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Sehn

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(54) **APPARATUS AND METHOD FOR SUPPLYING CONTENT AWARE PHOTO FILTERS**

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(52) **U.S. Cl.**
CPC ***H04N 5/23222*** (2013.01); ***H04N 5/23229*** (2013.01); ***H04N 5/23293*** (2013.01); *H04N 5/23216* (2013.01); *H04N 2201/3253* (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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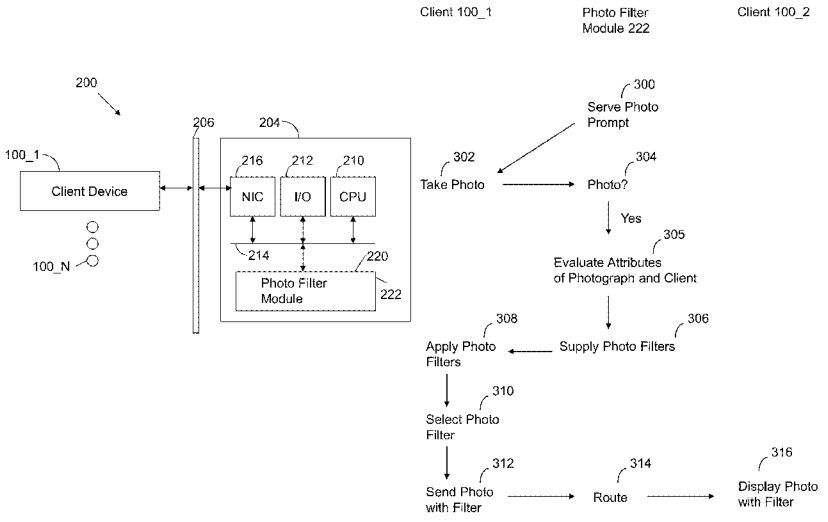
(57) **ABSTRACT**

A server includes a photo filter module with instructions executed by a processor to identify when a client device captures a photograph. Photograph filters are selected based upon attributes of the client device and attributes of the photograph. The photograph filters are supplied to the client device.

13 Claims, 7 Drawing Sheets



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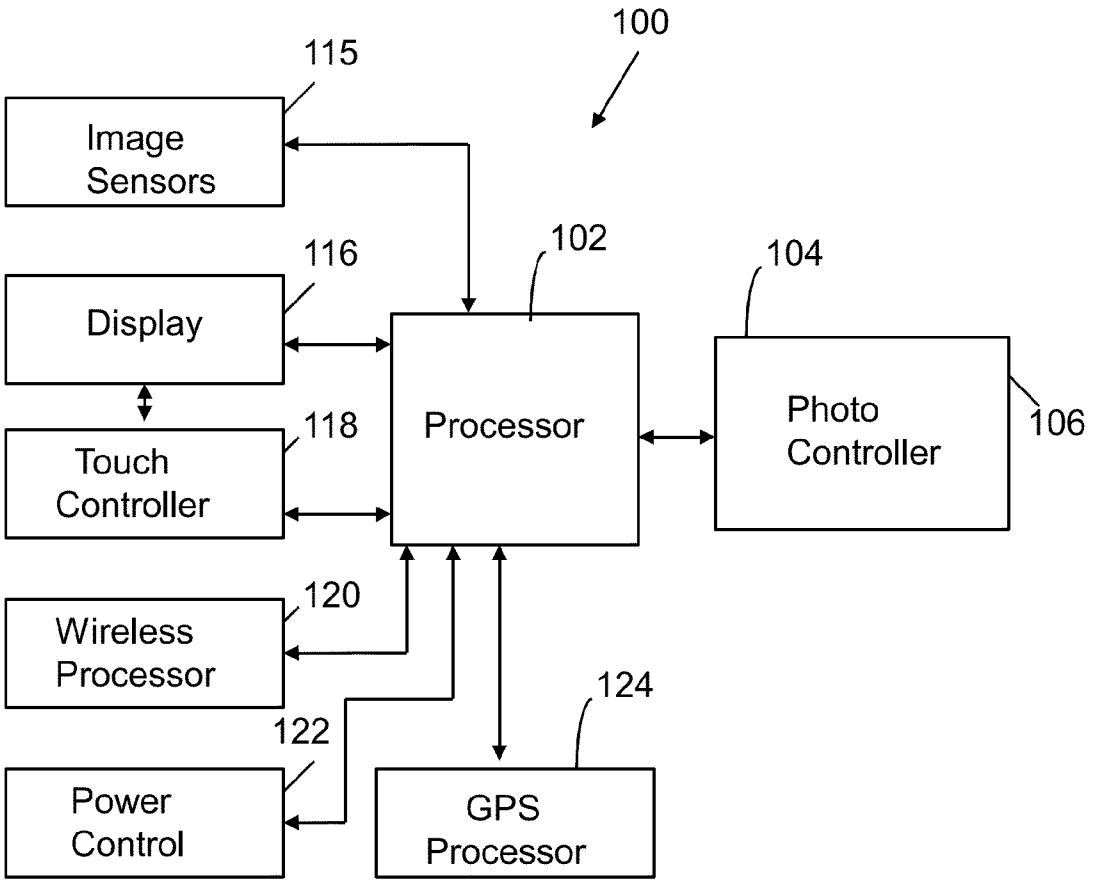
100
115
Image Sensors
116
Display
118
Touch Controller
102
Processor
104
Photo Controller
106
120
Wireless Processor
122
Power Control
124
GPS Processor

FIG. 1

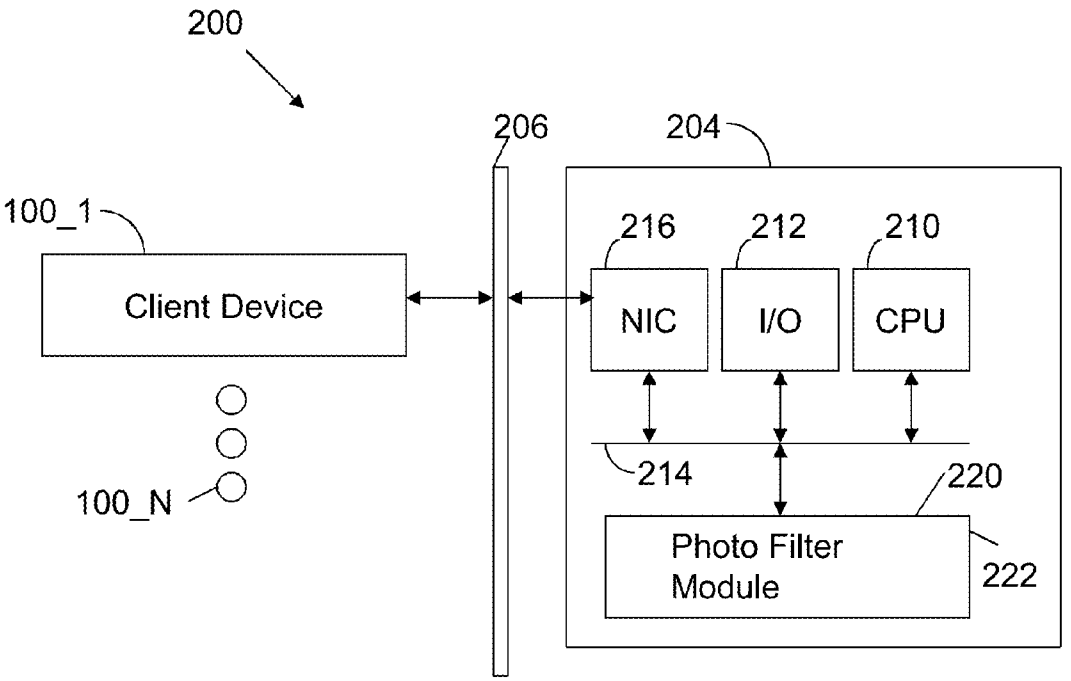
200
206
204
100_1
Client Device
100_N
216
212
210
NIC
I/O
CPU
214
220
Photo Filter Module
222

FIG. 2

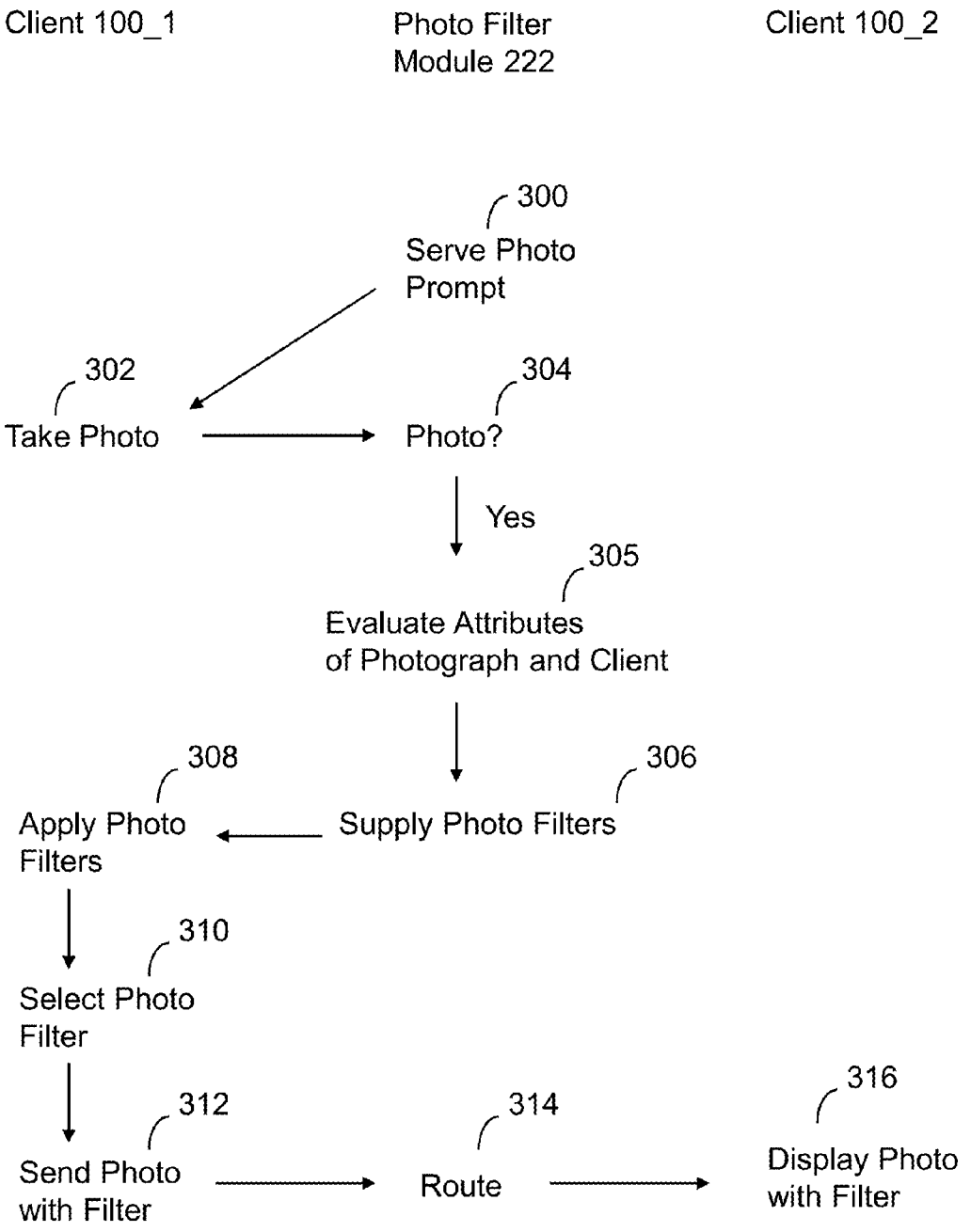
Client 100_1
Photo Filter Module 222
Client 100_2
300
Serve Photo Prompt
302
Take Photo
304
Photo?
Yes
305
Evaluate Attributes of Photograph and Client
308
Apply Photo Filters
306
Supply Photo Filters
310
Select Photo Filter
312
Send Photo with Filter
314
Route
316
Display Photo with Filter

FIG. 3

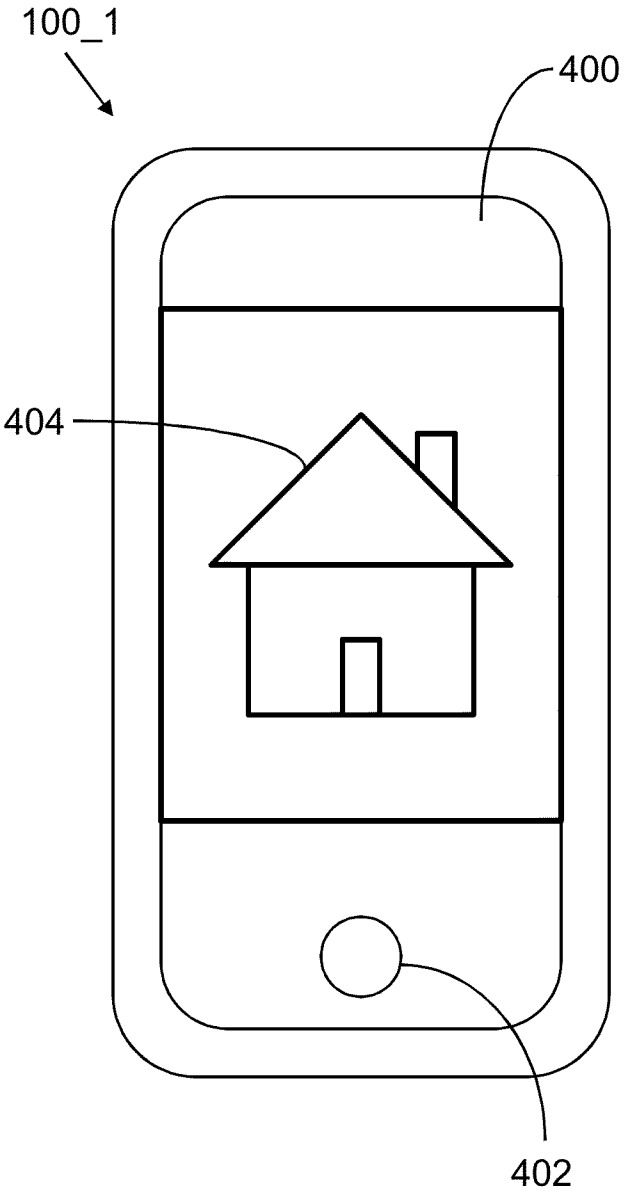

FIG. 4

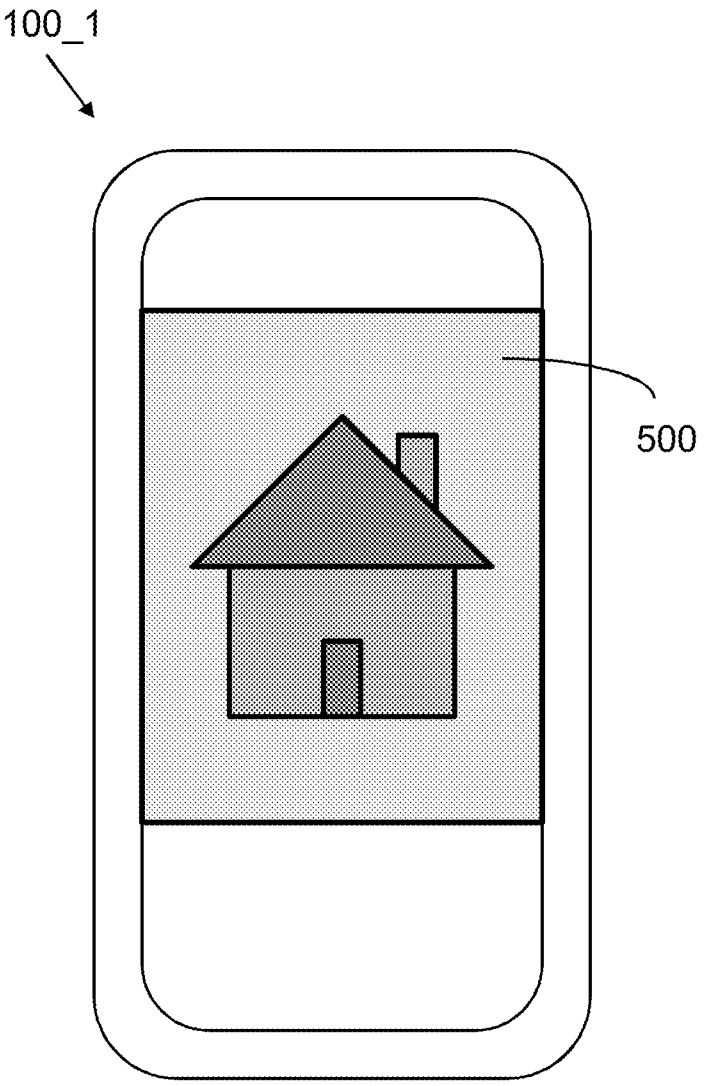

FIG. 5

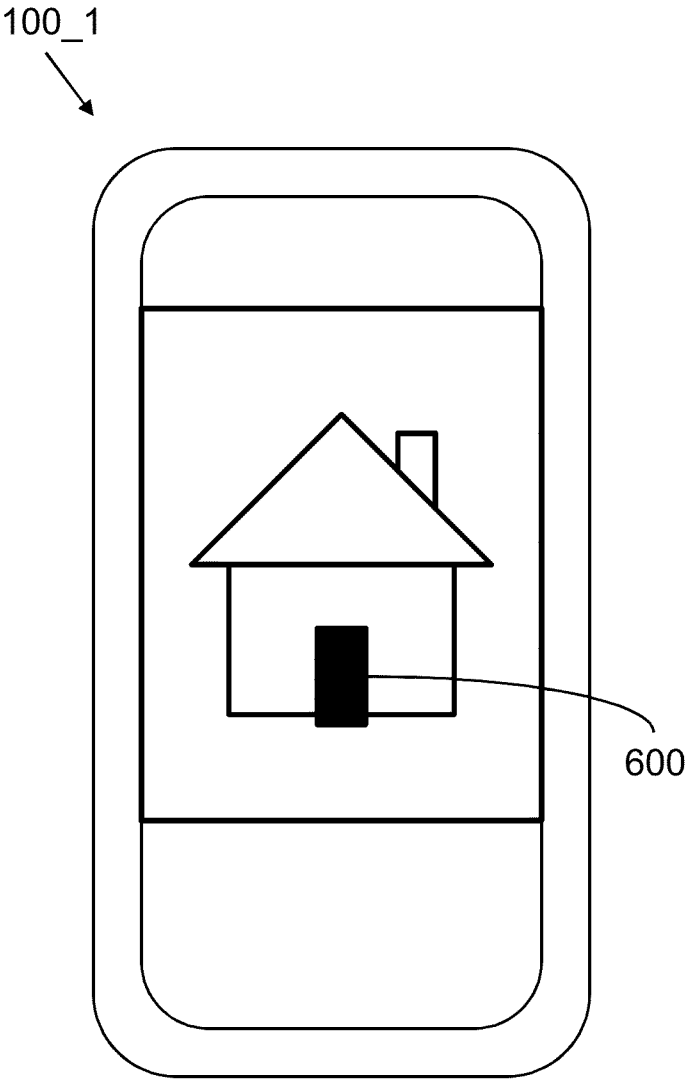

FIG. 6

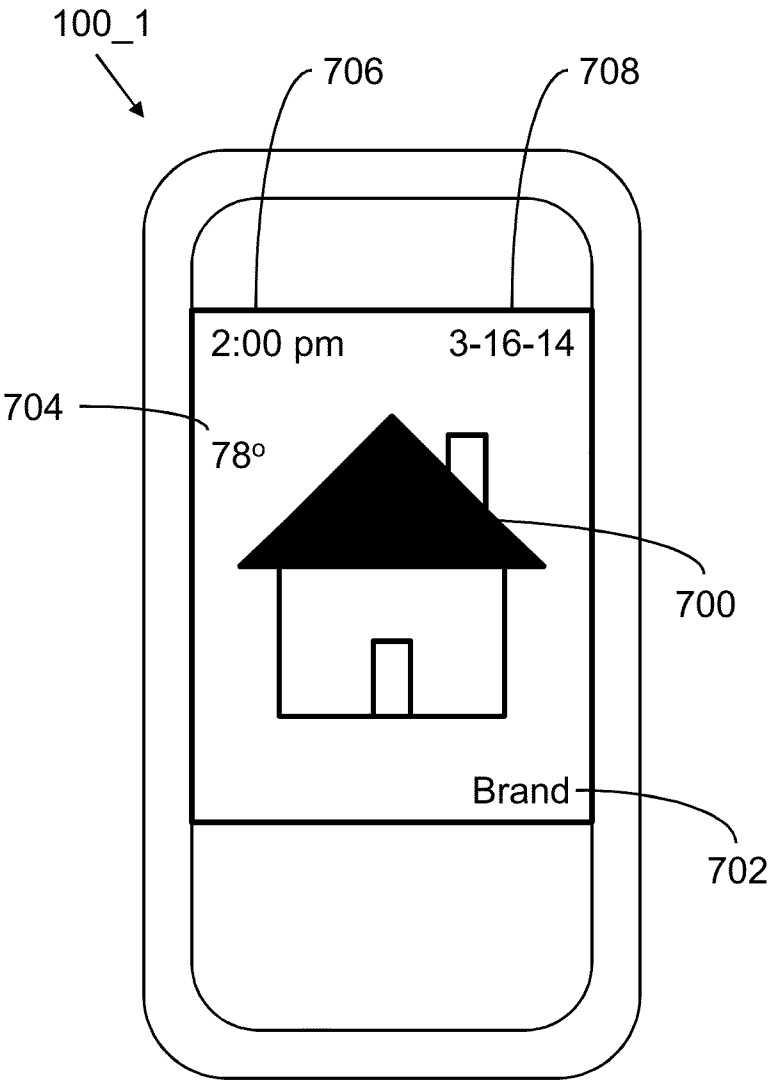

FIG. 7

APPARATUS AND METHOD FOR SUPPLYING CONTENT AWARE PHOTO FILTERS

FIELD OF THE INVENTION

This invention relates generally to photographs taken by a mobile device operative in a networked environment. More particularly, this invention relates to supplying such a mobile device with content aware photo filters.

BACKGROUND OF THE INVENTION

The number of digital photographs taken with mobile wireless devices is increasingly outnumbering photographs taken with dedicated digital and film based cameras. Thus, there are growing needs to improve the experience associated with mobile wireless digital photography.

SUMMARY OF THE INVENTION

A server includes a photo filter module with instructions executed by a processor to identify when a client device captures a photograph. Photograph filters are selected based upon attributes of the client device and attributes of the photograph. The photograph filters are supplied to the client device.

BRIEF DESCRIPTION OF THE FIGURES

The invention is more fully appreciated in connection with the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. **1** illustrates an electronic device utilized in accordance with an embodiment of the invention.

FIG. **2** illustrates a networked system utilized in accordance with an embodiment of the invention.

FIG. **3** illustrates processing operations associated with an embodiment of the invention.

FIG. **4** illustrates a photograph taken by a digital mobile device.

FIG. **5** illustrates a general filter applied to the photograph.

FIG. **6** illustrates a feature specific filter applied to the photograph.

FIG. **7** illustrates a different feature specific filter with a branded element applied to the photograph.

Like reference numerals refer to corresponding parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** illustrates an electronic device **100** utilized in accordance with an embodiment of the invention. In one embodiment, the electronic device **100** is a Smartphone with a processor **102** in communication with a memory **104**. The processor **102** may be a central processing unit and/or a graphics processing unit. The memory **104** is a combination of flash memory and random access memory. The memory **104** stores a photo controller **106**. The photo controller **106** includes executable instructions to coordinate the capture, display and archiving of digital photographs. The photo controller **106** may include photo filter processing disclosed herein, which augments or replaces such photo filter processing that is described below in connection with a server based photo filter module.

The processor **102** is also coupled to image sensors **115**. The image sensors **115** may be known digital image sensors, such as charge coupled devices. The image sensors capture visual media, which is presented on display **116**, as coordinated by the photo controller **106**.

A touch controller **118** is connected to the display **116** and the processor **102**. The touch controller **118** is responsive to haptic signals applied to the display **116**. In one embodiment, the photo controller **106** monitors signals from the touch controller **118** to coordinate the capture, display and archiving of digital photographs. The electronic device **100** may also include other components commonly associated with a Smartphone, such as a wireless signal processor **120** to support wireless communications, a power control circuit **122** and a global positioning system processor **124**.

FIG. **2** illustrates a system **200** configured in accordance with an embodiment of the invention. The system **200** includes a set of client devices **100_1** through **100_N**. The client devices **100** are connected to a network **206**, which is any combination of wireless and wired network communication devices. A server **204** is also connected to the network **206**. The server **204** includes standard components, such as a central processing unit **210** and input/output devices **212** connected via a bus **214**. The input/output devices **212** may include a keyboard, mouse, display and the like. A network interface circuit **216** is also connected to the bus **214** to provide connectivity to network **206**. A memory **220** is also connected to the bus **214**. The memory **220** includes modules with executable instructions, such as a photo filter module **222**. The photo filter module **222** implements photo evaluation and filter selection operations, as discussed below.

FIG. **3** illustrates processing operations associated with an embodiment of the invention. The operations are performed by the photo filter module **222** of server **204** in combination with one or more client devices **100**. Initially, the photo filter module **222** serves a photo prompt **300**. For example, the photo filter module **222** may form a segment of a network executed application that coordinates taking photographs and appending messages to such photographs for delivery from one user to another. In this context, client **100_1** accesses the photo filter module **222** over network **206** to activate the application, which serves the photo prompt to the client **100_1**. A user at the client **100_1** takes a photo **302**.

FIG. **4** illustrates client device **100_1** with a display **400** that presents a photo prompt **402**. Activation of the photo prompt **402** results in a picture **404**. The photo filter module **222** monitors the client device activity to determine if a photo is taken **304**. If so, the attributes of the photograph and client device are evaluated **305**. Photo filters are selected and supplied **306** based upon the evaluation.

By way of example, the attributes of the client device may include geolocation of the client device, which is collected from the GPS processor **124**. The geolocation may be used to designate photo filters relevant to the geolocation. For example, if the geolocation is proximate to a beach, then photo filters to augment a beach setting (e.g., a color filter for water, sand and/or sky) may be supplied. The geolocation may be used to select a filter with a brand associated with an establishment proximate to the geolocation. For example, a restaurant or store may sponsor a photo filter that includes a brand associated with the restaurant or store. In this case, in addition to the brand, the photo filter may include other indicia associated with the restaurant (e.g., an image of a hamburger or taco) or store (e.g., an image of a surf board or sun glasses).

The attributes associated with the client device may include established preferences associated with the client device. The established preferences may be defined by explicitly stated preferences supplied by a user. Alternately, the

established preferences may be derived from prior use patterns. For example, explicitly stated or derived preferences may indicate that photo filters with a temperature overlay, date and/or time overlay be supplied.

The attributes of the photograph may include the physical environment captured in the photograph. For example, the photograph may be evaluated to identify an urban setting, a rural setting, a sunset a seascape and the like. Filters applicable to the physical environment may then be supplied.

The attributes of the photograph may include an object depicted in the photograph. For example, the evaluation may identify a building, a building feature (e.g., door or roof), a flower, an individual, an animal and the like. Filters applicable to such objects may then be supplied.

The next operation of FIG. **3** is to apply the photo filters **308**. For example, a swipe across the display of a client device **100_1** may cause a photo filter to slide across the original photo. FIG. **5** illustrates the result of a first swipe motion, which results in a darkening filter **500** being applied to the original photo. Another swipe motion may result in another filter being presented. For example, FIG. **6** illustrates the result of a second swipe motion, which results in an object specific filter **600** being presented. In this case, the object specific filter **600** relates to the identification of a door in the photo. The identification of the door may result in the supply of a variety of filters for different door colors. Another swipe of the display may result in still another filter, such as shown in FIG. **7**. The filter of FIG. **7** includes an object specific filter **700**, in this case for a roof of a building. The filter also includes a brand component **702**. This filter also includes an overlay of the temperature **704** when the photo was taken. A time overlay **706** and date overlay **708** are also supplied.

Returning to FIG. **3**, the next operation is to select a photo filter **310**. Selection of a photo filter may include selection of one or more available filters. The photo may then be saved with the applicable filter or filters. The photo and filter may also be sent to another user **312**. In this case, the server **204** routes **314** the photo to another client **100_2**, which displays the photo with the filter **316**.

Photograph filters may also be selected based upon popular filters. Branded filters may be supplied based upon an auction mechanism. For example, vendors may bid on photo filters to be supplied based upon characteristics of a user, location of a user, content of a photograph and the like.

An embodiment of the present invention relates to a computer storage product with a non-transitory computer readable storage medium having computer code thereon for performing various computer-implemented operations. The media and computer code may be those specially designed and constructed for the purposes of the present invention, or they may be of the kind well known and available to those having skill in the computer software arts. Examples of computer-readable media include, but are not limited to: magnetic media, optical media, magneto-optical media and hardware devices that are specially configured to store and execute program code, such as application-specific integrated circuits ("ASICs"), programmable logic devices ("PLDs") and ROM and RAM devices. Examples of computer code include machine code, such as produced by a compiler, and files containing higher-level code that are executed by a computer using an interpreter. For example, an embodiment of the invention may be implemented using JAVA®, C++, or other object-oriented programming language and development tools. Another embodiment of the invention may be implemented in hardwired circuitry in place of, or in combination with, machine-executable software instructions.

The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the invention. However, it will be apparent to one skilled in the art that specific details are not required in order to practice the invention. Thus, the foregoing descriptions of specific embodiments of the invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed; obviously, many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, they thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated. It is intended that the following claims and their equivalents define the scope of the invention.

The invention claimed is:

1. A server, comprising: a photo filter module with instructions executed by a processor to: identify when a client device captures a photograph; select photograph filters based upon attributes of the client device and attributes of the photograph, wherein the attributes of the client device include geolocation of the client device; supply the selected photograph filters to the client device, wherein the supplied photograph filters are configured to be independently selectable by a user in response to a gesture applied to the photograph as presented on a display of the client device, wherein each supplied photograph filter is an overlay on top of the photograph to augment the photograph and is not presented on the display of the client device prior to being overlaid on top of the photograph in response to the gesture applied to the photograph presented on the display of the client device, and wherein at least one supplied photograph filter is configured for the geolocation; receive a selection of one or more of the supplied photograph filters; and route the one or more selected photograph filters and the photograph to another client device.

2. The server of claim **1**, wherein the attributes of the client device include established preferences of the client device.

3. The server of claim **1**, wherein the attributes of the photograph include the physical environment captured in the photograph.

4. The server of claim **1**, wherein the attributes of the photograph include an object depicted in the photograph.

5. The server of claim **1**, wherein the photograph filters include brand indicia.

6. The server of claim **5**, wherein the brand indicia is supplied in response to an auction.

7. The server of claim **1**, wherein the photograph filters include temperature indicia.

8. The server of claim **1**, wherein the photograph filters include time indicia.

9. The server of claim **1**, wherein the photograph filters include date indicia.

10. The server of claim **1**, wherein the photograph filters include a brand associated with an establishment proximate to the geolocation of the client device.

11. The server of claim **2**, wherein the established preferences are explicitly stated preferences supplied by a user.

12. The server of claim **2**, wherein the established preferences are derived from prior use patterns.

13. The server of claim **1**, wherein the photo filter module includes instructions executed by the processor to append a message to the photograph.

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