TITLE OF THE INVENTION

A SYSTEM FOR TRACKING A USER'S EXPOSURE TO UVB RADIATION

Methods?

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Not Applicable Omit if not needed

- Good job overall - I have a few fairly minor tweaks/suggestions

BACKGROUND OF THE INVENTION

[0002] The present invention generally relates to a [invention]. More particularly, the present invention relates to a [invention, more specifically – but NOT PON].

[0003] [general background]

[0004] [describe prior art]

[0005] [DO NOT INCLUDE ANY OF – long felt need, anything relating to your invention or the motivation for making your invention.]

BRIEF SUMMARY OF THE INVENTION

[0006] One or more of the embodiments of the present invention provide

[describe invention as claimed]

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 illustrates a [invention] according to an embodiment of the present invention.

[0008] Figure 2 illustrates a flow chart of an embodiment of the [invention process].

[REMEMBER – no element numbers]

DETAILED DESCRIPTION OF THE INVENTION

[0009] Figure 1 illustrates an MED determination system 100. The MED determination system 100 includes a color camera 110, an initial MED determination system 120, and a computer storage 130.

[0010] In the MED determination system 100, the initial MED determination system 120 receives data from the computer storage 130 using two-way electronic communications. The color camera 110 is in two way electronic communications with the computer storage 130.

[0011] In operation, the color camera 110 records a user image. The user image is a digital image of a user's skin, composed of a plurality of pixels each having a numeric pixel value. For example, the numeric pixel value may comprise of three separate three digit codes. Each three digit code is a range between 0 and 255, and each of the three digit code represents the shade of a color red, green, and blue. One skin tone may comprise of 255 red, 223 green, and 196 blue. Varying the value for each color changes affects the numeric pixel value. The color camera 110 transmits data representing the user image to the computer storage 130. The computer storage 130 stores data representing the user image.

[0012] The initial MED determination system 120 receives data representing the user image from the computer storage 130 using electronic communications. The initial MED determination system 120 includes a skin color set. The skin color set includes a plurality of potential skin colors and a plurality of potential target MED values. Plurality of potential skin colors are fifty skin types each associated with a range in potential target

MED value. Potential target MED values are an estimate of the amount of UVB exposure that a user having a certain skin ~~type~~ can be exposed before developing dangerous or painful symptoms such as ~~skin~~ burn. MED values are measured in millijoules. Under constant UVB intensity, MED values can be calculated in millijoules by multiplying the UVB intensity measured in milliwatts per square centimeter with the duration of exposure in seconds. In the skin color set, the lowest UVB value is fifteen millijoules, and the highest UVB value is 150 millijoules. The categories are fifty equal sections between 15 millijoules and 150 millijoules.

[0013] The initial MED determination system 120 identifies a user target MED among potential target MEDs in a series of steps. First the initial MED determination system 120 averages the numeric pixel color values of the plurality of pixels to determine a user image average color value. Second, the initial MED determination system 120 determines a skin numeric color value included in the skin color set that is closest to the user image average color value. Third, the initial MED determination system 120 identifies the MED associated with the skin numeric color value closest to the user image average color value as the user target MED.

[0014] Color camera 110, initial MED determination system 120, and computer storage 130 may be included as part of a portable computing device. Color camera 110, initial MED determination system 120, and computer storage 130 may be included as part of a smartphone.

[0015] In an alternative embodiment, the color camera 110 transmits data to the computer storage 130 using radio waves.

[0016] In an alternative embodiment, the number of skin ~~types can~~ colors may be increased to increase the sensitivity of the initial MED determination system 120 to different skin ~~tones,~~ colors or decreased to decrease the sensitivity of the initial MED determination system 120 to different skin tones.

[0017] In an alternative embodiment, the color set is stored in the computer storage 130. The initial MED determination system 120 receives the color set from the computer storage 130 using two way electronic communications.

[0018] In an alternative embodiment, the MED determination system 100 includes an image normalization system 140 as described in detail below with regard to Figure 7.

[0019] In an alternative the initial MED determination system 120 and computer storage 130 are included as part of a portable computing device. The MED determination system 100 further modifies the user target MED. In an alternative, the user target MED is reduced when the user is ~~under~~ consuming medication. For example, the user target MED is reduced by 50% when the person is on penicillin. Other medications may also affect the user target MED.

[0020] In another alternative, the user target MED is increased when the user is wearing clothing. For example, when the user is wearing a light cotton shirt, the user target MED is increased by 10%, when the user is wearing a heavy cotton shirt, the user target MED is increased by 25%. In another alternative, the user target MED is increased when the user applies sun protection product to the user's skin. The sun protection products reduce the intensity of UVB radiation affecting the user. The sun protection products work in two different ways, either by scattering the UVB radiation, or by

absorbing the UVB radiation. UVB adjustment is made based on sun protection factor (SPF). The user target MED is increased by 50% for SPF 2, 85% for SPF 10, and 95% for SPF 15. Some of the known UVB protecting compounds and their respective SPF values are provided in Figure 10. In an alternative, the user target MED is also reduced by 1% for every year age of the user over the age of 30 until the age of 60, and the user target MED is reduced by 2% for every year of age over the age of 60. In an alternative the user target MED is decreased by 10% up to a maximum of 25% when the user's sibling, user's parent, and user's grandparent has a history of skin cancer. In the alternative, the user target MED is also reduced when the user has a history of carcinoma. For example, the user target MED is reduced by 25% when the user has a history of a single carcinoma, the user target MED is reduced by 50% when the user has a history of a more than one carcinoma. In an alternative the user is given the choice to further increase or decrease the user target MED based on user's personal experiences regarding their tendency to be affected by exposure to sun.

[0021] The information regarding the medication of the user, clothing worn by the user, sun protection products applied to the user's skin, the age of the user, medical history of the user and the user's family, and personal experiences of the user can be obtained through a questionnaire using the portable computing device. For example, if the portable computing device is a smartphone with a touch screen, the questionnaire is presented to the user on the screen of the smartphone with appropriate selection field provided, where the user can enter information to the smartphone using the touch screen.

[0022] Although the preferred values are given here as preferred embodiments, the percentage increases and decreases can be changed without deviating from the scope of the invention.

[0023] In an alternative embodiment, the numeric pixel value is measured using cyan-magenta-yellow (CMY) scale. Each CMY color represents the opposite value of its opposite RGB color (cyan/red, magenta/green, yellow/blue). The actual CMY values depends on the color profile of the color camera. For example, when the numeric pixel value in RGB scale is R255 G223 B196, this corresponds to percentage values as percentage of red as R:100%, G:87%, and B:77%. This RGB profile has following CMY values: C:0%, M:13% (100-87), and Y:23%.

[0024] Figure 2 illustrates the method employed by the MED determination system 100. At a first step 210, MED determination system 100 records a user image 210 using the color camera 110. At a second step 220, data representing the user image is received at the initial MED determination system 120. At a third step 230, the initial MED determination system 120 determines a user image average color value by averaging the numeric pixel values of the pixels representing the user image 130. At a fourth step 240, the initial MED determination system 120 determines a skin numeric color value that is closest to the user image average color value 140. At a fifth step 250, the initial MED determination system 120 identifies the MED associated with the skin numeric color value in the skin color set 122.

[0025] Figure 3 illustrates a UVB exposure system 300. The UVB exposure system 300 includes a UV light sensor 310, a UVB determination system 320, and a computer storage 330.

[0026] In the UVB exposure system 300, the UVB determination system 320 is in two way electronic communications with the computer storage 330. The UV light sensor 310 is in two way electronic communications with the computer storage 330.

[0027] In operation, the light sensor 310 measures a first UV intensity value for the sunlight at a first time of day and associates the first UV intensity value with the first time of day. The light sensor 310 measures a second UV intensity value for the sunlight at a second time of day and associates the second UV intensity value with the second time of day. The UV intensity value is measured as milliwatts per square centimeter by the UV light sensor 310. The UV intensity value is comprised of both long wave ultraviolet (UVA) radiation and short wave ultraviolet (UVB) radiation. The UVA radiation and UVB radiation are differentiated based on the wavelength of the ultraviolet radiation. UVA radiation is classified as having a wavelength between 400 nm and 320 nm, UVB radiation is classified as having a wavelength between 320 nm and 290 nm. The light sensor transmits data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values to the computer storage 330 using electronic communications.

[0028] The UVB determination system 320 receives data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values from the computer storage 330 using electronic communications.

[0029] The UVB determination system 320 includes a UVB percentage set comprised of a plurality of potential UVB percentages stored in the computer storage, and each of the plurality of potential UVB percentages is associated with a time of day.

The amount of each type of UV radiation existing in the sunlight correlates with the time of day. The percentage of UVB radiation intensity in the UV intensity value starts increasing as the day progresses, peaks at noon up to a maximum of 13%, and starts declining in percentage as the day continues after noon. The UVB intensity as percentage of the UV intensity is given in Table 1 for Darwin Australia.

[0030] As described further below with regard to Figure 4, the UVB determination system 320 determines a total incident UVB exposure. First, the UVB determination system 320 identifies a first UVB percentage associated with the first time of day in the UVB percentage set, and the UVB determination system 320 identifies a second UVB percentage associated with the second time of day in the UVB percentage set. Second, the UVB determination system 320 determines a first UVB intensity values by multiplying the first UVB percentage with the first UV intensity value measured at the first time of day, and then the UVB determination system 320 determines a second UVB intensity value by multiplying the second UVB percentage with the second UV intensity value measured at the second time of day. Third, the UVB determination system 320 determines the total incident UVB exposure by summing the first UVB intensity value with the second UVB intensity value.

[0031] In another embodiment, the UVB determination system 320 includes a receiving radio wave transmitter, and the light sensor 310 includes an initiating radio wave transmitter. The light sensor 310 transmits data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values using initiating radio wave transmitter to receiving radio wave

transmitter of the UVB determination system 320 using radio waves. Yet in another embodiment, the radio waves conform to Bluetooth® standard.

[0032] Alternatively, The UVB determination system 320 and the light sensor 310 is included as part of a portable computing device. Alternatively, the portable computing device is a smartphone.

[0033] In another embodiment, the UVB determination system 320 transmits data representing the total incident UVB exposure to the computer storage 330 and stores the information as previous incident UVB exposure. The light sensor 310 measures a third UV intensity value for the sunlight at a third time of day and associates the third UV intensity value with the third time of day. The light sensor transmits data representing third UV intensity value and third time of day associated with the third UV intensity value to the computer storage 330 using electronic communications. The UVB determination system 320 receives data representing third UV intensity value, third time of day associated with the third UV intensity value, and previous incident UVB exposure from the computer storage 330 using electronic communications. The UVB determination system 320 determines an updated total incident UVB exposure. First, the UVB determination system 320 identifies a third UVB percentage associated with the third time of day in the UVB percentage set. Second, the UVB determination system 320 determines a third UVB intensity value by multiplying the third UVB percentage with the third UV intensity value measured at the third time of day. Third, the UVB determination system 320 determines the updated total incident UVB exposure by summing the third UVB intensity value with the previous incident UVB exposure. The system continues to add new UV intensity value measurements throughout the day.

[0034] Figure 4 illustrates the method used by the UVB determination system 320 described above in relation to Figure 3. At a first step 410, The UVB determination system 320 receives data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values from the light sensor 310 using electronic communications. At a second step 420, the UVB determination system 320 identifies a first UVB percentage associated with the first time of day in the UVB percentage set, and the UVB determination system 320 identifies a second UVB percentage associated with the second time of day in the UVB percentage set. At a third step 430, the UVB determination system 320 determines a first UVB intensity values by multiplying the first UVB percentage with the first UV intensity value measured at the first time of day, and then the UVB determination system 320 determines a second UVB intensity value by multiplying the second UVB percentage with the second UV intensity value measured at the second time of day. At a fourth step 440, the UVB determination system 320 determines the total incident UVB exposure by summing the first UVB intensity with the second UVB intensity.

[0035] Table 1 illustrates the change in the percentage of UVB intensity as compared to total UV intensity as the time of day changes in Darwin Australia. In alternative embodiments, the maximum percentage of UVB intensity throughout the day can be higher or lower based on the location.

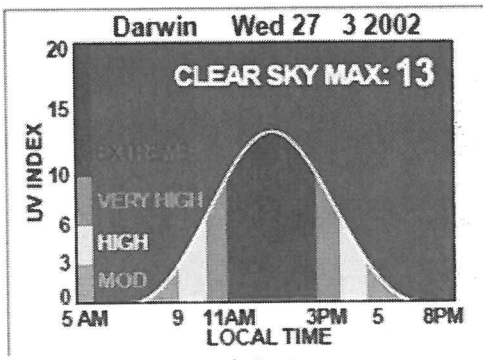

Table 1: The change in the percentage of UVB intensity with respect to local time

[0036] Figure 5 illustrates the top view of a wearable UV sensor 500. The UV wearable UV sensor 500 includes a radio communication device 510 and a UV light sensor 520.

[0037] The UV light sensor 520 is in electronic communication with the radio communication device 510.

[0038] In operation, the UV light sensor 520 measures the UV radiation intensity. The UV intensity value is measured as milliwatts per square centimeter by the UV light sensor 310. The UV intensity value is comprised of both long wave ultraviolet (UVA) radiation and short wave ultraviolet (UVB) radiation. The UVA radiation and UVB radiation are differentiated based on the wavelength of the ultraviolet radiation. UVA radiation is classified as having a wavelength between 400 nm and 320 nm, UVB radiation is classified as having a wavelength between 320 nm and 290 nm. The UV light sensor transmits data representing the UV radiation intensity to the radio communication device 510 using electronic communications.

[0039] The radio communication device 510 transmits data representing the UV radiation intensity to other devices. Radio communication device 510 includes an active

radio antenna, which generates radio signals. The radio signals are than received by passive radio antennas.

[0040] In an alternative, the wearable UV sensor 500 also includes a chargeable battery. The chargeable battery is electronically connected to the radio communication device 510. The chargeable battery is electronically connected to the UV light sensor 520. In operation, the chargeable battery provides electrical energy required to power the UV light sensor 520 and the radio communication device 510 to UV light sensor 520 and the radio communication device 510. The wearable UV sensor 500 also includes a universal serial bus (USB) for charging the chargeable battery.

[0041] Figure 6 illustrates a system for tracking an individuals UVB exposure 600. The system for tracking an individuals UVB exposure 600 includes a color camera 610, a computer storage 630, an initial MED determination system 620, a UV light sensor 640, a UVB exposure determination system 650, and a user alert system 660. The user alert system 660 includes a visual light source 662.

[0042] The color camera 610 is in two way electronic communications with the computer storage 630. The initial MED determination system 620 is in two way electronic communications with the computer storage 630. The UV light sensor 640 is in two way electronic communications with the computer storage 630. The UVB exposure determination system 650 is in two way electronic communications with the computer storage 630. The user alert system 660 is in two way electronic communications with the computer storage 630. The user alert system 660 is in one way electronic communication with the visual light source 662.

[0043] In operation, the color camera 610 records a user image. The user image is a digital image of a user's skin, composed of a plurality of pixels each having a numeric pixel value. Details of the numeric pixel value are discussed above in relation to Figure 1. The color camera 610 transmits data representing the user image to the computer storage 630. The computer storage 630 stores data representing the user image.

[0044] The initial MED determination system 620 receives data representing the user image from the computer storage 630 using electronic communications. The initial MED determination system 620 includes a skin color set. Details of the skin color set are described in relation to the embodiment discussed in relation to Figure 1 above.

[0045] The initial MED determination system 620 identifies a user target MED in a series of steps. First the initial MED determination system 620 averages the numeric pixel color values of the plurality of pixels to determine a user image average color value. Second, the initial MED determination system 620 determines a skin numeric color value included in the skin color set that is closest to the user image average color value. Third, the initial MED determination system 620 identifies the MED associated with the skin numeric color value closes to the user image average color value as the user target MED. The initial MED determination system 620 transmits data representing the user target MED to the computer storage 630. The computer storage stores data representing the user target MED to the computer storage 630.

[0046] The light sensor 640 measures a first UV intensity value for the sunlight at a first time of day and associates the first UV intensity value with the first time of day. The light sensor 640 measure a second UV intensity value for the sunlight at a second time of day and associates the second UV intensity value with the second time of day.

The UV intensity value is measured as milliwatts per square centimeter by the light sensor 640. The characteristic of UV intensity value is described above in relation to the embodiment described in Figure 3.

[0047] The UVB exposure determination system 650 receives data representing first and second UV intensity values, and first and second time of day associated with the first and second UV intensity values from the computer storage 630 using electronic communications.

[0048] The UVB exposure determination system 650 includes a UVB percentage set comprised of a plurality of potential UVB percentages, wherein each of the plurality of potential UVB percentages is associated with a time of day. The details of the UVB percentage set is describe above in relation to the embodiment described in figure 3.

[0049] The UVB exposure determination system 650 determines a total incident UVB exposure. First, the UVB exposure determination system 650 identifies a first UVB percentage associated with the first time of day in the UVB percentage set, and the UVB exposure determination system 650 identifies a second UVB percentage associated with the second time of day in the UVB percentage set. Second, the UVB exposure determination system 650 determines a first UVB intensity values by multiplying the first UVB percentage with the first UV intensity value measured at the first time of day, and then the UVB exposure determination system 650 determines a second UVB intensity value by multiplying the second UVB percentage with the second UV intensity value measured at the second time of day. Third, the UVB exposure determination system 650 determines the total incident UVB exposure by summing the first UVB intensity value

with the second UVB intensity value. The UVB exposure determination system 650 transmits the total incident UVB exposure to the computer storage 630.

[0050] The user alert system 660 receives data representing the total incident UVB exposure and data representing the user target MED from the computer storage 630. The user alert system 660 compares the total incident UVB exposure value to the user target MED value. When the total incident UVB exposure value is equal to or greater than the user target MED value, the user alert system 660 activates the visual light source 662 to alert the user that the target MED value is reached.

[0051] In an alternative embodiment, the system for tracking an individuals UVB exposure 600 is included as part of a portable computing device. The portable computing device may include one or more of the color camera 610, the UV light sensor 640, and the visual light source 662.

[0052] Alternatively the UV light sensor 640 is a separate device not physically attached to the portable computing device. The UV light sensor 640 includes a radio transmitter. The UV light sensor 640 is in two way radio communications with the portable computing device using the radio transmitter. Alternatively the radio transmitter works using Bluetooth® standard.

[0053] In an alternative embodiment, the user alert system 660 is included as part of a portable computing device. The portable computing device further includes a screen and a speaker. When the total incident UVB exposure value is equal to or greater than the user target MED value, the portable computing device displays an alert on the screen. Alternatively the portable computing device makes an audible sound using the speaker.

Alternatively the portable computing device displays an alert on the screen and makes an audible sound using the speaker. also Vibrating, generates a text

[0054] Figure 7 illustrates a system for image normalization 700. The system for image normalization 700 includes a color camera 710, a computer storage 730, and a color normalization system 740.

[0055] The image normalization system 740 is in two way electronic communication with the computer storage 730. The color camera 710 is in two way electronic communication with the computer storage 730.

[0056] The color camera 710 records a user image. The user image is a digital image of a user's skin, composed of a plurality of pixels each having a numeric pixel value. The color camera 710 record an item image. The item image is a digital image of an item, composed of a plurality of pixels each having a numeric pixel value. Preferably, the item image is recorded under the same of substantially similar light conditions as the user image. Consequently when the system performs normalization, the accuracy will improve when the item image and the user image are recorded under the similar lighting conditions. The color camera 710 transmits data representing the user image and the data representing the item image to the computer storage 130. The computer storage 130 stores data representing the user image and the data representing the item image.

[0057] The image normalization system 740 also includes an item actual color set. The item actual color set includes names of brand products commonly found in a persons possession. The item actual color set also includes an actual item color value associated with the item. For example, the item actual color set may include "can of Coke," and an item color code associated with the color Red found on the can of Coke.

add COPYRIGHT

[0058] The image normalization system 740 receives data representing the user image and the data representing the item image from the computer storage 730. The image normalization system 740 averages the numeric pixel color values of the plurality of pixels representing the user image to determine an initial user image average color value. The image normalization system 740 also averages the numeric pixel color values of the plurality of pixels representing the item image to determine an item image average color value. The image normalization system 740 subtracts the item image average color value from the actual item color value associated with that item to determine a color shift. The color shift may result because of lighting conditions or the quality of the color camera 710. The image normalization system 740 subtracts the color shift from the initial user image average color value to determine a user image average color value.

[0059] Figure 8 illustrates a social MED system 800. The social MED alert system 800 includes a server 810, a first UVB exposure tracking system 820, and a second UVB exposure tracking system 830. The first UVB exposure tracking system 820 and the second UVB exposure tracking system 830 ~~is identical~~ to the UVB exposure tracking system described below in relation to Figure 11. The first UVB exposure tracking system 820 includes a first user 821 and a first portable computing device 822. The second UVB exposure tracking system 830 includes a second user 831 and a second portable computing device 832.

[0060] The server 810 is in wireless communication with the first UVB exposure tracking system 820, The server 810 is in wireless communication with the second UVB exposure tracking system 830.

[0061] In operation, the server 810 receives location data of the first portable computing device 822. The server 810 receives location data of the second portable computing system 832. The location information consists of GPS coordinates representing the geographical location of the portable computing device. The portable computing devices determines the GPS coordinates using a GPS transceiver. The server determines a proximity area calculated as an equal distance from the GPS coordinates of the first portable computing device 822. The equal distance is predetermined in the server 810. Preferably the predetermined distance is fifty meters.

[0062] When the first user 821 indicates that sun burn has occurred at or before the UVB determination system determines that first user's user target MED is reached, the first portable computing system 822 transmits the indication to the server 810. When the second portable computing device 832 is within the proximity area, the server 820 sends a command to the second portable computing device 832 to modify the second user's target user MED. Indication by one user that the UVB determination system overestimates the target user MED can mean that the local UVB intensity is higher than estimated by the UVB determination system.

[0063] In an alternative the server is connected to two or more of portable computing devices. The server sends the command to every portable computing device in the proximity area of the first device 820 when the first device 820 reports the over estimation first in time. Preferably the server 810 only sends the command when there are multiple reports of over estimation of user target MED within the proximity area. The preferred number depends on the total number of users at or near a geographical area. For example where there are only 5 people within the proximity area, report of over

estimation from 2 users triggers the server 810 to send the command. Alternatively, when there are 100 people in the proximity area, the system waits for 30 reports of over estimation before sending the command.

[0064] Figure 9 illustrates the UVB determination system as described in relation to Figure 3 further including a time of day system a time determination system 950. The UVB determination system 900 includes a UV light sensor 910, a UVB determination system 920, a computer storage 930, a GPS transceiver 940, and a time determination system 950.

[0065] In the time of day system, the UV light sensor 910 is in two way electronic communications with the computer storage 930. The UVB determination system 920 is in two way electronic communications with the computer storage 930. The GPS transceiver 940 is in two way electronic communications with the time determination system 950. The time determination system 950 is in two way electronic communications with the computer storage 930. The time determination system 950 is also in two way electronic communications with the UVB determination system 920.

[0066] In operation, the light sensor 910 measures a first UV intensity value for the sunlight at a first time of day and associates the first UV intensity value with the first time of day. The light sensor 910 measure a second UV intensity value for the sunlight at a second time of day and associates the second UV intensity value with the second time of day. The UV intensity value is measured as milliwatts per square centimeter by the UV light sensor 910. The UV intensity value is comprised of both long wave ultraviolet (UVA) radiation and short wave ultraviolet (UVB) radiation. The UVA radiation and UVB radiation are differentiated based on the wavelength of the ultraviolet radiation.

UVA radiation is classified as having a wavelength between 400 nm and 320 nm, UVB radiation is classified as having a wavelength between 320 nm and 290 nm. The light sensor transmits data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values to the computer storage 330 using electronic communications.

[0067] The UVB determination system 920 receives data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values from the computer storage 930 using electronic communications. When the UVB determination system 920 receives data representing first and second UV intensity values and first and second time of day associated with the first and second UV intensity values from the computer storage 930, it sends a normalization request to the time determination system 950. When time determination system 950 receives the normalization request, it requests GPS coordinates representing the geographic location of the GPS transceiver. Using global positioning system, the GPS transceiver determines the GPS coordinates representing the geographic location of the GPS transceiver 940. GPS transceiver 940 sends the data representing the GPS coordinates to the time determination system 950.

[0068] The computer storage 930 includes a sunrise/sunset calendar. The sunrise sunset calendar includes plurality of geographic locations and a plurality of potential GPS coordinates each one associated with only one of the plurality of geographic locations. The sunrise sunset calendar also includes a plurality of sunrise sunset times and a plurality of dates where each of the plurality of date is associated with one of the sunrise sunset times. Time determination system 950 receives from the computer storage sunrise

and sunset times for the GPS coordinates at a current date. Time determination system 950 then determines the maximum UVB time as the midpoint between the sunrise and sunset times. Consequently the time determination system maps the sunrise and sunset times on a modified UVB percentage set in the computer storage 930 comprised of a plurality of potential UVB percentages, and where each of the plurality of potential UVB percentages is associated with a time of day. Details of the unmodified UVB percentage set is given above in relation to Table 1.

[0069] As described further above with regard to Figure 4, the UVB determination system 920 determines a total incident UVB exposure. First, the UVB determination system 920 identifies a first UVB percentage associated with the first time of day in the modified UVB percentage set, and the UVB determination system 920 identifies a second UVB percentage associated with the second time of day in the modified UVB percentage set. Second, the UVB determination system 920 determines a first UVB intensity values by multiplying the first UVB percentage with the first UV intensity value measured at the first time of day, and then the UVB determination system 920 determines a second UVB intensity value by multiplying the second UVB percentage with the second UV intensity value measured at the second time of day. Third, the UVB determination system 920 determines the total incident UVB exposure by summing the first UVB intensity value with the second UVB intensity value.

[0070] In an alternative embodiment, the UVB determination system 900 is provided as part of a portable computing device.

[0071] The UV light sensor referred in various figures can be any commercial UV light sensor capable of measuring the UV intensity of a UV light source.

[0072] Figure 10 illustrates a ~~system of use of a~~ wearable UV sensor as illustrated and described in relation to Figure 5. The system of use of a wearable UV sensor 1000 includes a wearable UV sensor 1010, an adhesive patch 1020, and a user 1030. The adhesive patch 1020 is in physical contact with the wearable UV sensor 1010. The adhesive patch 1020 is in physical contact with the user 1030.

[0073] The adhesive patch 1020 is covered with an adhesive material on one side. The adhesive patch 1020 is made from a material that doesn't reflect or absorb UV light. The adhesive patch 1020 is adhesive to the user 1030. The adhesive patch 1020 attaches to the user 1030 when the adhesive side makes physical contact with the user's skin.

[0074] In an alternative embodiment, the adhesive patch is attached to the user's clothing.

[0075] Figure 11 illustrates a UVB exposure tracking system 1100. The UVB exposure tracking system 1100 includes a user 1110, an item 1120, a portable computing device 1130, a MED determination system 1140, a UVB determination system 1150, a time determination system 1160, and an image color normalization system 1170. The portable computing device 1130 includes a GPS transceiver 1131, a UV light sensor 1132, a wireless communication device 1133, a color camera 1134, a computer storage 1135, a screen 1136, a speaker 1137, and a standard control 1138.

[0076] In the UVB exposure tracking system 1100, the user 1110 is in physical control of the portable computing device 1130. The user 1110 is in the close proximity of the item 1120. The portable computing device 1130 is in electronic communication with the MED determination system 1140. The portable computing device 1130 is in electronic communication with the UVB determination system 1150. The portable

computing device 1130 is in electronic communication with the image color normalization system 1170. The portable computing device 1130 is in electronic communication with the time determination system 1160. The computer storage 1135 is in electronic communication with the GPS transceiver 1131. The computer storage 1135 is in electronic communication with the UV light sensor 1132. The computer storage 1135 is in electronic communication with the wireless communication device 1133. The computer storage 1135 is in electronic communication with the color camera 1134. The computer storage 1135 is in electronic communication with the screen 1136. The computer storage 1135 is in electronic communication with the speaker 1137. The computer storage 1135 is in electronic communication with the standard control 1138. The computer storage 1135 is in electronic communication with the MED determination system 1140. The computer storage 1135 is in electronic communication with the UVB determination system 1150. The computer storage 1135 is in electronic communication with the time determination system 1160. The computer storage 1135 is in electronic communication with the image color normalization system 1170.

[0077] In operation, the user 1110 activates the portable computing device 1130 using the standard control 1138. The standard control may be a touch screen, or physical buttons designed to interact with the portable computing device 1130. The portable computing device 1130 displays a message on the screen 1136 requesting from the user 1110 a user image. The user image is a digital image of a part of the user's skin. The user 1130 activates the color camera 1134 using the standard control. The user 1130 ~~points~~ positions the color camera 1134 in relation to a portion of the user's skin normally exposed to the UV light source, for example the sun. The color camera 1134 records the user image when the user

1110 sends a request for recording of the user image. Preferably the user's skin is exposed to the UV light source when the color camera 1134 records the user image. Preferably the color camera 1134 is located within three inches of the user's skin when the color came 1134 records the user image. The color camera 1134 transmits data representing the user image to the computer storage 1135.

[0078] The image recorded by color camera 1134 is composed of a plurality of pixels each having a numeric pixel value. For example, the numeric pixel value may composed of a set of three digit codes. Each three digit code is associated with one of three colors. There colors are red, green, and blue. Each three digit code is a range between 0 and 255. The value of the three digit code represents a unique shade of the color it is associated with. For example, the skin tone as provided in Picture 1 has RGB values R:255, G:223, and B:196.

Nice idea, but
can't do color in spec

Picture 1: Sample skin tone

[0079] Still referring to Figure 11, the color camera 1134 transmits the user image to the computer storage 1135. When the color camera 1134 transmits the user image to the computer storage 1135, the portable computing device displays another message on the screen 1136 requesting from the user 1110 an item image. The item image is a digital image of the item 1120. The user 1130 activates the color camera 1134 using the controls

of the portable computing device 1130, for example a touch screen or a designated camera button. The user 1130 points the color camera 1134 to the item. The color camera 1134 records the item image when the user 1110 sends a request for recording of the item image. Preferably the item is exposed to the UV light source when the color camera 1134 records the item image. The color camera 1134 transmits data representing the item image to the computer storage 1135.

User must ID the ~~item~~ item so that system knows what to compare w

[0080] The computer storage 1135 includes an item actual color set. The item actual color set includes names of brand products commonly found in a persons possession. The item actual color set also includes an actual item color value associated with the item. Each of the plurality of items in the item actual color set has only one actual item color value associated with that item. The actual item color value is in the red-green-blue (RGB) color system having three digit values for each of the colors red, green, and blue. For example, the item actual color set may include "can of Coke," and an actual item color value associated with the red color found on the can of Coke. The registered trademark color of Coca-Cola has RGB values R:155, G:48, B:28.

[0081] Still referring to Figure 11, the image color normalization system 1170 receives data representing the user image, the item image, and the item actual color value associated with the item in the item actual color set from the computer storage. The image normalization system 1170 averages the numeric pixel color values of the plurality of pixels representing the user image to determine an initial user image average color value. The image normalization system 1170 also averages the numeric pixel color values of the plurality of pixels representing the item image to determine an item image average color value. The image normalization system 1170 subtracts the item image average color

value from the actual item color value associated with that item to determine a color shift. The color shift may result because of lighting conditions or the quality of the color camera 1134. The image normalization system 1170 subtracts the color shift from the initial user image average color value to determine a user image average color value. When the numeric pixel color value is in RGB color format, the color shift is calculated for each of the individual colors red, green, and blue. The image normalization system 1170 transmits the user image average color value to the computer storage 1135.

[0082] The MED determination system 1140 calculates a user target MED. The MED determination system 1140 receives the user image average color value from the computer storage 1135. The MED determination system 1140 includes a skin color set. The skin color set includes plurality of potential skin colors and a plurality of potential target MED values. The plurality of potential skin colors are fifty skin types each associated with a range of potential target MED values. Potential target MED values are an estimate of the amount of UVB exposure that a user having a certain skin type can be exposed before developing dangerous or painful symptoms such as skin burn. MED values are measured in millijoules. Under constant UVB intensity, MED values can be calculated in millijoules by multiplying the UVB intensity measured in milliwatts per square centimeter with the duration of exposure in seconds. In the skin color set, the lowest UVB value is fifteen millijoules, and the highest UVB value is 150 millijoules. The categories are fifty equal sections between 15 millijoules and 150 millijoules.

[0083] The MED determination system 1140 identifies an initial user target MED among potential target MEDs in a series of steps. First, the initial MED determination system 120 determines a skin numeric color value included in the skin color set that is

closest to the user image average color value. Second, the initial MED determination system 120 identifies the MED associated with the skin numeric color value closest to the user image average color value as the initial user target MED.

[0084] Still referring to Figure 11, the portable computing device 1130 displays a user questionnaire on the screen 1136. The user 1110 answers the user questionnaire using standard controls 1138. The information regarding a medication of the user 1110, a clothing article worn by the user 1110, a sun protection products applied to the user's skin, an age of the user 1110, a medical history for the user 1110, a medical history for the user's family, a current cloud condition, and a personal experience of the user 1110 is obtained through the user questionnaire. For example, if the portable computing device is a smartphone with a touch screen, the questionnaire is presented to the user on the screen of the smartphone with appropriate selection field provided, where the user can enter information to the smartphone using the touch screen.

[0085] The current cloud condition affects the UVB radiation intensity on the ground. The cloud conditions reduce the UVB radiation intensity by reflecting UV light away from the ground. The U.S. National Weather Service and Environmental Protection Agency use 89 percent UVB transmission for scattered clouds, 73 UVB percent transmission for broken clouds and 32 percent UVB transmission for overcast conditions. However, the clouds also reflect UVB radiation reflected from the surface of the Earth back down, thereby creating temporary increase in localized areas. The user questionnaire presents five options to the user 1110, scattered clouds, broken clouds, overcast clouds, cumulus clouds, and partial clouds.

[0086] The user questionnaire presents a list of medications, a list of clothing articles, and a list of sun protection products. The user 1110 selects the medication from the list of medications when the user 1110 is currently under the effect of the medication. The user 1110 selects a clothing article from the list of clothing articles when the user 1110 is currently wearing the clothing article. The user 1110 selects the sun protection product when the user's skin is under the protection of the sun protection product. When the user 1110 is currently under the effects of a medication that is not on the list of medications, the user 1110 uses the standard control 1138 to enter a a percentage amount representing the effect of the user's medication on the user target MED. When the user 1110 is currently wearing a clothing article that is not on the list of clothing articles, the user 1110 uses the standard control 1138 to enter a percentage amount representing the effect of the user's clothing on the user target MED. When the user's skin is currently protected by the sun protection product that is not on the list of sun protection products, the user 1110 uses the standard control 1138 to enter a percentage amount representing the effect of the user's clothing on the user target MED. The portable computing device 1130 stores responses to the user questionnaire on the computer storage 1135.

[0087] Still referring to Figure 11, the MED determination system 1140 modifies the initial user target MED based on the user questionnaire to determine a user target MED. The MED determination system 1140 receives the responses to the user questionnaire from the computer storage 1135. The initial target MED is reduced when the user is under medication. Certain medications increases the sensitivity of the user's skin to the UV radiation. For example, the user target MED is reduced by 50% when the person is on penicillin. Other medications also affect the user target MED.

[0088] The initial user target MED is also increased when the user is wearing the clothing article. The clothing articles absorb and reflect the UV light. Thereby the UV radiation that affects the user's skin covered by the clothing article is reduced. For example, when the user is wearing a light cotton shirt, the user target MED is increased by 10%, when the user is wearing a heavy cotton shirt, the user target MED is increased by 25%. Other clothing such as heavy coats completely absorb or reflect the UV radiation.

[0089] The initial user target MED is also increased when the user applies sun protection product to the user's skin. The sun protection products reduce the intensity of UVB radiation affecting the user. The sun protection products work in two different ways, either by scattering the UVB radiation, or by absorbing the UVB radiation. UVB adjustment is made based on sun protection factor (SPF). The user target MED is increased by 50% for SPF 2, 85% for SPF 10, and 95% for SPF 15. Some known UVB protecting compounds and their respective SPF values are provided below in Table 2.

Chemical Absorbers:		
Aminobenzoic acid (PABA)	UVB	No UVB Adjustment to SPF
Avobenzone	UVA1	-40% SPF Adjustment
Cinoxate	UVB	No UVB Adjustment to SPF
Dioxybenzone	UVB, UVA2	-10% SPF Adjustment
Ecamsule (Mexoryl SX)	UVA2	-25% SPF Adjustment
Ensulizole (Phenylbenzimiazole Sulfonic Acid)	UVB	No UVB Adjustment to SPF
Homosalate	UVB	No UVB Adjustment to SPF
Meradimate (Menthyl Anthranilate)	UVA2	-25% SPF Adjustment
Octocrylene	UVB	No UVB Adjustment to SPF
Octinoxate (Octyl Methoxycinnamate)	UVB	No UVB Adjustment to SPF
Octisalate (Octyl Salicylate)	UVB	No UVB Adjustment to SPF
Oxybenzone	UVB, UVA2	-10% SPF Adjustment
Padimate O	UVB	No UVB Adjustment to SPF
Sulisobenzone	UVB, UVA2	-10% SPF Adjustment
Trolamine Salicylate	UVB	No UVB Adjustment to SPF
Physical Filters:		
Titanium Dioxide	UVB, UVA2	-10% SPF Adjustment
Zinc Oxide	UVB,UVA2, UVA1	-15% SPF Adjustment

[0090] Table 2 includes a list of various chemical absorbers and physical filters that affect the amount of UVB radiation passing through the chemical. These chemicals are usually applied in the form of a cream to user's skin. Chemical absorbers are comprised of a polymer. The chemical bonds holding the polymer breaks when it is under UV light through a process called photo-degradation. Consequently, the energy stored in the UV light is transferred to the chemical bond, thereby reducing the UVB radiation affecting the user's skin. Physical filters are minerals processed into very small particles. Physical filters are also applied in the form of a cream to user's skin. These minerals, unlike chemical absorbers that change physical properties under UV light, reflect or dissipate the UV light. When applied to user's skin, the physical filter reflects the UV light away from the user, thereby reducing the UV radiation that passes through to affect the user's skin.

[0091] Still referring to Figure 11, the user target MED is also reduced by 1% for every year age of the user over the age of 30 until the age of 60, and the user target MED is reduced by 2% for every year of age over the age of 60. The user's skin's sensitivity to UV radiation gradually increase as the user 1110 gets older.

[0092] The user target MED is reduced by 10% up to a maximum of 25% for each of the user's sibling, the user's parent, and the and user's grandparent when the user's sibling, the user's parent, and the user's grandparent has a history of skin cancer. The user 1110 has a higher sensitivity UV radiation when the user's relatives have a history of skin cancer.

[0093] The user target MED is also reduced when the user has a history of carcinoma. For example, the user target MED is reduced by 25% when the user has a history of a single carcinoma, the user target MED is reduced by 50% when the user has a history of a more than one carcinoma. The user 1110 has a higher sensitivity UV radiation when the user 1110 has a history of carcinoma.

[0094] The MED determination system 1140 accordingly determines the user target MED. The MED determination system 1140 transmits the user target MED to the computer storage 1135. The portable computing device 1130 displays the user target MED on the screen 1136.

[0095] Still referring to Figure 11, the UV light sensor 1132 measures a UV intensity value for the sunlight. The UV intensity value is measured as milliwatts per square centimeter by the UV light sensor 1132. The UV intensity value is comprised of both long wave ultraviolet (UVA) radiation and short wave ultraviolet (UVB) radiation. The UVA radiation and UVB radiation are differentiated based on the wavelength of the

ultraviolet radiation. UVA radiation is classified as having a wavelength between 400 nm and 320 nm, UVB radiation is classified as having a wavelength between 320 nm and 290 nm.

[0096] The UV light sensor 1132 measures a first UV intensity value for the sunlight at a first time of day and associates the first UV intensity value with the first time of day. The UV light sensor 1132 measure a second UV intensity value for the sunlight at a second time of day and associates the second UV intensity value with the second time of day. The UV light sensor 1132 measures a third UV intensity value for the sunlight at a third time of day and associates the third UV intensity value with the third time of day. The time of day is the local time at the location of the portable computing device. The UV light sensor 1132 periodically measures the UV intensity values for plurality of time of days. The UV light sensor 1132 transmits the data representing the first UV intensity value, the first time of day, the second UV intensity value, the second time of day, the third UV intensity value, and the third time of day to the computer storage 1135.

[0097] The portable computing system 1130 includes a UVB percentage set comprised of a plurality of potential UVB percentages stored in the computer storage, and each of the plurality of potential UVB percentages is associated with a time of day. The amount of each type of UV radiation existing in the sunlight correlates with the time of day. The percentage of UVB radiation intensity in the UV intensity value starts increasing as the day progresses, peaks at noon up to a maximum of 13%, and starts declining in percentage as the day continue after noon represented as a bell curve. The UVB intensity as percentage of the UV intensity is given in Table 1 for Darwin Australia.

This is kind of repetitive, but not wrong

[0098] The time determination system modifies the UVB percentage set to accommodate for local conditions. The time zones create a variance in the angle of the sun, therefore the UVB percentage affecting a local area within the time zones. For example, both eastern Maine and Western Indiana are on east-coast time, but are literally 1,000 miles apart. Therefore it is preferred to calculate modify the UVB percentage set to create a better estimate. Time determination system 1160 requests a local GPS coordinates representing the geographic location of the portable computing device 1130. Using global positioning system, the GPS transceiver 1131 determines the local GPS coordinates representing the geographic location of the portable computing device 1130. GPS transceiver 1131 sends the data representing the GPS coordinates to the time determination system 1160.

[0099] The time determination system 1160 includes a sunrise sunset calendar. The sunrise sunset calendar includes plurality of geographic locations and a plurality of potential GPS coordinates each one associated with only one of the plurality of geographic locations. The sunrise sunset calendar also includes a plurality of sunrise sunset times and a plurality of dates where each of the plurality of date is associated with one of the sunrise sunset times. Time determination system 1160 determines a current sunrise time and a current sunset time included in the sunrise sunset calendar for the geographical location that has potential GPS coordinates closest to the local GPS coordinates. Time determination system 1160 then determines the maximum UVB time as the midpoint between the current sunrise time and current sunset time. Consequently the time determination system 1160 creates the modified UVB percentage set with the bell curve representing the increase and decrease in the UVB percentage throughout the

day starting to rise on the current sunrise time and ending at the current sunset time. The time determination system 1160 then transmits data representing the modified UVB percentage set to the computer storage 1135.

[00100] The UVB determination system 1150 receives data representing the first UV intensity value, the first time of day, the second UV intensity value, the second time of day, a previous incident UVB exposure, the current cloud condition, and the modified UVB percentage set from the computer storage 1135. The previous incident UVB exposure is the amount of UVB exposure the person was previously exposed in the same day. When the UVB determination system 1150 is activated first time, the previous incident UVB exposure is zero.

[00101] The UVB determination system 1150 determines a total incident UVB exposure. First, the UVB determination system 1150 identifies a first UVB percentage associated with the first time of day in the modified UVB percentage set, and a second UVB percentage associated with the second time of day in the modified UVB percentage set. Second, the UVB determination system 1150 determines a first UVB intensity value by multiplying the first UVB percentage with the first UV intensity value measured at the first time of day, and a second UVB intensity value by multiplying the second UVB percentage with the second UV intensity value measured at the second time of day. Third, the UVB determination system 1150 multiplies the first UVB intensity and the second UVB intensity with 89 percent when the current cloud condition is scattered clouds, 73 percent when the current cloud condition is broken clouds, 32 percent when the current cloud condition is overcast clouds, 125 percent when the current cloud condition is cumulus clouds, 140 percent when the cloud condition is partial clouds.

[00102] Fourth, the UVB determination system 1150 reduces the UVB intensity based on an altitude of the portable computing device. It is known that the UVB radiation intensity increases linearly 24% at 1000 meters above sea level. In order to reflect the effect of the altitude on the calculated UVB intensities, the UVB determination system 1150 requests the altitude of the portable computing device 1130 from the portable computing device 1130. The portable computing device 1130 determines the altitude of the portable computing device using the GPS transceiver 1131 in meters. The GPS coordinates representing the geographical location of the portable computing device 1130 includes the altitude of the portable computing device 1130. The UVB determination system multiplies the first UVB intensity and the second UVB intensity with 124 percent, then multiplies the result by the altitude value in meters and divides by 1000 to reflect the effect of the altitude.

[00103] Fifth, the UVB determination system 1150 determines the total incident UVB exposure by summing the first UVB intensity value, the second UVB intensity value, and the previous incident UVB exposure value. The UVB determination system 1150 transmits data representing the total incident UVB exposure to the computer storage 1135. The UVB determination system also transmits the first UVB intensity value and the second UVB intensity values to the computer storage 1135. The computer storage 1135 stores data representing the total incident UVB exposure as the previous incident UVB exposure.

[00104] The UVB determination system 1135 determines a new total incident UVB exposure when the UV light sensor 1132 measures a third UV intensity value at a

third time of day. The system continues to add new UV intensity value measurements throughout the day.

[00105] The portable computing device 1130 displays the previous incident UVB exposure to the user 1110 on the screen 1136. The portable computing device 1130 also displays a graph depicting the UVB intensity values in relation the time of day.

[00106] The portable computing device 1130 also calculates a remaining exposure time representing the time required to reach the user target MED under the current UV conditions. The portable computing device 1130 first subtracts previous incident UVB exposure value from the user target MED value to calculate a remaining UVB exposure value. Second, the portable computing device 1130 divides the remaining UVB exposure value by the latest UVB intensity value calculated by the MED determination system 1135 to calculate time re. The portable computing device 1130 displays the remaining exposure time on the screen 1136.

[00107] Still referring to Figure 11, the portable computing device 1130 compares the total incident UVB exposure value to the user target MED value. When the total incident UVB exposure value is equal to or greater than the user target MED value, the portable computing device 1130 displays an alert message on screen notifying the user that the target MED value is reached.

[00108] In an alternative embodiment, the portable computing device 1130 displays a second questionnaire when the total incident UVB exposure value is equal to or greater than the user target MED value. The questionnaire receives feedback from the user 1110 regarding an amount of sunburn existing on the user's skin. The user target MED value is reduced relative to the amount of sunburn. In one embodiment, the user

target MED is reduced by 5% when the user has a little burn, 10% when the user has somewhat burn, 20% when the user has a significant burn, 40% when the user has a great burn. In an alternative, the questionnaire also receives feedback from the user 1110 regarding a blister on user's skin. Consequently the user MED is reduced by 50% when the user 1110 experiences a single blister. The user MED is reduced by 75% when the user 1110 experiences a plurality of blisters. In an alternative, the portable computing device 1130 allows user to modify the user target MED.

[00109] In an alternative embodiment, the portable computing device 1130 displays a snooze option with the alert message. When the user 1110 chooses snooze option, the portable computing device 1130 postpones the alert. In one embodiment, the portable computing device 1130 postpones the alert for a predetermined duration, for example five minutes. In an alternative, the portable computing device 1130 requests from the user to enter a duration, postpones the alert for that duration. In an alternative the portable computing device 1130 requests from the user to enter a percentage of the user target MED. The portable computing device postpones the alert until the user is exposed to the additional amount of UVB radiation.

[00110] In an alternative embodiment, the user modifies the medication of the user 1110, the clothing article worn by the user 1110, the sun protection products applied to the user's skin, the medical history for the user 1110, the medical history for the user's family, and the current cloud condition.

[00111] In an alternative embodiment, the portable computing device 1130 stores the responses to the user questionnaire in a user profile in relation to the user 1110.

Consequently, multiple user can use the portable computing device to monitor their UVB exposure.

[00112] In an alternative embodiment, the image normalization system 1170 applies the color shift to each of the plurality of pixels representing the user image to create a modified user image. The image normalization system 1170 then transmits the modified user image to the computer storage 1135. The portable computing device 1130 displays the modified user image on the screen 1136. Alternatively the portable computing device 1130 displays the modified user image on the screen 1136 when the user 1110 requests the modified user image to be displayed on the screen using the standard controls.

[00113] Alternatively, The portable computing device 1130 displays the user target MED on the screen 1136 when the user 1110 requests the user target MED on the screen 1136 using the standard control 1138.

[00114] In an alternative embodiment the UVB exposure tracking system 1100 includes a secondary computing device. One or more of the MED determination system 1140, the UVB determination system, the time determination system, and the image color normalization system is included as part of the secondary computing device. The secondary computing device is in wireless connection using radio waves to the portable computing device 1130. Alternatively the secondary computing device is a server. The server is in communication with the portable computing device 1130 over the Internet. The portable computing device 1130 connects to the Internet using the wireless communication device 1133.

[00115] While particular elements, embodiments, and applications of the present invention have been shown and described, it is understood that the invention is not limited thereto because modifications may be made by those skilled in the art, particularly in light of the foregoing teaching. It is therefore contemplated by the appended claims to cover such modifications and incorporate those features which come within the spirit and scope of the invention.

CLAIMS

1. An MED determination system including:

a computer storage;

a color camera, wherein said color camera records a user image, wherein said user image is a digital image of a user's skin, wherein said user image is composed of a plurality of pixels each having a numeric pixel color value, wherein said color camera transmits data representing said user image to said computer storage; and

an initial MED determination system, wherein said initial MED determination system receives data representing said user image from said computer storage using electronic communications,

wherein said initial MED determination system includes a skin color set comprised of a plurality of potential skin colors, wherein each of said plurality of potential skin colors is associated with a skin numeric color value and with a MED value, wherein each MED value is different,

wherein said initial MED determination system averages said numeric pixel color value for said plurality of pixels to determine a user image average color value,

wherein said initial MED determination system determines a skin numeric color value that is closest to said user image average color value and identifies the MED associated with said skin numeric color value as a user target MED.

2. The MED determination system of claim 1, said MED determination system further including a user, wherein said user provides information to said initial MED determination system, wherein said information includes said user's clothing, wherein said initial MED determination system increases said user target MED when said user is wearing clothing.

3. The MED determination system of claim 1, said MED determination system further including a user, wherein said user provides an information to said initial MED determination system, wherein said information includes a protection product applied to said user's skin, wherein said protection product reduces the

UVB radiation effecting the user's skin, wherein said initial MED determination system increases said user target MED when said user applies protection product to said user's skin.

4. A UVB exposure system including:

a computer storage;

a UV light sensor,

wherein said UV light sensor is in two way electronic communication with said computer storage, wherein said UV light sensor measures a first UV intensity value and a second UV intensity value using said UV light sensor and associates said first UV intensity value with a first time of day and said second UV intensity value with a second time of day,

wherein said first UV intensity value and said second UV intensity value are numerical values representing the intensity of a UV light detected by said UV light sensor, wherein said first time of day and said second time of day are numerical values representing a time of day when said UV light sensor detects said UV light,

wherein said UV light sensor transmits data representing said first time of day, said second time of day, said first UV intensity value, and said second UV intensity value to said computer storage; and

a UVB exposure determination system, wherein said UVB exposure determination system includes a UVB percentage set comprised of a plurality of potential UVB percentages, wherein each of said plurality of potential UVB percentages is associated with a time of day,

wherein said UV intensity determination system is in two way electronic communications with said computer storage,

wherein said UVB exposure determination system receives said first time of day, said second time of day, said first UV intensity value, and said second UV intensity value from said computer storage,

wherein said UVB exposure determination system:

identifies a first UVB percentage associated with said first time of day and a second UVB percentage associated with said second time of day,

determines a first UVB intensity value by multiplying said first UVB percentage with said first UV intensity value and a second UVB intensity value by multiplying said second UVB percentage with said second UV intensity value,

determines a total incident UVB exposure by summing said first UVB intensity with said second UVB intensity.

need this

5. A system for tracking UVB exposure, said system including:

a computer storage;

a color camera, wherein said color camera records a user image, wherein said user image is a digital image of a user's skin, wherein said user image is composed of a plurality of pixels each having a numeric pixel color value, wherein said color camera transmits data representing said user image to said computer storage; and

an initial MED determination system, wherein said initial MED determination system receives data representing said user image from said computer storage using electronic communications,

wherein said initial MED determination system includes a skin color set comprised of a plurality of potential skin colors, wherein each of said plurality of potential skin colors is associated with a skin numeric color value and with a MED value, wherein each MED value is different,

wherein said initial MED determination system averages said numeric pixel color value for said plurality of pixels to determine a user image average color value,

wherein said initial MED determination system determines a skin numeric color value that is closest to said user image average color value and identifies the MED associated with said skin numeric color value as a user target MED,

wherein said initial MED determination system transmits said user target MED to said computer storage;

a UV light sensor,

wherein said UV light sensor is in two way communication with said computer storage,

wherein said UV light sensor measures a first UV intensity value and a second UV intensity value using said UV light sensor and associates said first UV intensity value with a first time of day and said second UV intensity value with a second time of day,

wherein said first UV intensity value and said second UV intensity value are numerical values representing the intensity of a UV light detected by said UV light sensor, wherein said first time of day and said second time of day are numerical values representing a time of day when said UV light sensor detects said UV light,

wherein said UV light sensor transmits said first time of day, said second time of day, said first UV intensity value, and said second UV intensity value to said computer storage; and

a UVB exposure determination system, wherein said UVB exposure determination system includes a UVB percentage set comprised of a plurality of potential UVB percentages, wherein each of said plurality of potential UVB percentages is associated with a time of day,

wherein said UV intensity determination system is in two way electronic communications with said computer storage,

wherein said UVB exposure determination system receives said first time of day, said second time of day, said first UV intensity value, and said second UV intensity value from said computer storage,

wherein said UVB exposure determination system:

identifies a first UVB percentage associated with said first time of day and a second UVB percentage associated with said second time of day,

determines a first UVB intensity value by multiplying said first UVB percentage with said first UV intensity value and a second UVB intensity value by multiplying said second UVB percentage with said second UV intensity value,

determines a total incident UVB exposure value by summing said first UVB intensity value with said second UVB intensity value,

wherein said UVB exposure determination system receives said user target MED from said computer storage, wherein said UVB exposure determination

system compares the value of said user target MED with said total incident UVB exposure value.

6. The system for tracking UVB exposure of claim 5, wherein said computer storage, said color camera, said UVB determination system, and said initial MED determination system are included as part of a portable computing device.

7. The system for tracking UVB exposure of claim 6, wherein said UV light sensor is included as part of said portable computing device.

8. The system for tracking UVB exposure of claim 6, wherein said portable computing device also includes a radio wave receiver, wherein said UV light sensor is provided as part of a sensor patch, wherein said sensor patch includes a radio wave transmitter, and said UV light sensor, wherein said UV light sensor in in radio communication with said radio wave transmitter,
wherein said sensor patch transmits said first time of day, said second time of day, said first UV intensity value, and said second UV intensity value to said portable computing device using radio waves.

9. The system for tracking UVB exposure of claim 8, wherein said sensor patch includes an platform, wherein said platform has an adhesive side, wherein said platform is physically connected to said radio wave transmitter, and said UV light sensor.

ABSTRACT

A [method and/or system] is provided which [describe invention as claimed]

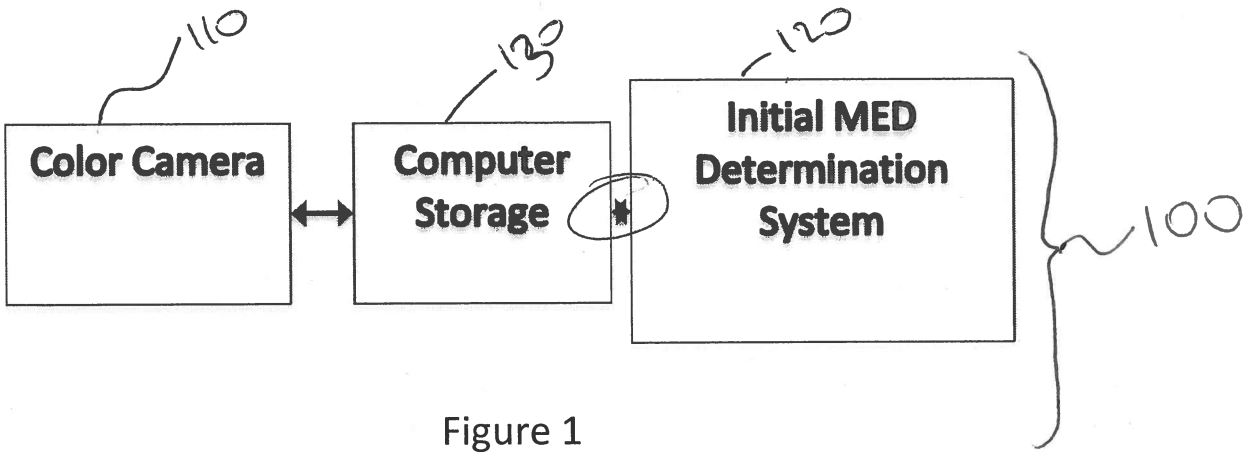

Figure 1

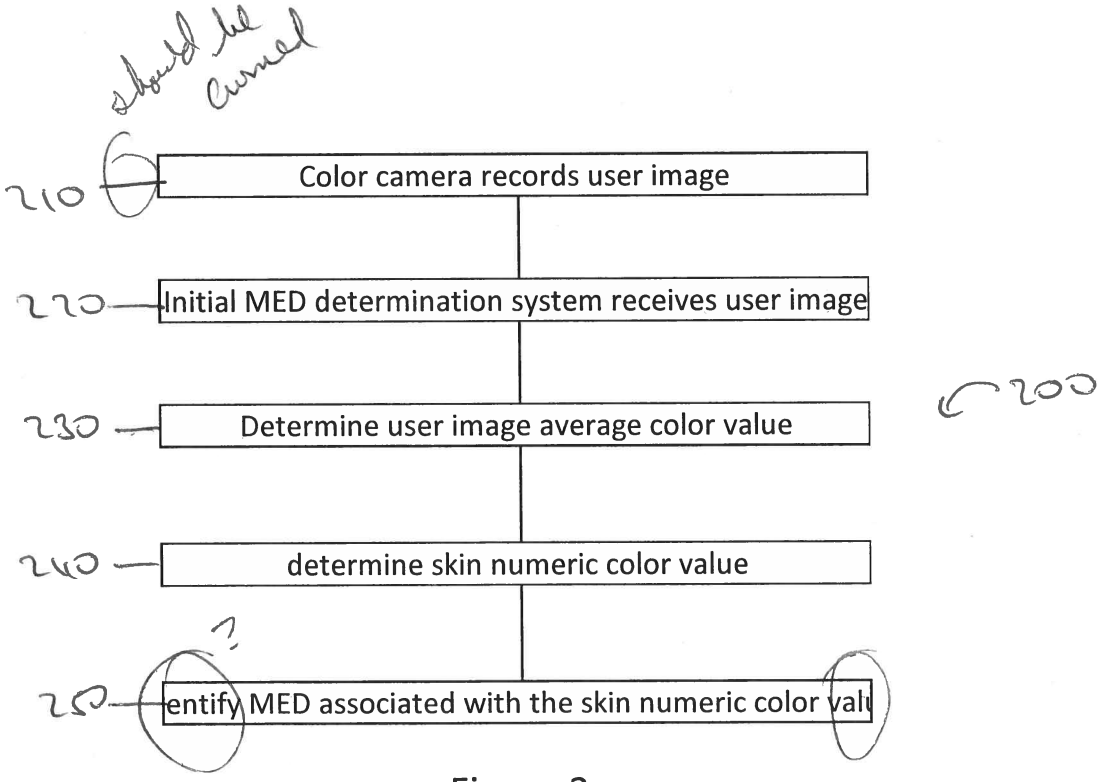

Figure 2

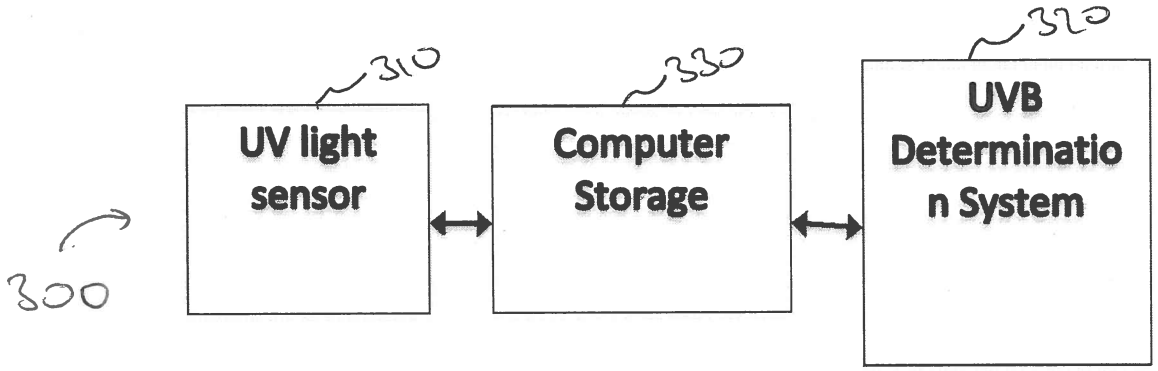

Figure 3

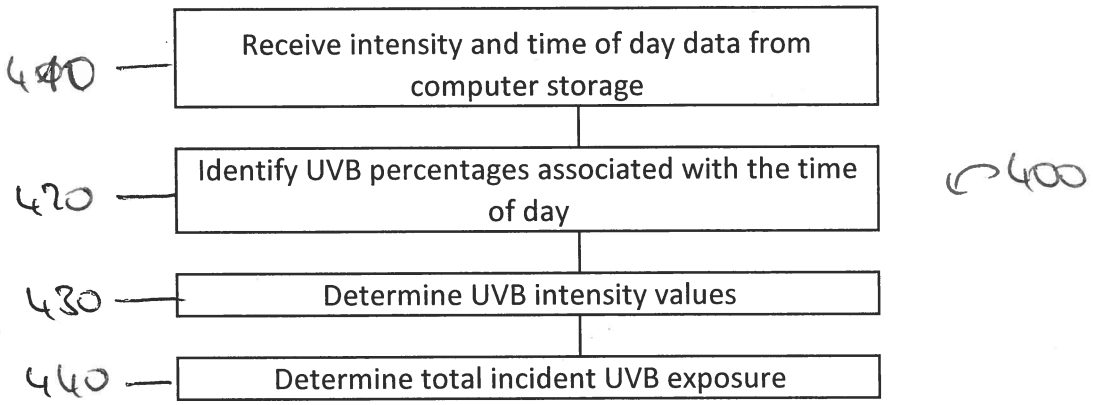

Figure 4

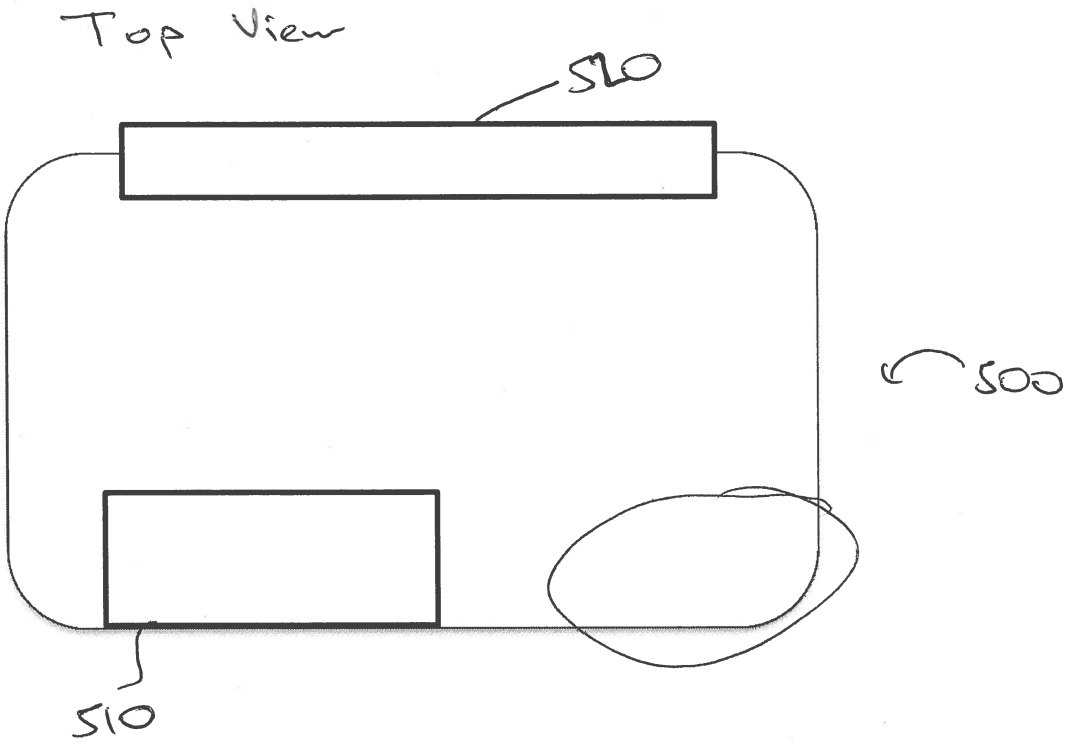

Figure 5

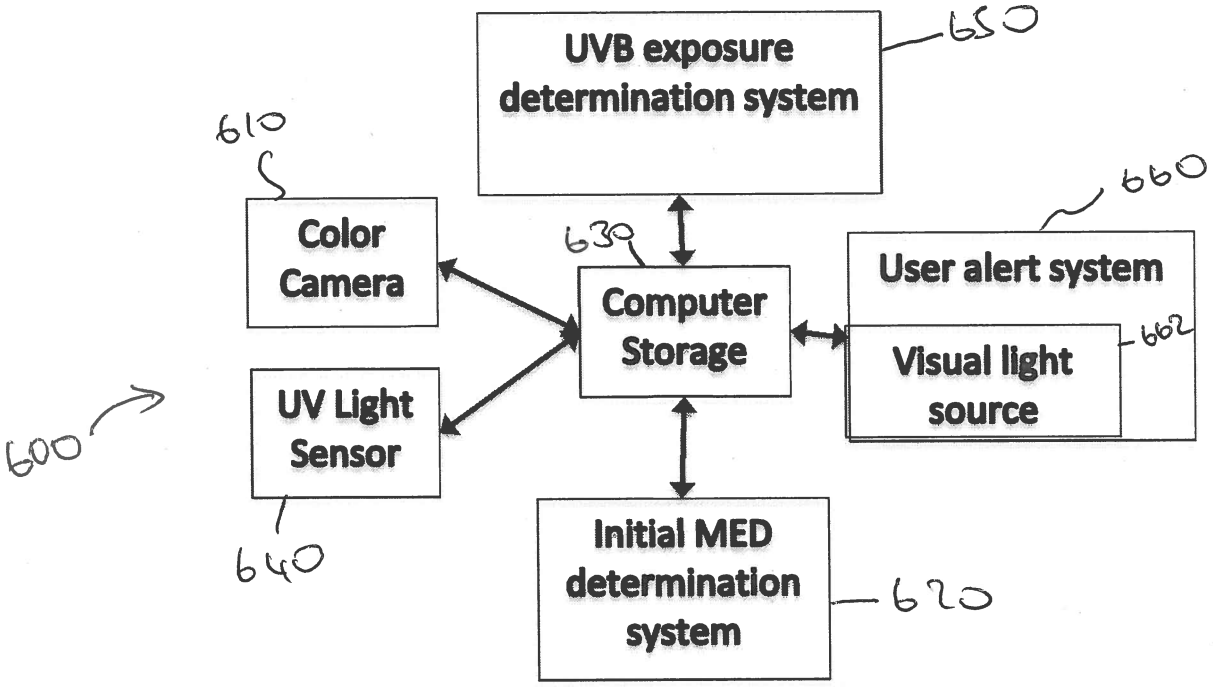

Figure 6

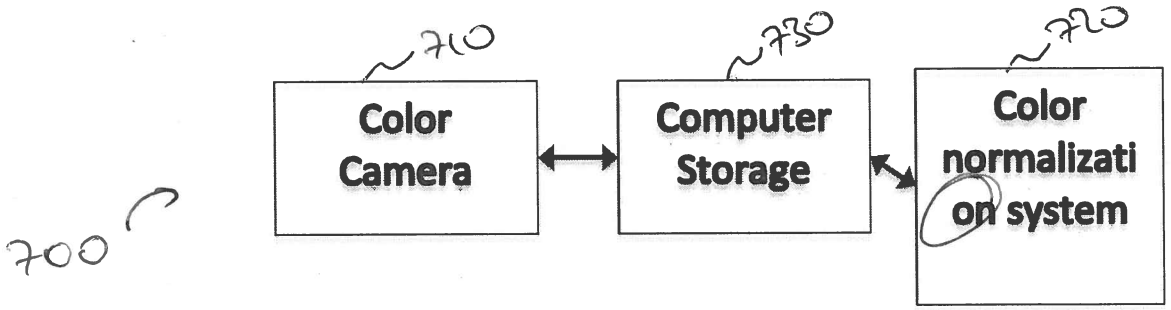

Figure 7

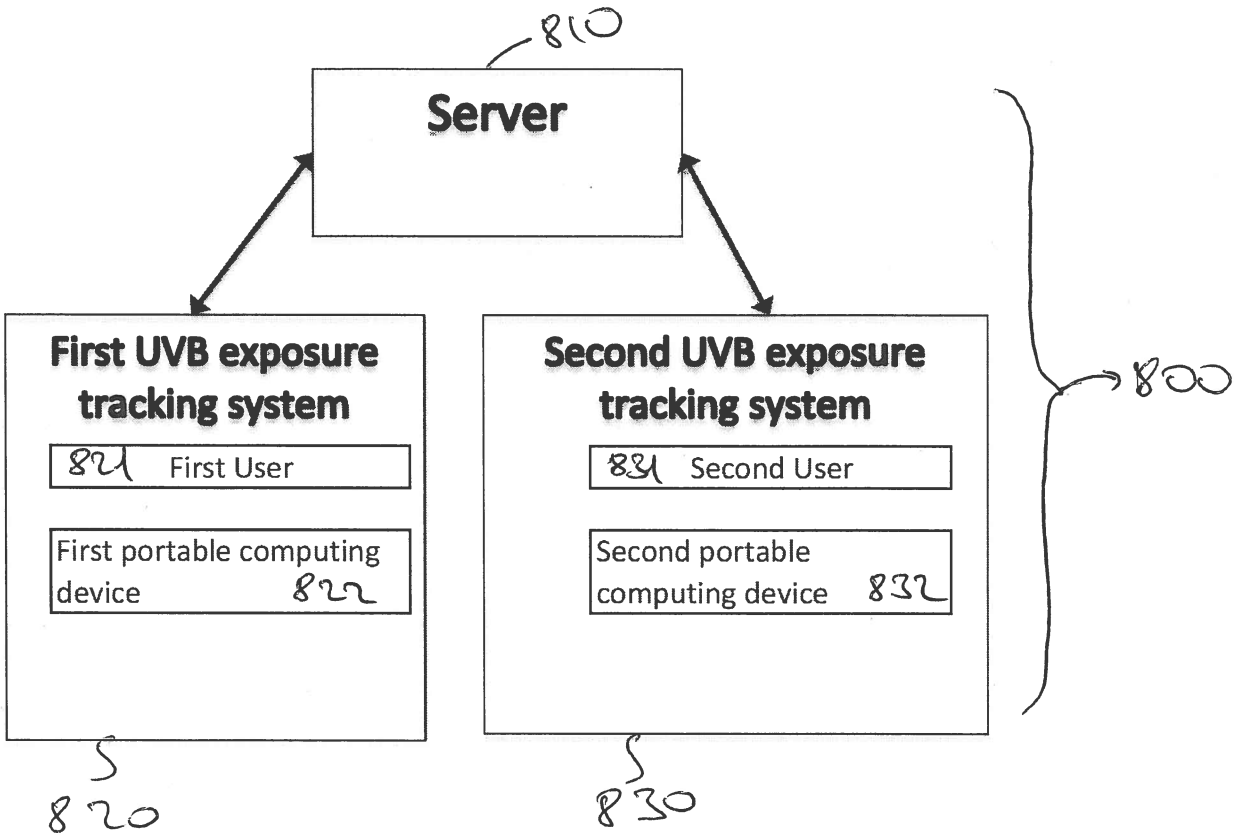
810
Server
First UVB exposure tracking system
821 First User
First portable computing device 822
820
Second UVB exposure tracking system
831 Second User
Second portable computing device 832
830
800

Figure 8

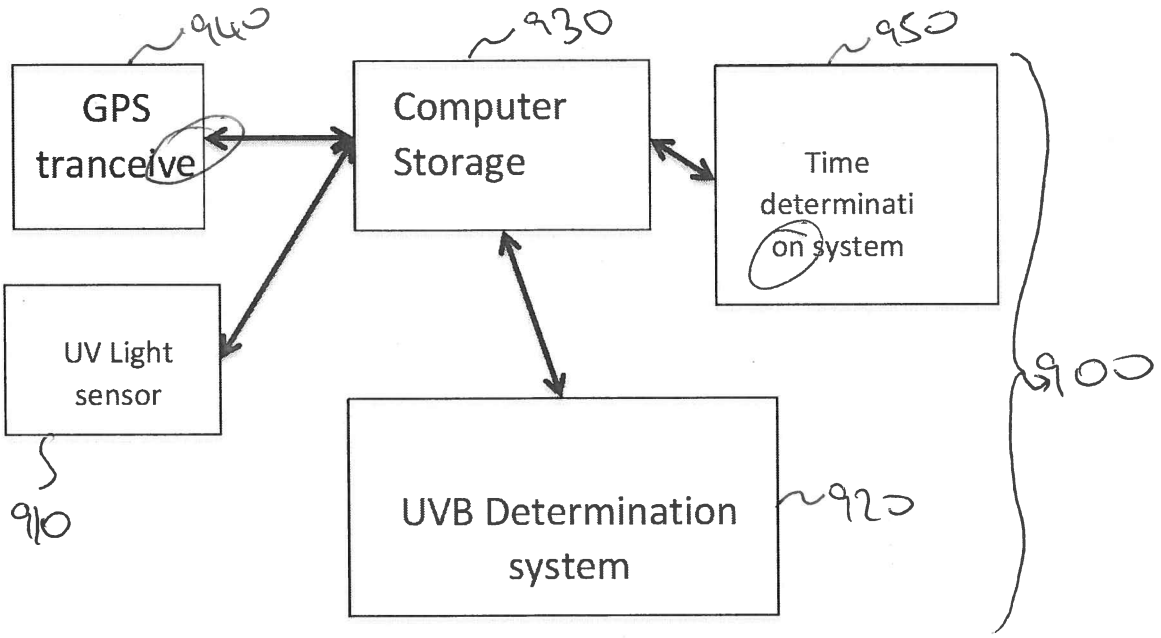

Figure 9

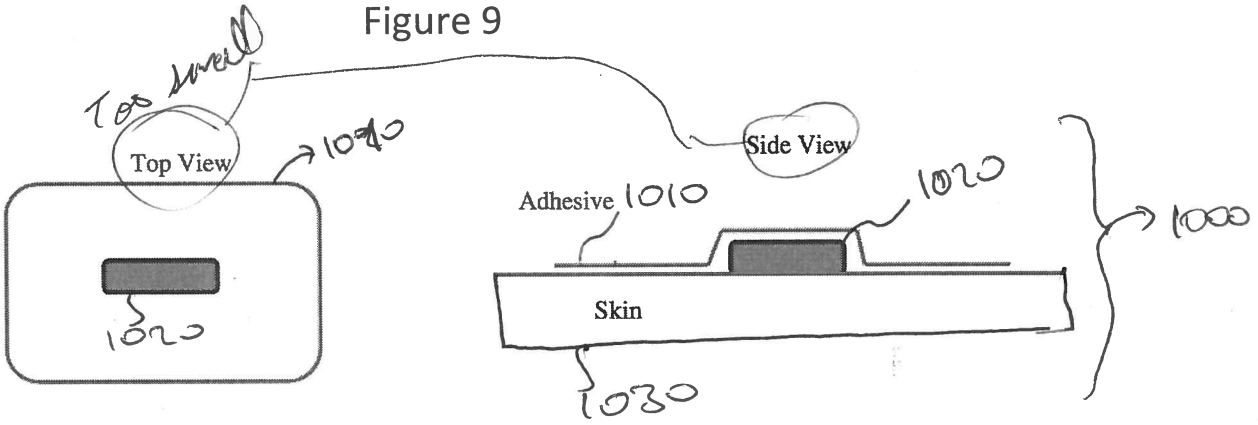

Figure 10 actually 2 figures

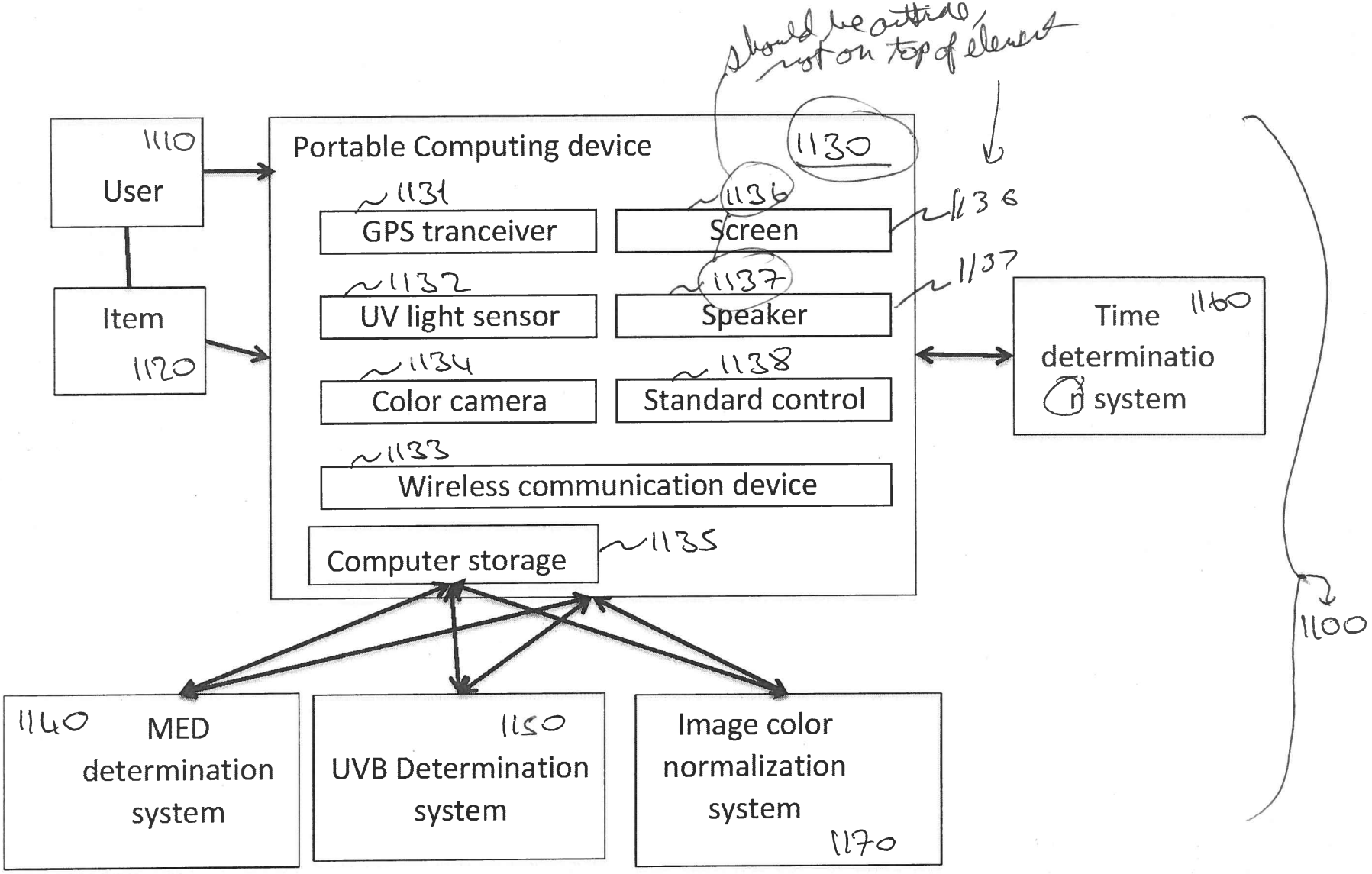
should be attached, not on top of element
1110
User
Item
1120
Portable Computing device
1130
1131
GPS tranceiver
1132
UV light sensor
1134
Color camera
1133
Wireless communication device
Computer storage
1135
1136
Screen
1137
Speaker
1138
Standard control
1136
1137
Time determination system
1160
1100
1140
MED determination system
1150
UVB Determination system
Image color normalization system
1170

Figure 11