection, the face is detected on an image with use of a specific face detection algorithm (e.g., Viola-Jones). Then, an Active Shape Model (ASM) algorithm is applied to the face region of an image to detect facial feature reference points.

In other examples, other methods and algorithms suitable for face detection can be used. For example, in some embodiments, features are located using a landmark, which represents a distinguishable point present in most of the images under consideration. For facial landmarks, for example, the location of the left eye pupil may be used. If an initial landmark is not identifiable (e.g., if a person has an eyepatch), secondary landmarks may be used. Such landmark identification procedures may be used for any such objects. In some examples, a set of landmarks forms a shape. Shapes can be represented as vectors using the coordinates of the points in the shape. One shape is aligned to another with a similarity transform (allowing translation, scaling, and rotation) that minimizes the average Euclidean distance between shape points. The mean shape is the mean of the aligned training shapes.

In some examples, a search for landmarks from the mean shape aligned to the position and size of the face determined by a global face detector is started. Such a search then repeats the steps of suggesting a tentative shape by adjusting the locations of shape points by template matching of the image texture around each point and then conforming the tentative shape to a global shape model until convergence

occurs. In some systems, individual template matches are unreliable, and the shape model pools the results of the weak template matches to form a stronger overall classifier. The entire search is repeated at each level in an image pyramid, from coarse to fine resolution.

A transformation system can capture an image or video stream on a client device (e.g., the client device **102**) and perform complex image manipulations locally on the client device **102** while maintaining a suitable user experience, computation time, and power consumption. The complex image manipulations may include size and shape changes, emotion transfers (e.g., changing a face from a frown to a smile), state transfers (e.g., aging a subject, reducing apparent age, changing gender), style transfers, graphical element application, and any other suitable image or video manipulation implemented by a convolutional neural network that has been configured to execute efficiently on the client device **102**.

In some examples, a computer animation model to transform image data can be used by a system where a user may capture an image or video stream of the user (e.g., a selfie) using a client device **102** having a neural network operating as part of a messaging client application **104** operating on the client device **102**. The transformation system operating within the messaging client **104** determines the presence of a face within the image or video stream and provides modification icons associated with a computer animation model to transform image data, or the computer animation model can be present as associated with an interface described herein. The modification icons include changes that may be the basis for modifying the user's face within the image or video stream as part of the modification operation. Once a modification icon is selected, the transform system initiates a process to convert the image of the user to reflect the selected modification icon (e.g., generate a smiling face on the user). A modified image or video stream may be presented in a graphical user interface displayed on the client device **102** as soon as the image or video stream is captured, and a specified modification is selected. The transformation system may implement a complex convolutional neural network on a portion of the image or video stream to generate and apply the selected modification. That is, the user may capture the image or video stream and be presented with a modified result in real-time or near real-time once a modification icon has been selected. Further, the modification may be persistent while the video stream is being captured, and the selected modification icon remains toggled. Machine taught neural networks may be used to enable such modifications.

The graphical user interface, presenting the modification performed by the transform system, may supply the user with additional interaction options. Such options may be based on the interface used to initiate the content capture and selection of a particular computer animation model (e.g., initiation from a content creator user interface). In various embodiments, a modification may be persistent after an initial selection of a modification icon. The user may toggle the modification on or off by tapping or otherwise selecting the face being modified by the transformation system and store it for later viewing or browse to other areas of the imaging application. Where multiple faces are modified by the transformation system, the user may toggle the modification on or off globally by tapping or selecting a single face modified and displayed within a graphical user interface. In some embodiments, individual faces, among a group of multiple faces, may be individually modified, or such modifications may be individually toggled by tapping or selecting the individual face or a series of individual faces displayed within the graphical user interface.

A story table **312** stores data regarding collections of messages and associated image, video, or audio data, which are compiled into a collection (e.g., a story or a gallery). The creation of a particular collection may be initiated by a particular user (e.g., each user for which a record is maintained in the entity table **304**). A user may create a "personal story" in the form of a collection of content that has been created and sent/broadcast by that user. To this end, the user interface of the messaging client **104** may include an icon that is user-selectable to enable a sending user to add specific content to his or her personal story.

A collection may also constitute a "live story," which is a collection of content from multiple users that is created manually, automatically, or using a combination of manual and automatic techniques. For example, a "live story" may constitute a curated stream of user-submitted content from varies locations and events. Users whose client devices have location services enabled and are at a common location event at a particular time may, for example, be presented with an option, via a user interface of the messaging client **104**, to contribute content to a particular live story. The live story may be identified to the user by the messaging client **104**, based on his or her location. The end result is a "live story" told from a community perspective.

A further type of content collection is known as a "location story," which enables a user whose client device **102** is located within a specific geographic location (e.g., on a college or university campus) to contribute to a particular collection. In some examples, a contribution to a location story may require a second degree of authentication to verify that the end user belongs to a specific organization or other entity (e.g., is a student on the university campus).

As mentioned above, the video table **314** stores video data that, in one example, is associated with messages for which records are maintained within the message table **302**. Similarly, the image table **316** stores image data associated with messages for which message data is stored in the entity table **304**. The entity table **304** may associate various augmentations from the augmentation table **310** with various images and videos stored in the image table **316** and the video table **314**.

The database **120** can also store data necessary for the functioning of the encoding system **210**, such as references to media content generated by a user of the encoding system **210**. For example, the database **120** may comprise a series of references that correlate a given matrix barcode with media content, or a particular set of instructions. Accordingly, responsive to receiving a request that includes a reference, the encoding system **210** may access the database **120** in order to identify and access the appropriate media or instructions.

Data Communications Architecture

FIG. **4** is a schematic diagram illustrating a structure of a message **400**, according to some examples, generated by a messaging client **104** for communication to a further messaging client **104** or the messaging server **114**. The content of a particular message **400** is used to populate the message table **302** stored within the database **120**, accessible by the messaging server **114**. Similarly, the content of a message **400** is stored in memory as "in-transit" or "in-flight" data of the client device **102** or the application servers **112**. A message **400** is shown to include the following example components:

message identifier **402**: a unique identifier that identifies the message **400**.

message text payload **404**: text, to be generated by a user via a user interface of the client device **102**, and that is included in the message **400**.

message image payload **406**: image data, captured by a camera component of a client device **102** or retrieved from a memory component of a client device **102**, and that is included in the message **400**. Image data for a sent or received message **400** may be stored in the image table **316**.

message video payload **408**: video data, captured by a camera component or retrieved from a memory component of the client device **102**, and that is included in the message **400**. Video data for a sent or received message **400** may be stored in the video table **314**.

message audio payload **410**: audio data, captured by a microphone or retrieved from a memory component of the client device **102**, and that is included in the message **400**.

message augmentation data **412**: augmentation data (e.g., filters, stickers, or other annotations or enhancements) that represents augmentations to be applied to message image payload **406**, message video payload **408**, or message audio payload **410** of the message **400**. Augmentation data for a sent or received message **400** may be stored in the augmentation table **310**.

message duration parameter **414**: parameter value indicating, in seconds, the amount of time for which content of the message (e.g., the message image payload **406**, message video payload **408**, message audio payload **410**) is to be presented or made accessible to a user via the messaging client **104**.

message geolocation parameter **416**: geolocation data (e.g., latitudinal and longitudinal coordinates) associated with the content payload of the message. Multiple message geolocation parameter **416** values may be included in the payload, each of these parameter values being associated with respect to content items included in the content (e.g., a specific image into within the message image payload **406**, or a specific video in the message video payload **408**).

message story identifier **418**: identifier values identifying one or more content collections (e.g., "stories" identified in the story table **312**) with which a particular content item in the message image payload **406** of the message **400** is associated. For example, multiple images within the message image payload **406** may each be associated with multiple content collections using identifier values.

message tag **420**: each message **400** may be tagged with multiple tags, each of which is indicative of the subject matter of content included in the message payload. For example, where a particular image included in the message image payload **406** depicts an animal (e.g., a lion), a tag value may be included within the message tag **420** that is indicative of the relevant animal. Tag values may be generated manually, based on user input, or may be automatically generated using, for example, image recognition.

message sender identifier **422**: an identifier (e.g., a messaging system identifier, email address, or device identifier) indicative of a user of the Client device **102** on which the message **400** was generated and from which the message **400** was sent.

message receiver identifier **424**: an identifier (e.g., a messaging system identifier, email address, or device identifier) indicative of a user of the client device **102** to which the message **400** is addressed.

The contents (e.g., values) of the various components of message **400** may be pointers to locations in tables within which content data values are stored. For example, an image value in the message image payload **406** may be a pointer to (or address of) a location within an image table **316**. Similarly, values within the message video payload **408** may point to data stored within a video table **314**, values stored within the message augmentations **412** may point to data stored in an augmentation table **310**, values stored within the message story identifier **418** may point to data stored in a story table **312**, and values stored within the message sender identifier **422** and the message receiver identifier **424** may point to user records stored within an entity table **304**.

Time-Based Access Limitation Architecture

FIG. **5** is a schematic diagram illustrating an access-limiting process **500**, in terms of which access to content (e.g., an ephemeral message **502**, and associated multimedia payload of data) or a content collection (e.g., an ephemeral message group **504**) may be time-limited (e.g., made ephemeral).

An ephemeral message **502** is shown to be associated with a message duration parameter **506**, the value of which determines an amount of time that the ephemeral message **502** will be displayed to a receiving user of the ephemeral message **502** by the messaging client **104**. In one example, an ephemeral message **502** is viewable by a receiving user for up to a maximum of 10 seconds, depending on the amount of time that the sending user specifies using the message duration parameter **506**.

The message duration parameter **506** and the message receiver identifier **424** are shown to be inputs to a message timer **512**, which is responsible for determining the amount of time that the ephemeral message **502** is shown to a particular receiving user identified by the message receiver identifier **424**. In particular, the ephemeral message **502** will only be shown to the relevant receiving user for a time period determined by the value of the message duration parameter **506**. The message timer **512** is shown to provide output to a more generalized ephemeral timer system **202**, which is responsible for the overall timing of display of content (e.g., an ephemeral message **502**) to a receiving user.

The ephemeral message **502** is shown in FIG. **5** to be included within an ephemeral message group **504** (e.g., a collection of messages in a personal story, or an event story). The ephemeral message group **504** has an associated group duration parameter **508**, a value of which determines a time duration for which the ephemeral message group **504** is presented and accessible to users of the messaging system **100**. The group duration parameter **508**, for example, may be the duration of a music concert, where the ephemeral message group **504** is a collection of content pertaining to that concert. Alternatively, a user (either the owning user or a curator user) may specify the value for the group duration parameter **508** when performing the setup and creation of the ephemeral message group **504**.

Additionally, each ephemeral message **502** within the ephemeral message group **504** has an associated group participation parameter **510**, a value of which determines the duration of time for which the ephemeral message **502** will be accessible within the context of the ephemeral message group **504**. Accordingly, a particular ephemeral message group **504** may "expire" and become inaccessible within the context of the ephemeral message group **504**, prior to the

ephemeral message group **504** itself expiring in terms of the group duration parameter **508**. The group duration parameter **508**, group participation parameter **510**, and message receiver identifier **424** each provide input to a group timer **514**, which operationally determines, firstly, whether a particular ephemeral message **502** of the ephemeral message group **504** will be displayed to a particular receiving user and, if so, for how long. Note that the ephemeral message group **504** is also aware of the identity of the particular receiving user as a result of the message receiver identifier **424**.

Accordingly, the group timer **514** operationally controls the overall lifespan of an associated ephemeral message group **504**, as well as an individual ephemeral message **502** included in the ephemeral message group **504**. In one example, each and every ephemeral message **502** within the ephemeral message group **504** remains viewable and accessible for a time period specified by the group duration parameter **508**. In a further example, a certain ephemeral message **502** may expire, within the context of ephemeral message group **504**, based on a group participation parameter **510**. Note that a message duration parameter **506** may still determine the duration of time for which a particular ephemeral message **502** is displayed to a receiving user, even within the context of the ephemeral message group **504**. Accordingly, the message duration parameter **506** determines the duration of time that a particular ephemeral message **502** is displayed to a receiving user, regardless of whether the receiving user is viewing that ephemeral message **502** inside or outside the context of an ephemeral message group **504**.

The ephemeral timer system **202** may furthermore operationally remove a particular ephemeral message **502** from the ephemeral message group **504** based on a determination that it has exceeded an associated group participation parameter **510**. For example, when a sending user has established a group participation parameter **510** of 24 hours from posting, the ephemeral timer system **202** will remove the relevant ephemeral message **502** from the ephemeral message group **504** after the specified 24 hours. The ephemeral timer system **202** also operates to remove an ephemeral message group **504** when either the group participation parameter **510** for each and every ephemeral message **502** within the ephemeral message group **504** has expired, or when the ephemeral message group **504** itself has expired in terms of the group duration parameter **508**.

In certain use cases, a creator of a particular ephemeral message group **504** may specify an indefinite group duration parameter **508**. In this case, the expiration of the group participation parameter **510** for the last remaining ephemeral message **502** within the ephemeral message group **504** will determine when the ephemeral message group **504** itself expires. In this case, a new ephemeral message **502**, added to the ephemeral message group **504**, with a new group participation parameter **510**, effectively extends the life of an ephemeral message group **504** to equal the value of the group participation parameter **510**.

Responsive to the ephemeral timer system **202** determining that an ephemeral message group **504** has expired (e.g., is no longer accessible), the ephemeral timer system **202** communicates with the messaging system **100** (and, for example, specifically the messaging client **104**) to cause an indicium (e.g., an icon) associated with the relevant ephemeral message group **504** to no longer be displayed within a user interface of the messaging client **104**. Similarly, when the ephemeral timer system **202** determines that the message duration parameter **506** for a particular ephemeral message **502** has expired, the ephemeral timer system **202** causes the messaging client **104** to no longer display an indicium (e.g., an icon or textual identification) associated with the ephemeral message **502**.

FIG. **6** illustrates a method **600** for encoding a matrix barcode with a reference to a media item, in accordance with one embodiment. Operations of the method **600** may be performed by one or more subsystems of the messaging system **100** described above with respect to FIG. **2**, such as the encoding system **210**. As shown in FIG. **6**, the method **600** includes one or more operations **602**, **604**, **606**, **608** and **610**.

At operation **602**, the encoding system **210** causes display of a media item with a GUI at a client device **102**. The GUI may include a GUI to configure media content to be included in a message distributed by the client device **102**, or to be added to a media collection associated with a user profile of the client device **102**. The GUI may include a display of a set of graphical elements, such as stickers, wherein a user may provide an input to select and position a graphical element at a position within the media item presented within the GUI.

At operation **604**, the user provides an input that selects a graphical element from among the set of graphical elements displayed within the GUI. For example, in some embodiments, the input may include a tactile input that drags and drops the graphical element at a position within the media item presented within the GUI. In some embodiments, as discussed herein, the graphical element may correspond with a feature to generate a scannable coded image, such as a matrix barcode, or Quick-Response (QR) code, which may be displayed at a position upon the media item.

At operation **606**, responsive to receiving the input that selects the graphical element from among the set of graphical elements, the encoding system **210** generates a reference to the media item displayed within the GUI. For example, the reference may include a URL which directs to the media item, or a position of the media item among a media collection, such as a story.

At operation **608**, the encoding system **210** encodes a matrix barcode with the reference to the media item. Encoding the matrix barcode may include operations to generate a two-dimensional code that consists of cells, or dots, arranges in a pattern, whereby the unique patterned arrangement of cells or dots is based on the reference. Accordingly, by scanning the matrix barcode, a machine configured to read such patterns would be able to decode the matrix barcode in order to receive the reference encoded within the matrix barcode.

At operation **610**, the encoding system **210** generates a presentation of the media item that includes a display of the matrix barcode at a position within the media item, wherein the position of the matrix barcode within the media item is based on a user input.

In some embodiments, generating the presentation of the media item that includes the display of the matrix barcode may include generating a unique matrix barcode based on one or more factors that include attributes of the media item, as well as user profile data associated with a user of the client device **102**. For example, in some embodiments, the matrix barcode may include a user identifier from the user profile associated with the client device **102**, or may have one or more graphical properties, such as colors or shapes, which may be based on attributes of the media item itself. As an illustrative example, a matrix barcode may be generated which includes a display of a user identifier (i.e., a user

avatar) within the matrix barcode, and one or more colors which may be based on user preferences, or a foreground or background color detected within the media item presented within the GUI.

FIG. **7** illustrates a method **700** for distributing a message that includes a presentation of a matrix barcode, in accordance with one embodiment. Operations of the method **700** may be performed by one or more subsystems of the messaging system **100** described above with respect to FIG. **2**, such as the encoding system **210**. As shown in FIG. **7**, the method **700** includes one or more operations **702**, **704**, and **706**.

At operation **702**, responsive to a request from the client device **102**, the messaging client **104** generates a message that includes the presentation of the media item generated by the encoding system **210**, wherein the presentation of the media item includes a display of a matrix barcode at a position within the media item.

At operation **704**, the message that includes the presentation of the media item is distributed to one or more recipients. According to certain embodiments, distribution of the message that includes the presentation of the media item may include adding the presentation of the media content to a collection of media content associated with the user of the client device **102**. In such embodiments, and as discussed above, a media collection may include a "story," "personal story," "live story," or "location story," wherein a user accessing one or more of the above stories may be presented with the presentation of the media content among a display of the corresponding collection of media content. In further embodiments, the message may be distributed to one or more recipients directly as a message, whereby recipients of the message may be presented with the presentation of the media content. In certain embodiments, any of the above messages may include an ephemeral message, wherein a display duration of the ephemeral message may be determined by the ephemeral timer system **202**. Accordingly, at operation **706**, the presentation of the media content is displayed to the one or more recipients based on the display duration.

FIG. **8** illustrates a method **800** for accessing media content via a matrix barcode, in accordance with one embodiment. Operations of the method **800** may be performed by one or more subsystems of the messaging system **100** described above with respect to FIG. **2**, such as the encoding system **210**. As shown in FIG. **8**, the method **800** includes one or more operations **802**, **804**, and **806**, which may be performed subsequent to one or more of the operations of the method **700**, such as operation **706**, in which the presentation of the media item that includes the display of the matrix barcode is displayed at one or more recipient devices (i.e., a client device **102**).

At operation **802**, as in operation **706**, the messaging client **104** causes display of the presentation of media content that includes the display of the matrix barcode at a first client device (i.e., a client device **102**).

At operation **804**, the messaging client **104** receives a request from a second client device (i.e., a client device **102**), wherein the request includes a scan of the matrix barcode displayed at the first client device. For example, a user of the second client device may directly scan the presentation of the media content that includes the matrix barcode displayed at the first client device, and in response, based on the instructions and the reference encoded within the matrix barcode, the encoding system **210** may cause the second client device to generate a request to the messaging client **104**.

At operation **806**, the encoding system **210** accesses the database **120** to access the media content based on the reference encoded within the matrix barcode, and causes the second client device to display the presentation of the media content responsive to the request.

In some embodiments, causing display of the presentation of the media content may include accessing a story (i.e., a media collection), and presenting the story from a position of the presentation of the media content within the story. As an illustrative example, if the presentation of the media content happens to be the third piece of media content among a media collection of ten media items, the messaging client **104** may cause display of the entire story, starting from the third piece of media content that comprises the presentation of the media content.

FIG. **9** illustrates an interface diagram **900**, according to certain example embodiments. As seen in the interface diagram **900**, the encoding system **210** may generate and cause display of a GUI **904** to configure a media item, such as the media item **1002** depicted in the interface diagram **1000** of FIG. **10**. The GUI **904** may include a display of a set of graphical elements **906**, wherein the set of graphical elements **906** may comprise stickers.

In some embodiments, each graphical element among the set of graphical elements **906** may correspond with a set of instructions that cause the messaging system **100** to perform certain operations. For example, as discussed in the method **600** depicted in FIG. **6**, responsive to receiving an input that selects the graphical element **902**, the messaging system **100** may cause the encoding system **210** to generate a reference to a media item (i.e., the media item **1002**), and to encode a matrix barcode (i.e., the matrix barcode **1004**) with the reference to the media item.

Accordingly, the GUI **904** may comprise a set of graphical elements **906** from which a user of the client device **102** may provide inputs to select one or more of the set of graphical elements **906**, and to position the one or more graphical elements at a position within a media item, such as an image, in order to generate the media item **1002** of the interface diagram **1000**.

In some embodiments, attributes of the set of graphical elements **906** may be based on context data that includes location data, temporal data, as well as user profile data of a user of the client device **102**. For example, according to certain embodiments, one or more of the set of graphical elements **906** may be generated and presented based on the user identifier **908**. As seen in the interface diagram **900**, the graphical element **902** may comprise a display of the user identifier **908**.

In some embodiments, the GUI **904** may be presented at the client device **102** responsive to a request from the client device **102** to generate a message, or a media item to be distributed in a message, or added to a media collection.

FIG. **10** illustrates an interface diagram **1000**, according to certain example embodiments. As seen in the interface diagram **1000**, the encoding system **210** may generate and cause display of the media item **1002** at a client device, such as the client device **102**, wherein the media item **1002** may have been configured based on inputs received from a user via the GUI **904**.

As seen in the interface diagram **1000**, the media item **1002** may comprise a presentation of an image **1008** that includes a display of a matrix barcode **1004** at a user defined position within the image **1008**. In such embodiments, the matrix barcode **1004** may be generated by the encoding system **210**, and encoded with instructions that include a reference to the media item **1002**. Accordingly, by scanning

the matrix barcode **1004**, the encoding system **210** may cause a client device **102** to perform operations that include generating a request to the messaging system **100**, wherein the request include the reference to the media item **1002**.

As described in the method **800**, responsive to receiving the request that includes the reference to the media item **1002** from a client device **102**, the messaging system **100** may cause display of the media item **1002** at the client device **102**.

According to certain embodiments, the matrix barcode **1004** may include a display of a user identifier, such as the user avatar **1006**, wherein the user avatar **1006** is associated with a user profile of a user that generated or otherwise configured the media item **1002**, and wherein the media item **1002** is a part of a media collection of the user profile associated with the avatar **1006**.

Machine Architecture

FIG. **11** is a diagrammatic representation of the machine **1100** within which instructions **1108** (e.g., software, a program, an application, an applet, an app, or other executable code) for causing the machine **1100** to perform any one or more of the methodologies discussed herein may be executed. For example, the instructions **1108** may cause the machine **1100** to execute any one or more of the methods described herein. The instructions **1108** transform the general, non-programmed machine **1100** into a particular machine **1100** programmed to carry out the described and illustrated functions in the manner described. The machine **1100** may operate as a standalone device or may be coupled (e.g., networked) to other machines. In a networked deployment, the machine **1100** may operate in the capacity of a server machine or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine **1100** may comprise, but not be limited to, a server computer, a client computer, a personal computer (PC), a tablet computer, a laptop computer, a netbook, a set-top box (STB), a personal digital assistant (PDA), an entertainment media system, a cellular telephone, a smartphone, a mobile device, a wearable device (e.g., a smartwatch), a smart home device (e.g., a smart appliance), other smart devices, a web appliance, a network router, a network switch, a network bridge, or any machine capable of executing the instructions **1108**, sequentially or otherwise, that specify actions to be taken by the machine **1100**. Further, while only a single machine **1100** is illustrated, the term "machine" shall also be taken to include a collection of machines that individually or jointly execute the instructions **1108** to perform any one or more of the methodologies discussed herein. The machine **1100**, for example, may comprise the client device **102** or any one of a number of server devices forming part of the messaging server system **108**. In some examples, the machine **1100** may also comprise both client and server systems, with certain operations of a particular method or algorithm being performed on the server-side and with certain operations of the particular method or algorithm being performed on the client-side.

The machine **1100** may include processors **1102**, memory **1104**, and input/output I/O components **638**, which may be configured to communicate with each other via a bus **1140**. In an example, the processors **1102** (e.g., a Central Processing Unit (CPU), a Reduced Instruction Set Computing (RISC) Processor, a Complex Instruction Set Computing (CISC) Processor, a Graphics Processing Unit (GPU), a Digital Signal Processor (DSP), an Application Specific Integrated Circuit (ASIC), a Radio-Frequency Integrated Circuit (RFIC), another processor, or any suitable combination thereof) may include, for example, a processor **1106** and a processor **1110** that execute the instructions **1108**. The term "processor" is intended to include multi-core processors that may comprise two or more independent processors (sometimes referred to as "cores") that may execute instructions contemporaneously. Although FIG. **11** shows multiple processors **1102**, the machine **1100** may include a single processor with a single-core, a single processor with multiple cores (e.g., a multi-core processor), multiple processors with a single core, multiple processors with multiples cores, or any combination thereof.

The memory **1104** includes a main memory **1112**, a static memory **1114**, and a storage unit **1116**, both accessible to the processors **1102** via the bus **1140**. The main memory **1104**, the static memory **1114**, and storage unit **1116** store the instructions **1108** embodying any one or more of the methodologies or functions described herein. The instructions **1108** may also reside, completely or partially, within the main memory **1112**, within the static memory **1114**, within machine-readable medium **1118** within the storage unit **1116**, within at least one of the processors **1102** (e.g., within the Processor's cache memory), or any suitable combination thereof, during execution thereof by the machine **1100**.

The I/O components **1138** may include a wide variety of components to receive input, provide output, produce output, transmit information, exchange information, capture measurements, and so on. The specific I/O components **1138** that are included in a particular machine will depend on the type of machine. For example, portable machines such as mobile phones may include a touch input device or other such input mechanisms, while a headless server machine will likely not include such a touch input device. It will be appreciated that the I/O components **1138** may include many other components that are not shown in FIG. **11**. In various examples, the I/O components **1138** may include user output components **1124** and user input components **1126**. The user output components **1124** may include visual components (e.g., a display such as a plasma display panel (PDP), a light-emitting diode (LED) display, a liquid crystal display (LCD), a projector, or a cathode ray tube (CRT)), acoustic components (e.g., speakers), haptic components (e.g., a vibratory motor, resistance mechanisms), other signal generators, and so forth. The user input components **1126** may include alphanumeric input components (e.g., a keyboard, a touch screen configured to receive alphanumeric input, a photo-optical keyboard, or other alphanumeric input components), point-based input components (e.g., a mouse, a touchpad, a trackball, a joystick, a motion sensor, or another pointing instrument), tactile input components (e.g., a physical button, a touch screen that provides location and force of touches or touch gestures, or other tactile input components), audio input components (e.g., a microphone), and the like.

In further examples, the I/O components **1138** may include biometric components **1128**, motion components **1130**, environmental components **1132**, or position components **1134**, among a wide array of other components. For example, the biometric components **1128** include components to detect expressions (e.g., hand expressions, facial expressions, vocal expressions, body gestures, or eye-tracking), measure biosignals (e.g., blood pressure, heart rate, body temperature, perspiration, or brain waves), identify a person (e.g., voice identification, retinal identification, facial identification, fingerprint identification, or electroencephalogram-based identification), and the like. The motion com-

ponents **1130** include acceleration sensor components (e.g., accelerometer), gravitation sensor components, rotation sensor components (e.g., gyroscope).

The environmental components **1132** include, for example, one or cameras (with still image/photograph and video capabilities), illumination sensor components (e.g., photometer), temperature sensor components (e.g., one or more thermometers that detect ambient temperature), humidity sensor components, pressure sensor components (e.g., barometer), acoustic sensor components (e.g., one or more microphones that detect background noise), proximity sensor components (e.g., infrared sensors that detect nearby objects), gas sensors (e.g., gas detection sensors to detection concentrations of hazardous gases for safety or to measure pollutants in the atmosphere), or other components that may provide indications, measurements, or signals corresponding to a surrounding physical environment.

With respect to cameras, the client device **102** may have a camera system comprising, for example, front cameras on a front surface of the client device **102** and rear cameras on a rear surface of the client device **102**. The front cameras may, for example, be used to capture still images and video of a user of the client device **102** (e.g., "selfies"), which may then be augmented with augmentation data (e.g., filters) described above. The rear cameras may, for example, be used to capture still images and videos in a more traditional camera mode, with these images similarly being augmented with augmentation data. In addition to front and rear cameras, the client device **102** may also include a **3600** camera for capturing 360° photographs and videos.

Further, the camera system of a client device **102** may include dual rear cameras (e.g., a primary camera as well as a depth-sensing camera), or even triple, quad or penta rear camera configurations on the front and rear sides of the client device **102**. These multiple cameras systems may include a wide camera, an ultra-wide camera, a telephoto camera, a macro camera and a depth sensor, for example.

The position components **1134** include location sensor components (e.g., a GPS receiver component), altitude sensor components (e.g., altimeters or barometers that detect air pressure from which altitude may be derived), orientation sensor components (e.g., magnetometers), and the like.

Communication may be implemented using a wide variety of technologies. The I/O components **1138** further include communication components **1136** operable to couple the machine **1100** to a network **1120** or devices **1122** via respective coupling or connections. For example, the communication components **1136** may include a network interface Component or another suitable device to interface with the network **1120**. In further examples, the communication components **1136** may include wired communication components, wireless communication components, cellular communication components, Near Field Communication (NFC) components, Bluetooth® components (e.g., Bluetooth® Low Energy), Wi-Fi® components, and other communication components to provide communication via other modalities. The devices **1122** may be another machine or any of a wide variety of peripheral devices (e.g., a peripheral device coupled via a USB).

Moreover, the communication components **1136** may detect identifiers or include components operable to detect identifiers. For example, the communication components **1136** may include Radio Frequency Identification (RFID) tag reader components, NFC smart tag detection components, optical reader components (e.g., an optical sensor to detect one-dimensional bar codes such as Universal Product Code (UPC) bar code, multi-dimensional bar codes such as Quick Response (QR) code, Aztec code, Data Matrix, Dataglyph, MaxiCode, PDF417, Ultra Code, UCC RSS-2D bar code, and other optical codes), or acoustic detection components (e.g., microphones to identify tagged audio signals). In addition, a variety of information may be derived via the communication components **1136**, such as location via Internet Protocol (IP) geolocation, location via Wi-Fi® signal triangulation, location via detecting an NFC beacon signal that may indicate a particular location, and so forth.

The various memories (e.g., main memory **1112**, static memory **1114**, and memory of the processors **1102**) and storage unit **1116** may store one or more sets of instructions and data structures (e.g., software) embodying or used by any one or more of the methodologies or functions described herein. These instructions (e.g., the instructions **1108**), when executed by processors **1102**, cause various operations to implement the disclosed examples.

The instructions **1108** may be transmitted or received over the network **1120**, using a transmission medium, via a network interface device (e.g., a network interface component included in the communication components **1136**) and using any one of several well-known transfer protocols (e.g., hypertext transfer protocol (HTTP)). Similarly, the instructions **1108** may be transmitted or received using a transmission medium via a coupling (e.g., a peer-to-peer coupling) to the devices **1122**.

Software Architecture

FIG. **12** is a block diagram **1200** illustrating a software architecture **1204**, which can be installed on any one or more of the devices described herein. The software architecture **1204** is supported by hardware such as a machine **1202** that includes processors **1220**, memory **1226**, and I/O components **1238**. In this example, the software architecture **1204** can be conceptualized as a stack of layers, where each layer provides a particular functionality. The software architecture **1204** includes layers such as an operating system **1212**, libraries **1210**, frameworks **1208**, and applications **1206**. Operationally, the applications **1206** invoke API calls **1250** through the software stack and receive messages **1252** in response to the API calls **1250**.

The operating system **1212** manages hardware resources and provides common services. The operating system **1212** includes, for example, a kernel **1214**, services **1216**, and drivers **1222**. The kernel **1214** acts as an abstraction layer between the hardware and the other software layers. For example, the kernel **1214** provides memory management, processor management (e.g., scheduling), component management, networking, and security settings, among other functionality. The services **1216** can provide other common services for the other software layers. The drivers **1222** are responsible for controlling or interfacing with the underlying hardware. For instance, the drivers **1222** can include display drivers, camera drivers, BLUETOOTH® or BLUETOOTH® Low Energy drivers, flash memory drivers, serial communication drivers (e.g., USB drivers), WI-FI® drivers, audio drivers, power management drivers, and so forth.

The libraries **1210** provide a common low-level infrastructure used by the applications **1206**. The libraries **1210** can include system libraries **1218** (e.g., C standard library) that provide functions such as memory allocation functions, string manipulation functions, mathematic functions, and the like. In addition, the libraries **1210** can include API libraries **1224** such as media libraries (e.g., libraries to support presentation and manipulation of various media

formats such as Moving Picture Experts Group-4 (MPEG4), Advanced Video Coding (H.264 or AVC), Moving Picture Experts Group Layer-3 (MP3), Advanced Audio Coding (AAC), Adaptive Multi-Rate (AMR) audio codec, Joint Photographic Experts Group (JPEG or JPG), or Portable Network Graphics (PNG)), graphics libraries (e.g., an OpenGL framework used to render in two dimensions (2D) and three dimensions (3D) in a graphic content on a display), database libraries (e.g., SQLite to provide various relational database functions), web libraries (e.g., WebKit to provide web browsing functionality), and the like. The libraries **1210** can also include a wide variety of other libraries **1228** to provide many other APIs to the applications **1206**.

The frameworks **1208** provide a common high-level infrastructure that is used by the applications **1206**. For example, the frameworks **1208** provide various graphical user interface (GUI) functions, high-level resource management, and high-level location services. The frameworks **1208** can provide a broad spectrum of other APIs that can be used by the applications **1206**, some of which may be specific to a particular operating system or platform.

In an example, the applications **1206** may include a home application **1236**, a contacts application **1230**, a browser application **1232**, a book reader application **1234**, a location application **1242**, a media application **1244**, a messaging application **1246**, a game application **1248**, and a broad assortment of other applications such as a third-party application **1240**. The applications **1206** are programs that execute functions defined in the programs. Various programming languages can be employed to create one or more of the applications **1206**, structured in a variety of manners, such as object-oriented programming languages (e.g., Objective-C, Java, or C++) or procedural programming languages (e.g., C or assembly language). In a specific example, the third-party application **1240** (e.g., an application developed using the ANDROID™ or IOS™ software development kit (SDK) by an entity other than the vendor of the particular platform) may be mobile software running on a mobile operating system such as IOS™, ANDROID™, WINDOWS® Phone, or another mobile operating system. In this example, the third-party application **1240** can invoke the API calls **1250** provided by the operating system **1212** to facilitate functionality described herein.

Processing Components

Turning now to FIG. **13**, there is shown a diagrammatic representation of a processing environment **1300**, which includes a processor **1302**, a processor **1306**, and a processor **1308** (e.g., a GPU, CPU or combination thereof).

The processor **1302** is shown to be coupled to a power source **1304**, and to include (either permanently configured or temporarily instantiated) modules, namely an X component **1310**, a Y component **1312**, and a Z component **1314**. The X component **1310** operationally performs operations as discussed in the method **600**, the Y component **1312** operationally performs operations as discussed in the method **700**, and the Z component **1314** operationally performs operations as discussed in the method **800**. As illustrated, the processor **1302** is communicatively coupled to both the processor **1306** and the processor **1308**. The X component **1310**, Y component **1312**, and Z component **1314**, are not necessarily limited to only the operations described in the above methods, and may work in conjunction with one another to perform one or more operations of each of the methods discussed above.

Glossary

"Carrier signal" refers to any intangible medium that is capable of storing, encoding, or carrying instructions for execution by the machine, and includes digital or analog communications signals or other intangible media to facilitate communication of such instructions. Instructions may be transmitted or received over a network using a transmission medium via a network interface device.

"Client device" refers to any machine that interfaces to a communications network to obtain resources from one or more server systems or other client devices. A client device may be, but is not limited to, a mobile phone, desktop computer, laptop, portable digital assistants (PDAs), smartphones, tablets, ultrabooks, netbooks, laptops, multi-processor systems, microprocessor-based or programmable consumer electronics, game consoles, set-top boxes, or any other communication device that a user may use to access a network.

"Communication network" refers to one or more portions of a network that may be an ad hoc network, an intranet, an extranet, a virtual private network (VPN), a local area network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a wireless WAN (WWAN), a metropolitan area network (MAN), the Internet, a portion of the Internet, a portion of the Public Switched Telephone Network (PSTN), a plain old telephone service (POTS) network, a cellular telephone network, a wireless network, a Wi-Fi® network, another type of network, or a combination of two or more such networks. For example, a network or a portion of a network may include a wireless or cellular network and the coupling may be a Code Division Multiple Access (CDMA) connection, a Global System for Mobile communications (GSM) connection, or other types of cellular or wireless coupling. In this example, the coupling may implement any of a variety of types of data transfer technology, such as Single Carrier Radio Transmission Technology (1×RTT), Evolution-Data Optimized (EVDO) technology, General Packet Radio Service (GPRS) technology, Enhanced Data rates for GSM Evolution (EDGE) technology, third Generation Partnership Project (3GPP) including 3G, fourth generation wireless (4G) networks, Universal Mobile Telecommunications System (UMTS), High Speed Packet Access (HSPA), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE) standard, others defined by various standard-setting organizations, other long-range protocols, or other data transfer technology.

"Component" refers to a device, physical entity, or logic having boundaries defined by function or subroutine calls, branch points, APIs, or other technologies that provide for the partitioning or modularization of particular processing or control functions. Components may be combined via their interfaces with other components to carry out a machine process. A component may be a packaged functional hardware unit designed for use with other components and a part of a program that usually performs a particular function of related functions. Components may constitute either software components (e.g., code embodied on a machine-readable medium) or hardware components. A "hardware component" is a tangible unit capable of performing certain operations and may be configured or arranged in a certain physical manner. In various example embodiments, one or more computer systems (e.g., a standalone computer system, a client computer system, or a server computer system) or one or more hardware components of a computer system (e.g., a processor or a group of processors) may be config-

ured by software (e.g., an application or application portion) as a hardware component that operates to perform certain operations as described herein. A hardware component may also be implemented mechanically, electronically, or any suitable combination thereof. For example, a hardware component may include dedicated circuitry or logic that is permanently configured to perform certain operations. A hardware component may be a special-purpose processor, such as a field-programmable gate array (FPGA) or an application specific integrated circuit (ASIC). A hardware component may also include programmable logic or circuitry that is temporarily configured by software to perform certain operations. For example, a hardware component may include software executed by a general-purpose processor or other programmable processor. Once configured by such software, hardware components become specific machines (or specific components of a machine) uniquely tailored to perform the configured functions and are no longer general-purpose processors. It will be appreciated that the decision to implement a hardware component mechanically, in dedicated and permanently configured circuitry, or in temporarily configured circuitry (e.g., configured by software), may be driven by cost and time considerations. Accordingly, the phrase "hardware component" (or "hardware-implemented component") should be understood to encompass a tangible entity, be that an entity that is physically constructed, permanently configured (e.g., hardwired), or temporarily configured (e.g., programmed) to operate in a certain manner or to perform certain operations described herein. Considering embodiments in which hardware components are temporarily configured (e.g., programmed), each of the hardware components need not be configured or instantiated at any one instance in time. For example, where a hardware component comprises a general-purpose processor configured by software to become a special-purpose processor, the general-purpose processor may be configured as respectively different special-purpose processors (e.g., comprising different hardware components) at different times. Software accordingly configures a particular processor or processors, for example, to constitute a particular hardware component at one instance of time and to constitute a different hardware component at a different instance of time. Hardware components can provide information to, and receive information from, other hardware components. Accordingly, the described hardware components may be regarded as being communicatively coupled. Where multiple hardware components exist contemporaneously, communications may be achieved through signal transmission (e.g., over appropriate circuits and buses) between or among two or more of the hardware components. In embodiments in which multiple hardware components are configured or instantiated at different times, communications between such hardware components may be achieved, for example, through the storage and retrieval of information in memory structures to which the multiple hardware components have access. For example, one hardware component may perform an operation and store the output of that operation in a memory device to which it is communicatively coupled. A further hardware component may then, at a later time, access the memory device to retrieve and process the stored output. Hardware components may also initiate communications with input or output devices, and can operate on a resource (e.g., a collection of information). The various operations of example methods described herein may be performed, at least partially, by one or more processors that are temporarily configured (e.g., by software) or permanently configured to perform the relevant operations. Whether temporarily or permanently configured, such processors may constitute processor-implemented components that operate to perform one or more operations or functions described herein. As used herein, "processor-implemented component" refers to a hardware component implemented using one or more processors. Similarly, the methods described herein may be at least partially processor-implemented, with a particular processor or processors being an example of hardware. For example, at least some of the operations of a method may be performed by one or more processors **1004** or processor-implemented components. Moreover, the one or more processors may also operate to support performance of the relevant operations in a "cloud computing" environment or as a "software as a service" (SaaS). For example, at least some of the operations may be performed by a group of computers (as examples of machines including processors), with these operations being accessible via a network (e.g., the Internet) and via one or more appropriate interfaces (e.g., an API). The performance of certain of the operations may be distributed among the processors, not only residing within a single machine, but deployed across a number of machines. In some example embodiments, the processors or processor-implemented components may be located in a single geographic location (e.g., within a home environment, an office environment, or a server farm). In other example embodiments, the processors or processor-implemented components may be distributed across a number of geographic locations.

"Computer-readable storage medium" refers to both machine-storage media and transmission media. Thus, the terms include both storage devices/media and carrier waves/modulated data signals. The terms "machine-readable medium," "computer-readable medium" and "device-readable medium" mean the same thing and may be used interchangeably in this disclosure.

"Ephemeral message" refers to a message that is accessible for a time-limited duration. An ephemeral message may be a text, an image, a video and the like. The access time for the ephemeral message may be set by the message sender. Alternatively, the access time may be a default setting or a setting specified by the recipient. Regardless of the setting technique, the message is transitory.

"Machine storage medium" refers to a single or multiple storage devices and media (e.g., a centralized or distributed database, and associated caches and servers) that store executable instructions, routines and data. The term shall accordingly be taken to include, but not be limited to, solid-state memories, and optical and magnetic media, including memory internal or external to processors. Specific examples of machine-storage media, computer-storage media and device-storage media include non-volatile memory, including by way of example semiconductor memory devices, e.g., erasable programmable read-only memory (EPROM), electrically erasable programmable read-only memory (EEPROM), FPGA, and flash memory devices; magnetic disks such as internal hard disks and removable disks; magneto-optical disks; and CD-ROM and DVD-ROM disks The terms "machine-storage medium," "device-storage medium," "computer-storage medium" mean the same thing and may be used interchangeably in this disclosure. The terms "machine-storage media," "computer-storage media," and "device-storage media" specifically exclude carrier waves, modulated data signals, and other such media, at least some of which are covered under the term "signal medium."

"Non-transitory computer-readable storage medium" refers to a tangible medium that is capable of storing, encoding, or carrying the instructions for execution by a machine.

"Signal medium" refers to any intangible medium that is capable of storing, encoding, or carrying the instructions for execution by a machine and includes digital or analog communications signals or other intangible media to facilitate communication of software or data. The term "signal medium" shall be taken to include any form of a modulated data signal, carrier wave, and so forth. The term "modulated data signal" means a signal that has one or more of its characteristics set or changed in such a matter as to encode information in the signal. The terms "transmission medium" and "signal medium" mean the same thing and may be used interchangeably in this disclosure.

What is claimed is:

1. A method comprising:

causing display of a graphical user interface (GUI) at a client device associated with a user profile, the GUI including a display of one or more graphical icons to be applied to a media item, the media item comprising an attribute that includes a background color;

receiving an input that selects a graphical icon from among the set of graphical icons presented within the GUI, the graphical icon corresponding with a request to generate a matrix barcode;

generating the matrix barcode based on the attribute that includes the background color of the media item and a graphical avatar associated with the user profile client device responsive to the input that selects the graphical icon that corresponds with the request to generate the matrix barcode;

encoding the matrix barcode with a set of instructions to add the user profile to a list of social network connections responsive to a scan request of the matrix barcode; and

causing display of a presentation of the matrix barcode at a position within the media item.

2. The method of claim **1**, wherein the media item comprises image data.

3. The method of claim **1**, wherein the media item comprises a display duration that defines a display period associated with the media item.

4. The method of claim **1**, wherein the media item corresponds with a set of access conditions, and the causing the client device to display the series of media items from the position of the media item includes:

detecting one or more access conditions from among the set of access conditions associated with the media item; and

causing the client device to display the series of media items from the position of the media item based on the one or more access conditions.

5. The method of claim **4**, wherein the one or more access conditions include location criteria.

6. A system comprising:

a memory; and

at least one hardware processor coupled to the memory and comprising instructions that causes the system to perform operations comprising:

causing display of a graphical user interface (GUI) at a client device associated with a user profile, the GUI including a display of one or more graphical icons to be applied to a media item, the media item comprising an attribute that includes a background color;

receiving an input that selects a graphical icon from among the set of graphical icons presented within the GUI the graphical icon corresponding with a request to generate a matrix barcode;

generating the matrix barcode based on the attribute that includes the background color of the media item and a graphical avatar associated with the user profile client device responsive to the input that selects the graphical icon that corresponds with the request to generate the matrix barcode;

encoding the matrix barcode with a set of instructions to add the user profile to a list of social network connections responsive to a scan request of the matrix barcode; and

causing display of a presentation of the matrix barcode at a position within the media item.

7. The system of claim **6**, wherein the media item comprises image data.

8. The system of claim **6**, wherein the media item comprises a display duration that defines a display period associated with the media item.

9. The system of claim **6**, wherein the media item corresponds with a set of access conditions, and the causing the client device to display the series of media items from the position of the media item includes:

detecting one or more access conditions from among the set of access conditions associated with the media item; and

causing the client device to display the series of media items from the position of the media item based on the one or more access conditions.

10. The system of claim **9**, wherein the one or more access conditions include location criteria.

11. A non-transitory machine-readable storage medium comprising instructions that, when executed by one or more processors of a machine, cause the machine to perform operations comprising:

causing display of a graphical user interface (GUI) at a client device associated with a user profile, the GUI including a display of one or more graphical icons to be applied to a media item, the media item comprising an attribute that includes a background color;

receiving an input that selects a graphical icon from among the set of graphical icons presented within the GUI, the graphical icon corresponding with a request to generate a matrix barcode;

generating the matrix barcode based on the attribute that includes the background color of the media item and a graphical avatar associated with the user profile client device responsive to the input that selects the graphical icon that corresponds with the request to generate the matrix barcode;

encoding the matrix barcode with a set of instructions to add the user profile to a list of social network connections responsive to a scan request of the matrix barcode; and

causing display of a presentation of the matrix barcode at a position within the media item.

12. The non-transitory machine-readable storage medium of claim **11**, wherein the media item comprises image data.

13. The non-transitory machine-readable storage medium of claim **11**, wherein the media item comprises a display duration that defines a display period associated with the media item.

14. The non-transitory machine-readable storage medium of claim **11**, wherein the media item corresponds with a set

of access conditions, and the causing the client device to display the series of media items from the position of the media item includes:

detecting one or more access conditions from among the set of access conditions associated with the media item; and

causing the client device to display the series of media items from the position of the media item based on the one or more access conditions.

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