Title: MOBILE SYSTEM FOR THE ASSESSMENT OF CONSUMER MEDICATION COMPLIANCE AND PROVISION OF MOBILE CAREGIVING

Abstract: An application system capable of providing a continuation of care for a user. This is achieved through the assessing of medication compliance, assessing medical testing compliance and providing appropriate care suggestions. The system incorporates medication reminder, medication compliance analytics and the capacity to provide responses to user specific medication inquiries. The system also incorporates medical test assessment capabilities and the capacity to provide basic medical testing protocols. Additionally, as medication and medical testing data are collected, processed and analyzed, they are stored in a zero-click fashion with results being rapidly presented back to the user via an interactive avatar. These data can also be provided in standard of care summaries to users, HIPPA compliant third parties and/or medical care providers.

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MOBILE SYSTEM FOR THE ASSESSMENT OF CONSUMER MEDICATION COMPLIANCE AND PROVISION OF MOBILE CAREGIVING

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the priority benefit of U.S. Provisional Patent Application Serial No. 62/655,582, filed on April 10, 2018 and titled “Mobile System for the Assessment of Consumer Medication Compliance and Provision of Mobile Caregiving,” which is hereby incorporated by reference.

FIELD OF INVENTION

[0002] The present invention relates to a connected device application system; and, more particularly, to a software application system capable of providing virtual caregiving services by way of a smartphone, tablet or other device having Internet and/or cellular network connectivity, a web browser and voice communication technology.
SUMMARY

[0003] It is an object of the present invention to provide access to continued care through interaction with a connected device. As such, in the application functions as a user’s virtual caregiver and displays materials related to the user’s continuum of care on the display of a user’s devices (Smartphone, tablet or computer). Additionally, while having Internet connectivity or cellular network access, connectivity to the Electronic Caregiver Optimum Recognition Blueprint ("ORB") for Emergency Medical Records, cloud-based access to stored user information, Voice over Internet Protocol communication with emergency medical responders, localized voice capture for cloud-based system communications and communication capabilities between user and the Electronic Caregiver Image (ECI) avatar. All capabilities can be displayed on the user’s device and provide response capabilities to said user. This will improve provision of continued care to the users of the invention. Additional advantages of the invention are apparent from the detailed embodiment descriptions and accompanying drawings, which set forth embodiments of the invention.
BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The accompanying drawings, where like reference numerals refer to identical or functionally similar elements throughout the separate views, together with the detailed description below, are incorporated in and form part of the specification, and serve to further illustrate embodiments of concepts that include the claimed disclosure, and explain various principles and advantages of those embodiments.

[0005] The methods and systems disclosed herein have been represented where appropriate by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein.

[0006] FIG. 1 depicts areas of virtual caregiving provided by the application system interface according to exemplary embodiments of the present technology.

[0007] FIG. 2 outlines single pathway login design providing access to various system components according to exemplary embodiments of the present technology.

[0008] FIG. 3 depicts local device timer creation and push notification transmission within the application system according to exemplary embodiments of the present technology.

[0009] FIG. 4 outlines the data flow pathway for medication data according to exemplary embodiments of the present technology.

[0010] FIG. 5 provides a representation of the selection provided to users during medication reminder according to exemplary embodiments of the present technology.

[0011] FIG. 6 demonstrates what occurs throughout a medication consumption delay process according to exemplary embodiments of the present technology.

[0012] FIG. 7 is a representation of a video analytic process for medication consumption verification according to exemplary embodiments of the present technology.
[0013] FIG. 8 outlines Voice over internet Protocol actions according to exemplary embodiments of the present technology.

[0014] FIG. 9 is a depiction of an Electronic Caregiver Image (ECI) avatar according to exemplary embodiments of the present technology.

[0015] FIG. 10 is a full body representation of the ECI avatar according to exemplary embodiments of the present technology.

[0016] FIG. 11 is a schematic diagram of an exemplary computing architecture that can be used to practice aspects of the present technology.

[0017] FIG. 12 illustrates a computer system according to exemplary embodiments of the present technology.
DETAILED DESCRIPTION

[0018] The detailed embodiments of the current invention are disclosed here. It should be understood, that the disclosed embodiments are merely exemplary of the invention, which may be embodied in multiple forms. Those details disclosed herein are not to be interpreted in any form as limiting, but as the basis for the claims.

[0019] In response to the numerous risks associated with aging, and the fact that the population of the United States is rapidly aging, the effort to maintain independence has led to the development of a number of Personal Emergency Response Systems (PERS) or Medical Emergency Response Systems (MERS). Most of these systems have been developed in a manner that include three main components, 1) a radio transmitter in the form of a single button typically worn or the wrist, a belt or around the neck and allow a user to summon help during an emergency, 2) a communicator typically attached to the user’s phone line that acts as a speakerphone when the radio transmitter has been activated, and 3) an emergency response center that provides communication to the end user and emergency medical services. While evidence suggests that older adults are experiencing high rates of user satisfaction with home-based PERS, currently available systems do not provide capacity for continuation of care capabilities. Most current PERS/MERS simply provide monitoring for and response to adverse events. Additionally, these current systems do not provide mobile care capabilities tied directly to a smartphone and/or tablet allowing for provision of continued care, immediate and direct contact with emergency responders built into the system, without the need to dial 911, the capability to communicate with a computer simulation, or avatar, acting as a caregiver for the provision of information, and/or services associated with medication, functional movement, and care facilities. Therefore, the present technology has been developed in response to this current lack of capabilities in providing a continuation of care across allied health. Problems requiring health monitoring, assessment and delivery have yet to be fully solved by currently available PERS/MERS. The present
technology provides a comprehensive method of electronic caregiving support, health information provision and access to dedicated emergency technicians to directly benefit the user and provide continuation of care. This critical continuation of care information can be displayed on the user’s device and/or provided via voice and/or text interaction with the Electronic Caregiver Image (ECI) avatar within the application.

[0020] Referring first to FIG. 1, the present application is represented in summary. As such, the user (101) utilizes the application installed on a connected device (102) that connected to either the internet or cellular network (103). The installed application is an Electronic Caregiver developed system capable of providing a continuation of care for 101. This is achieved through the assessment and/or display of materials and data related to characteristics including the user’s current medication characteristics (104), medical testing activities (105) and care provision factors (106). In doing so, this application system provides 101 with the ability to virtually receive continuation of care and medication monitoring outside of both their typical home setting and the traditional healthcare environment.

[0021] To provide these continuation of care capabilities, as depicted in FIG. 2, 102 is used to provide 101 with simultaneous connection to the Electronic Caregiver Object Recognition Blueprint, or ORB (107) and cloud-based utilities (108) via connection to 103. This connection occurs immediately upon user access of the application and is performed via a single encrypted pathway through Electronic Caregiver derived Application Programming Interface. This single pathway design functions to enhance the security and integrity of the information associated with 101 such that the application system is capable of providing access to 107 and 108 utilities without storing login information associated with 101. Once simultaneously logged into provided access to 107 and 108, 101 has the capability to utilize the application system to access information and protocols associated with 104, 105 and 106.

[0022] MEDICATION INFORMATION
[0023] To provide accurate information associated with 104, upon opening the application system on 102, 101 gains access to a variety of medication data via cloud-based functionality. These data associated with 104 include: current medication status (109), current medication reminders (110), directions for medication consumption (111), drug side-effects (112), drug-drug interactions (113), drug-food interactions (114), consumption compliance (115) by 101 and time to refill of medication (116). The information associated with 104 that is provided via the application system to 101 is described in Table 1.

[0024] To successfully allow the application system to provide information to 101 describing 109, the application system provides 101 with continuous communication capabilities to 107 and 108. This connection provides 101 with access to drop down menu type functionality within the application that contains various medications that can be selected and stored. Once a medication is selected by 101, further details such as dosage, consumption time and consumption frequency are input and all data associated with the specific medication are transmitted to and stored in 108 allowing for information describing 109 to be consistently provided to and/or accessed by 101 within the application.

[0025] Table 1. Application System Provided Information Associated with User Medication.

<table>
<thead>
<tr>
<th>Item</th>
<th>Application Provided Information</th>
<th>Application Point of Information Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>109 – Medication Status</td>
<td>1. Medications that have been consumed by user&lt;br&gt;2. Medications that are to be consumed by user in the future.</td>
<td>Application collected records stored O.R.B and cloud-based data storage services.</td>
</tr>
<tr>
<td>110 – Medication Reminders</td>
<td>1. Time, date and dosage of medication to be consumed.</td>
<td>User input information stored in cloud-based allowing push notifications to be defined.</td>
</tr>
<tr>
<td>111 – Consumption Directions</td>
<td>1. Recommended method for consuming medication.</td>
<td>Programmed functionality for the access of OpenFDA through government provided Application Programming Interface.</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>112– Drug Side Effects</td>
<td>1. Known side-effects associated with each medication.</td>
<td>Programmed functionality for the access of OpenFDA through government provided Application Programming Interface.</td>
</tr>
<tr>
<td>113 – Drug-Drug Interactions</td>
<td>1. Known drug-drug interactions associated with each medication.</td>
<td>Programmed functionality for the access of OpenFDA through government provided Application Programming Interface.</td>
</tr>
<tr>
<td>114 – Drug-Food Interactions</td>
<td>1. Known drug-food interactions associated with each drug.</td>
<td>Programmed functionality for the access of OpenFDA through government provided Application Programming Interface.</td>
</tr>
<tr>
<td>115 – Medication Compliance</td>
<td>1. User acknowledgement of appropriate consumption of medication.</td>
<td>Application collected records stored O.R.B and cloud-based data storage services and cloud-based data streaming functionality.</td>
</tr>
</tbody>
</table>
| 116 – Medication Refill Information | 1. Number of doses remaining in current medication.  
2. Days remaining until medication is exhausted.  
3. Number of refills remaining for medication.  
4. Relevant information for pharmacy where medication was obtained. | Application collected records stored O.R.B and cloud-based data storage services. |

[0026] The application system embodies the capability for a user to enter local device timers for the provision of 110 to 101 through the use of local device timers. FIG. 3 demonstrates how these local device timers are transmitted and stored in cloud-based database(s) following their entry by the user. This information storage allows 101 to
create push notifications that are transmitted from cloud-based utilities to the
application at the indicated time of medication consumption that inform 101 of the
appropriate medication, the dosage and consumption instructions to be consumed.

[0027] In order for the application system to provide information to 101 that
describe 111, 112, 113, and 114, the current application system utilizes mechanisms that
include; the generation of a user profile upon login to ORB through the mobile device
interface. Following the login, 101 immediately has the capability to query for
customizable drug interaction data maintained with the ORB environment. These data,
housed within the ORB environment, will be collected using available an OpenFDA API
capable of scrubbing both the United States National Library of Medicine Data Access
site and the United States Food and Drug Administration Data access site (containing
government provided, open-source, documents/databases that contain information
describing drug adverse events, drug product labeling, and drug recall enforcement
reports). Upon retrieval of these drug data, exportation of the data occurs through the
Electronic Caregiver interface such that analysis and storage occurs within ORB
environment. As depicted in FIG. 4, this process provides 101 with on-demand access
to a variety of medication information that may include; 1) side effects, 2) personal
usage history, 3) food and drug interactions, 4) adverse event reports, and 5) available
dosages. This query data can be stored to a user profile that can be presented to a
physician at any time. Additionally, the company derived analytic processes housed
within ORB provide consistent assessment of 101 medication data. As such, when two
medications scheduled for consumption by 101 pose a risk of possible interaction, the
experiencing of known side effects or other adverse reaction, an alert will be put
through to the user interface for review by 101.

[0028] For the tracking of, and provision of information describing 115, the
application system utilizes multiple methods that include manual data input by 101 and
video analytics made possible via the manufacturer developed camera system installed
into 102. With regard to the capability of allowing 101 to acknowledge compliance with their medication regiment through manual data input, utilization of the touch screen capabilities of 102 are incorporated. As such 101 is provided with the previously described push notification for 110 and prompted with pop-up “Yes” and “Not Now” buttons depicted in FIG. 5. When 101 selects the “Yes” button they progress to the medication page in the user interface displayed on 102. Following consumption of the medication, 101 inputs an acknowledgement of medication consumption into the application through continued use of the touch screen capabilities of 102. Upon manual acknowledgement of 115 by 101, an update of cloud-based medication data associated with 101 is processed and a cessation of 110 occurs.

Continuing with manual input of 115, the application system provides 101 with the option to delay medication consumption using the “Not Now” option also depicted in FIG. 5. The application allows this delay of 115 to occur for up to a maximum of 30 minutes. When 101 selects the option to delay consumption following the receipt of 110, the application system initiates a 10-minute delay period. At the conclusion of the 10-minute delay, 101 again receives 110 and is prompted with “Yes” and “Wait” options. The available “Wait” option may be activated up to two times without additional input from 101. When the activation of the delay occurs a third time, the application system immediately notifies 101 that their indicated responsible party will be contacted if consumption of medication is not acknowledged. In instances where 101 does not acknowledge medication consumption following the final reminder, the notification of responsible party protocol displayed in FIG. 6 is activated.

FIG. 7 demonstrates the utilization of mobile device camera system in 102 to perform medication consumption verification by way of video analytics. 101 will place self in front of 102 where system included facial recognition software and object recognition software will verify 101 and medication being taken. Included motion tracking software will then be used to monitor the actions of 101 during medication
consumption such that confirmation of the following actions occur; 1) medication is placed within the hand of 101, 2) 101 reorients the hand in front of their mouth, 3) the medication to be consumed is transferred from the hand to the mouth, 4) 101 reorients the hand away from the mouth and the hand no longer contains the medication to be consumed and 5) 101 completes a swallowing action. These verified output of these actions will be transmitted to and stored via the ORB environment for appropriate utilization.

[0031] Also associated with 115, the application system provides 101 with the capability to review any medication reminders that would be considered “missed”. In instances where 101 does not adhere to the medication protocol and their indicated third party is contacted, the application system provides 101 or their indicated third part with the ability to review the medications that were not taken correctly. This allows the tracking and storage of medication adherence in cloud-based utilities and provides 101 with the opportunity to safely consume any medications that were missed. Throughout the utilization of medication tracking aspect, the connection to the cloud-based utilities and the capability of the application system to provide 111, 112, 113 and 114 potential problems associated with medication(s) being consumed at the wrong time or too closely to another medication can be identified and monitored.

[0032] The application system also embodies the capability for allowing for medication refill information (116) to be provided consistently to 101. With regard to 116, 101 makes use of the system connection to both 107 and 108 provided by the application system to input information regarding refill conditions for all current medications consumed by 101. Upon selection of medication form the drop down menu functionality provided via 102, 101 inputs data describing the number of doses associated with the medication and the number of available refills. Following the input of these data by 101, the application system utilizes cloud-based compute functionality resulting in the transmission of these medication data to cloud-based storage databases.
Similar to 110, during this process local device timers for medication refill are created by 101, transmitted and stored in cloud-based database(s) following their entry by the user. This information storage allows the creation of push notifications informing 101 of pending medication refill needs that are transmitted from cloud-based utilities to the application at indicated times. These refill indicators are transmitted to 101 at intervals of 3-days, 2-days and 1-day to 101 exhausting their current medication. At the time of each refill reminder, 101 is provided with the option to confirm the execution of any refill orders in a similar fashion to that described for 115. Upon the transmission of the 1-day reminder from the application system to 101, 101 is notified that a failure to execute a refill order will result in the activation of the indicated responsible party 101 failing to indicate the execution of a refill order following the 1-day reminder, the application system immediately notifies 101 that their indicated responsible party will be contacted if refill order execution is not acknowledged. In instances where 101 does not acknowledge refill of medication following the 1-day reminder, the notification of responsible party protocol is activated and carried out.

[0033] MEDICAL TESTING

[0034] The application system embodies the capacity to enhance compliance with medical testing protocols. Similar to 110, 101 inputs medical testing data into 102 and those data are transmitted and stored in 107 and 108. Following storage of medical testing data, a local device timer is created, transmitted and stored in cloud-based data storage instances. This information storage allows 101 to create push notifications that are transmitted from cloud-based utilities to the application at the indicated time of medical testing and informs 101 of the pending test to be completed, the procedures by which the test is to be completed and any additional information relevant to the specific medical test.

[0035] A subsequent embodiment of the application system is the ability to store and analyze data associated with medical testing protocols input by 101. Following the
creation of a customizable user profile within 107 medical testing data can be stored and accessed by 101 or responsible parties under HIPAA compliance. Additionally, various internal analyses techniques can be applied to the stored test data so that analytic outputs can be provided to 101 or responsible parties. These analytic outputs can be utilized by 101, a responsible party or a physician for additional review. The user can also input day to day symptoms on how they felt prior to and during the various medical tests that can provide insight into various aspects of the medical testing associated with 101.

[0036] PROVISION OF CARE

[0037] The current application embodies the provision of access to an emergency call center staffed with dedicated emergency responders to 101. As depicted in FIG. 8, the application system includes company developed Voice over Internet Protocol (VoIP) capabilities to provide 101 with direct voice access to emergency responders by way of cloud-based real-time streaming utilities. This is achieved through an emergency response action initiated by 101 through use of 102. The initiation of this emergency response action by 101 is followed by an immediate connection sequence to a queued emergency operator. Following the connection, both 101 and the emergency operator enter a sessionized instance of data exchange during which audio data exchange between 101 and operator are encrypted. In the application system, this sessionized audio data exchange is achieved using one communication channel in which data tags are assigned to each record of transmitted data.

[0038] The application system embodies the ability to incorporate existing local voice capture technology to allow the user to communicate directly with the Electronic Caregiving Image (ECI) avatar by voice. This local voice capture communication capability with the ECI avatar allows the user to make voice based inquiries of their medical data. Responses to these queries are provided via the ECI avatar depicted in FIG. 9 and FIG. 10. In such, 101 can use standard voice communication hardware to
vocally communicate with the ECI avatar regarding 109, 110, 111, 112, 113, 114, 115 and 116. This aspect of the application system also provides redundancy in that when confusion regarding current care status and/or needs occur, 101 is capable of communicating with ECI avatar to request clarifying information based on available care data.

[0039] The application system also provides 101 with the capacity to identify care provision facilities though the application system interface. As such, 101 is provided with the capacity to utilize GPS through a connected mobile device that interacts with the ECI avatar. This capacity provides 101 with available map data of every emergency/urgent care facility available in the vicinity of the current location of 101. This embodiment is particularly useful when 101 is in an unfamiliar area and comes experiences an adverse event that may require medical intervention. By accessing the ECI avatar though hand held or voice interaction, 101 can request information regarding care facilities. Following this request for information, the application system utilizes the GPS capabilities of the connected device and provides the location and directions to the nearest care facility. This can be achieved within the system using ECI avatar communication direct with 101, 101 can be refer to a list of directions displayed on 102 or 101 can be provided map data detailing the fastest route to the nearest facility.

[0040] APPLICATION SYSTEM USE EXAMPLES


[0042] As 101 prepares to consume a prescribed medication, they can make a simply inquiry of the ECI avatar by asking “Addison, I am preparing to take medication X after lunch. Are there any known food-drug interactions associated with medication X?” Upon this query, the application system will access ORB to identify any interaction data that has been previously retrieved from the FDA and/or NLM data sources. Upon accessing these data and identifying a potential drug-food interaction (e.g. – alcohol), the ECI avatar will respond to 101 with a statement such as, “Mrs. Caroline, the
medication you indicated has been shown to interact with alcohol. I would recommend that you not consume any alcoholic beverages during your lunch.”


[0044] Following the completion of daily blood pressure testing on the final day of the month, 101 can be provided a breakdown of the trends associated with their data. As such, if the results of the trend analysis indicated a slow and steady increase in blood pressure measurements over the course of the month, the application system can suggest 101 consider making an appointment with the appropriate health care provider. If the results of the trend analysis indicate consistency for the month of blood pressure testing results, the application system can provide positive feedback to 101 indicating their hard work appears to be resulting in successful regulation of their blood pressure.

[0045] FIG. 11 illustrates an exemplary architecture for practicing aspects of the present technology. The architecture comprises a server system, hereinafter “system 121” that is configured to provide various functionalities, which are described in greater detail throughout this document. Generally the system 121 is configured to communicate with client devices, such as client 117. The client 117 may include, for example, a computing system (e.g., connected device 102) or other similar computing device. An example of a computing device that can be utilized in accordance with the present technology is described in greater detail with respect to FIG. 12.

[0046] The system 121 may communicatively couple with the client 117 via a public or private network, such as network 120 (e.g., internet cellular network 103). Suitable networks may include or interface with any one or more of, for instance, a local intranet, a PAN (Personal Area Network), a LAN (Local Area Network), a WAN (Wide Area Network), a MAN (Metropolitan Area Network), a virtual private network (VPN), a storage area network (SAN), a frame relay connection, an Advanced Intelligent Network (AIN) connection, a synchronous optical network (SONET) connection, a digital T1, T3, E1 or E3 line, Digital Data Service (DDS) connection, DSL (Digital
Subscriber Line) connection, an Ethernet connection, an ISDN (Integrated Services Digital Network) line, a dial-up port such as a V.90, V.34 or V.34bis analog modem connection, a cable modem, an ATM (Asynchronous Transfer Mode) connection, or an FDDI (Fiber Distributed Data Interface) or CDDI (Copper Distributed Data Interface) connection. Furthermore, communications may also include links to any of a variety of wireless networks, including WAP (Wireless Application Protocol), GPRS (General Packet Radio Service), GSM (Global System for Mobile Communication), CDMA (Code Division Multiple Access) or TDMA (Time Division Multiple Access), cellular phone networks, GPS (Global Positioning System), CDPD (cellular digital packet data), RIM (Research in Motion, Limited) duplex paging network, Bluetooth radio, or an IEEE 802.11-based radio frequency network. The network 120 can further include or interface with any one or more of an RS-232 serial connection, an IEEE-1394 (Firewire) connection, a Fiber Channel connection, an IrDA (infrared) port, a SCSI (Small Computer Systems Interface) connection, a USB (Universal Serial Bus) connection or other wired or wireless, digital or analog interface or connection, mesh or Digi® networking.

[0047] The system 121 generally comprises a processor, 130, a network interface 135, and a memory 140. According to some embodiments, the memory 140 comprises logic (e.g., instructions) 145 that can be executed by the processor 130 to perform various methods. For example, the logic may include a user interface module 125 as well as a data aggregation and correlation application (hereinafter application 150) that is configured to provide the functionalities described in greater detail herein including tracking and evaluating neurological disease. In some instances, application 150 is the application system providing virtual caregiving services described herein. In various instances, the user interface module 125 enables the customizable interface 200 or the user interfaces shown in FIG. 5 and FIG. 6 and the avatars shown in FIG. 9 and FIG. 10.
[0048] It will be understood that the functionalities described herein, which are attributed to the system 121 and application 150 may also be executed within the client 117. That is, the client 117 may be programmed to execute the functionalities described herein. In other instances, the system 121 and client 117 may cooperate to provide the functionalities described herein, such that the client 117 is provided with a client-side application that interacts with the system 121 such that the system 121 and client 117 operate in a client/server relationship. Complex computational features may be executed by the server 121, while simple operations that require fewer computational resources may be executed by the client 117, such as data gathering and data display.

[0049] In general, the user interface module 125 may be executed by the system 121 to provide various graphical user interfaces (GUIs) that allow users to interact with the system 121. For example, the user interfaces shown in FIG. 5 and FIG. 6 and the avatars shown in FIG. 9 and FIG. 10. In some instances, GUIs are generated by execution of the application 150 itself. Users may interact with the system 121 using, for example, a client 117. The system 121 may generate web-based interfaces for the client 117.

[0050] FIG. 12 is a diagrammatic representation of an example machine in the form of a computer system 1, within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein may be executed. In various example embodiments, the machine operates as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine may operate in the capacity of a server or a client machine in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine may be a personal computer (PC), a tablet PC, a set-top box (STB), a personal digital assistant (PDA), a cellular telephone, a portable music player (e.g., a portable hard drive audio device such as an Moving Picture Experts Group Audio Layer 3 (MP3) player), a web appliance, a network router, switch or bridge, or
any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term “machine” shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

[0051] The example computer system 1 includes a processor or multiple processor(s) 5 (e.g., a central processing unit (CPU), a graphics processing unit (GPU), or both), and a main memory 10 and static memory 15, which communicate with each other via a bus 20. The computer system 1 may further include a video display 35 (e.g., a liquid crystal display (LCD)). The computer system 1 may also include an alphanumeric input device(s) 30 (e.g., a keyboard), a cursor control device (e.g., a mouse), a voice recognition or biometric verification unit (not shown), a drive unit 37 (also referred to as disk drive unit), a signal generation device 40 (e.g., a speaker), and a network interface device 45. The computer system 1 may further include a data encryption module (not shown) to encrypt data.

[0052] The disk drive unit 37 includes a computer or machine-readable medium 50 on which is stored one or more sets of instructions and data structures (e.g., instructions 55) embodying or utilizing any one or more of the methodologies or functions described herein. The instructions 55 may also reside, completely or at least partially, within the main memory 10 and/or within the processor(s) 5 during execution thereof by the computer system 1. The main memory 10 and the processor(s) 5 may also constitute machine-readable media.

[0053] The instructions 55 may further be transmitted or received over a network (e.g., network 120, see FIG. 11) via the network interface device 45 utilizing any one of a number of well-known transfer protocols (e.g., Hyper Text Transfer Protocol (HTTP)). While the machine-readable medium 50 is shown in an example embodiment to be a single medium, the term "computer-readable medium" should be taken to include a
single medium or multiple media (e.g., a centralized or distributed database and/or associated caches and servers) that store the one or more sets of instructions. The term "computer-readable medium" shall also be taken to include any medium that is capable of storing, encoding, or carrying a set of instructions for execution by the machine and that causes the machine to perform any one or more of the methodologies of the present application, or that is capable of storing, encoding, or carrying data structures utilized by or associated with such a set of instructions. The term "computer-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories, optical and magnetic media, and carrier wave signals. Such media may also include, without limitation, hard disks, floppy disks, flash memory cards, digital video disks, random access memory (RAM), read only memory (ROM), and the like. The example embodiments described herein may be implemented in an operating environment comprising software installed on a computer, in hardware, or in a combination of software and hardware.

[0054] One skilled in the art will recognize that the Internet service may be configured to provide Internet access to one or more computing devices that are coupled to the Internet service, and that the computing devices may include one or more processors, buses, memory devices, display devices, input/output devices, and the like. Furthermore, those skilled in the art may appreciate that the Internet service may be coupled to one or more databases, repositories, servers, and the like, which may be utilized in order to implement any of the embodiments of the disclosure as described herein.

[0055] These computer program instructions may also be stored in a computer readable medium that can direct a computer, other programmable data processing apparatus, or other devices to function in a particular manner, such that the instructions stored in the computer readable medium produce an article of manufacture including
instructions which implement the function/act specified in the flowchart and/or block diagram block or blocks.

[0056] The computer program instructions may also be loaded onto a computer, other programmable data processing apparatus, or other devices to cause a series of operational steps to be performed on the computer, other programmable apparatus or other devices to produce a computer implemented process such that the instructions which execute on the computer or other programmable apparatus provide processes for implementing the functions/acts specified in the flowchart and/or block diagram block or blocks.

[0057] In the description, for purposes of explanation and not limitation, specific details are set forth, such as particular embodiments, procedures, techniques, etc. in order to provide a thorough understanding of the present technology. However, it will be apparent to one skilled in the art that the present technology may be practiced in other embodiments that depart from these specific details.

[0058] While specific embodiments of, and examples for, the system are described above for illustrative purposes, various equivalent modifications are possible within the scope of the system, as those skilled in the relevant art will recognize. For example, while processes or steps are presented in a given order, alternative embodiments may perform routines having steps in a different order, and some processes or steps may be deleted, moved, added, subdivided, combined, and/or modified to provide alternative or sub-combinations. Each of these processes or steps may be implemented in a variety of different ways. Also, while processes or steps are at times shown as being performed in series, these processes or steps may instead be performed in parallel, or may be performed at different times.

[0059] While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. The descriptions are not intended to limit the scope of the present technology to the
particular forms set forth herein. To the contrary, the present descriptions are intended to cover such alternatives, modifications, and equivalents as may be included within the spirit and scope of the present technology as appreciated by one of ordinary skill in the art. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above-described exemplary embodiments.
CLAIMS

What is claimed is:

1. A system capable of running on an internet and/or cellular network, the system comprising a connected device capable of providing virtual continued care.

2. The system of claim 1, further comprising:
   an Object Recognition Blueprint (ORB); and
   a variety of cloud-based utilities;
   wherein upon initiation, a single pathway system is utilized to simultaneously and securely connect the connected device to the Object Recognition Blueprint (ORB) and the variety of cloud-based utilities.

3. The system of claim 2, wherein simultaneous communication between ORB and cloud-based utilities and the connected device is provided.

4. The system of claim 1, further comprising provision of continuous and secure access to cloud-based storage of user information.

5. The system of claim 4, wherein the cloud-based storage of user information is consistently and automatically updated.
6. A method for providing a user with consistent access to personalized and pertinent medication and medical testing information.

7. The method of claim 6, further comprising allowing user storage and retrieval of the pertinent medication and medical testing information using cloud based services.

8. The method of claim 6, further comprising allowing a user to store and retrieve provided medication consumption data.

9. The method of claim 6, further comprising allowing a user to identify medications that have been taken.

10. The method of claim 6, further comprising allowing a user to retrieve directions for appropriate consumption of their medication.

11. The method of claim 6, further comprising allowing a user to retrieve known and identified drug-drug interactions for the medications they are consuming.
12. The method in claim 6, further comprising allowing a user to retrieve known and identified drug-food interactions for the medications they are consuming.

13. The method of claim 6, further comprising allowing a user to retrieve known and identified side effects of the medication they are consuming.

14. The method of claim 6 claim, further comprising allowing a user to store and retrieve medical testing data.

15. The method of claim 6, further comprising allowing a user to retrieve directions for appropriate completion of medical testing protocols.

16. A method for monitoring medication consumption and/or medical testing compliance of a user.

17. The method of claim 16, wherein a user is able to store and retrieve data describing their adherence to their medication regiment and/or medical testing protocols.
18. The method of claim 16, using storage of local device timers for medication consumption and/or medical testing conduction.

19. The method of claim 16, using automatic transmission of push notification triggered by stored local device timers.

20. The method of claim 16, wherein push notification reminder of medication consumption and/or medical testing is visually displayed on a connected device of a user.

21. The method of claim 16, using user input acknowledgement of consumption of medication and/or medical testing associated with reminder notification.

22. The method of claim 16, wherein user medication consumption and/or medical testing data housed in cloud-based storage services are updated in real-time following user acknowledgement of consumption.

23. A method for the provision of limited flexibility associated with user medication consumption and/or medical testing regiment compliance for a user.
24. The method of claim 23, wherein the user is provided an option to delay medication consumption and/or medical testing for a short period.

25. The method of claim 23, wherein the user is notified of identified third party contact when medication consumption and/or medical testing acknowledgement is delayed more than 30 minutes.

26. A method for the provision of access to additional medication safety information following a lack of adherence to medication regimen.

27. The method of claim 26, wherein a user is provided with a review of medications when missed.

28. The method of claim 28, wherein known and identified side effects, drug-drug, and drug-food interactions are immediately provided following missed medication consumption.

29. A method for providing medication refill reminders based on user input data.
30. The method of claim 29, wherein a user is able to utilize cloud-based storage utilities for the storage and retrieval of the user input data describing the medication refill needs.

31. The method of claim 29, using storage of local device timers for medication refill.

32. The method of claim 29, using automatic transmission of push notification triggered by stored local device timers.

33. The method of claim 29, wherein a push notification reminder of medication refill is visually displayed on the connected device of the user.

34. The method of claim 29, using user input acknowledgement of medication reminder associated with push notification reminder.

35. A system for providing a user with immediate and secure access to dedicated emergency responders.

36. The system of claim 35, wherein user and operator data are transmitted through a single communication channel.
37. The system of claim 35, wherein user and operator voice data are encrypted prior to transmission.
FIG. 2

Internet/Cellular

Single Channel Secure Log-in

ECG Object Recognition Blueprint (O.R.B)

Cloud-Based Utilities

102

101

103
1. 101 is logged into 108 following access of the application system.

2. Following authentication, 101 gains access to cloud-based data storage instances.

3. 101 inputs medication reminder data through 102 such that data are transmitted and stored in cloud-based data storage instance and local device timer is established.

4. Device timer information stored in 108 is retrieved and a push notification is transmitted to 101 through 102 at designated time.
Would you like to take your meds now?
User positions device for camera access and shown pill in hand

User moves hand to mouth in capture area of device camera

User displays hand no longer containing medication in capture area of device camera

User swallows medication while positioning device for clear view of chin and throat

Video data are confirmed and automatically transmitted to ORB for storage

FIG. 7
1 - User places call via mobile device touch screen capabilities.
2 - Cloud-based compute capacity processed user call and assigns queued operator to call.
3 - Session information is exchanged between user device and operator.
4 - Session identification and anonymized identification is sent to user and operator so that streaming session begins.
5 - User and operator are connected to encrypted data stream.
6 - Single channel encrypted data stream is utilized to allow communication between user and operator.

FIG. 8
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - A61B 5/00; A61B 5/103; G06F 19/26; G16H 10/60; H04N 7/15 (2019.01)
CPC - G16H 10/60; A61B 5/0077; A61B 5/1128; G06K 9/00771; G16H 80/00; H04N 7/147 (2019.05)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
See Search History document

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC - 348/14.01; 348/14.08; 340/286.07; 705/2 (keyword delimited)
See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td>A</td>
<td>US 2012/0120184 A1 (FORNELL et al) 17 May 2012 (17.05.2012) entire document</td>
<td>1-5</td>
</tr>
</tbody>
</table>

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered to be of particular relevance
  "E" earlier application or patent but published on or after the international filing date
  "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referring to an oral disclosure, use, exhibition or other means
  "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search
12 July 2019

Date of mailing of the international search report
18 JUL 2019

Name and mailing address of the ISA/US
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Authorized officer
Blaine R. Copenheaver
PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7774

Form PCT/ISA/210 (second sheet) (January 2015)
<table>
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<td>This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:</td>
<td></td>
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<tr>
<td>1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:</td>
<td></td>
</tr>
<tr>
<td>2. □ Claims Nos.: because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:</td>
<td></td>
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<tr>
<td>3. □ Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).</td>
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<th>Observations where unity of invention is lacking (Continuation of item 3 of first sheet)</th>
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<tr>
<td>This International Searching Authority found multiple inventions in this international application, as follows:</td>
<td></td>
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<td>See extra sheet(s).</td>
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| 1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims. |
| 2. □ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees. |
| 3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: |
| 4. X No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-5 |

**Remark on Protest**
- □ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- □ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- □ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (2)) (January 2015)
Continued from Box No. III Observations where unity of invention is lacking

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-5, are drawn to a system capable of running on an internet and/or cellular network, the system comprising a connected device capable of providing virtual continued care.

Group II, claims 6-25, are drawn to a method for providing a user with consistent access to personalized and pertinent medication and medical testing information.

Group III, claims 26-28, are drawn to a method for the provision of access to additional medication safety information following a lack of adherence to medication regiment.

Group IV, claims 29-34, are drawn to a method for providing medication refill reminders based on user input data.

Group V, claims 35-37, are drawn to a system for providing a user with immediate and secure access to dedicated emergency responders.

The inventions listed as Groups I, II, III, IV, or V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature of the Group I invention: a system capable of running on an internet and/or cellular network, the system comprising a connected device capable of providing virtual continued care as claimed therein is not present in the invention of Groups II, III, IV, or V. The special technical feature of the Group II invention: a method for providing a user with consistent access to personalized and pertinent medication and medical testing information as claimed therein is not present in the invention of Groups I, III, IV, or V. The special technical feature of the Group III invention: a method for the provision of access to additional medication safety information following a lack of adherence to medication regiment as claimed therein is not present in the invention of Groups I, II, IV, or V. The special technical feature of the Group IV invention: a method for providing medication refill reminders based on user input data as claimed therein is not present in the invention of Groups I, II, III, or V. The special technical feature of the Group V invention: a system for providing a user with immediate and secure access to dedicated emergency responders as claimed therein is not present in the invention of Groups I, II, III, or IV.

Groups I, II, III, IV, and V lack unity of invention because even though the inventions of these groups require the technical feature of a system for providing a user with an access, this technical feature is not a special technical feature as it does not make a contribution over the prior art.

Specifically, US 2002/0196944 to Davis et al. teaches a system for providing a user with an access (Paras. [0025-0027]).

Since none of the special technical features of the Group I, II, III, IV or V inventions are found in more than one of the inventions, unity of invention is lacking.