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(72) Inventor: HOWLEY, Joseph; 9 Rock Street, Suite C, Middleboro, MA 02346 (US).

(74) Agent: GRADY, Matthew, H.; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210-2206 (US).


(54) Title: INTEGRATION PLATFORM AND APPLICATION INTERFACES FOR REMOTE DATA MANAGEMENT AND SECURITY

(57) Abstract: Various embodiments implement a multiplatform system architected to provide secure messaging between a plurality of disparate systems (e.g., mobile devices, secure cloud systems, remote locations, health monitoring devices, fitness centers, etc.), coordinate resources associated with each of the disparate systems, manage communication between proprietary applications via customized application programming interfaces (APIs) and manage reservation of resources of the disparate systems via the APIs. Further embodiments enable an extensible system architecture to incorporate additional systems. In some embodiments, the system includes a multi-layered database architecture to mediate information and access control (e.g., based on inheritable privileges, specific user classes are allowed or denied access to data in the database). In further embodiments, the data architecture is architected with access layers that ensure compliance with regulatory systems governing health data.

FIG. 1B
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>IPC(8)</th>
<th>CPC</th>
<th>According to International Patent Classification (IPC) or to both national classification and IPC</th>
</tr>
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<tbody>
<tr>
<td>G06F 15/16 (2017.01)</td>
<td>H04L29/06</td>
<td></td>
</tr>
</tbody>
</table>

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

| CPC: H04L29/06; IPC(8): G06F 15/16 (2017.01); USPC: 709/229 |

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

CPC: H04L29/0872, H04L29/06, H04L29/0809, H04L63/08, H04L63/10; USPC: 709/223, 709/229, 713/151 (keyword limited; terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatBase; Google Scholar

Search Terms: collect biologic data user device paired time series index database access tier permission remote report personnel API reservation

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>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 2014/0257047 A1 (SILLAY et al.) 11 September 2014 (11.09.2014), entire document, especially abstract and para [0151]-[0163], [0168]-[0175], [0202], [0206], [0236], [0240], [0257], [0286], Fig. 105A, Fig. 105B, Fig. 17, Fig. 38, Fig. 39.</td>
<td>1-45</td>
</tr>
<tr>
<td>A</td>
<td>US 2015/0066534 A1 (TANAKA et al.) 05 March 2015 (05.03.2015), entire document.</td>
<td>1-45</td>
</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C.

Date of the actual completion of the international search:
14 February 2017 (14.02.2017)

Date of mailing of the international search report:
24 FEB 2017

Name and mailing address of the ISA/US:
Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-8300

Authorized officer:
Lee W. Young
PCT Helpdesk: 571-272-4300
PCT OSP: 571-272-7714

Form PCT/ISA/210 (second sheet) (January 2015)
This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

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:

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).

This International Searching Authority found multiple inventions in this international application, as follows:

- see extra sheet –

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. □ 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. 1-45.

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.
In continuation of Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet):

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.

Group I: Claims 1-45, directed to a database system for executing multi-tier data and multi-platform data access requests, further comprising automatically identifying physical resources and candidate personnel required for the request, and coordinating between a plurality of locations and resource availability information associated with required resources and personnel.

Group II: Claims 46-85, directed to a database system for executing multi-tier data and multi-platform data access requests, further comprising utilizing verbal command data to control execution of a user device.

Group III: Claim 86-125, directed to a database system for executing multi-tier data and multi-platform data access requests, further comprising utilizing a plurality of APIs in conjunction with integrating physician systems with user biologic data captured at fitness centers, and scheduling trainers/training sessions.

The groups of inventions listed above 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 is automatically identifying physical resources and candidate personnel required for the request; coordinate between a plurality of locations and resource availability information associated with required resources and personnel, and wherein coordination includes executing at least a first API to capture resource availability information from one or more systems executing at at least one of the plurality of locations and wherein the first API is further configured to reserve the resources identified as required for the request and confirm the reservation of resources with the one or more systems, not required by Group II-III.

The special technical feature of the Group II invention is integrate with a first user device operatively paired with a second user device associated with a first user, wherein the first user device is configured to receive verbal commands from the first user and communicate verbal commands to the second user device; receive verbal command data from the second user device via a secure application executing on the second user device; authenticate the first user responsive to authentication input received as verbal commands received by the first user device or as input at the second user device through the secure application; change execution parameters of the first device or the second device responsive to verbal command data received from the second user device via the secure application; wherein changing the execution parameters of the first device includes at least one of: activating one or more sensors on the first device, deactivating one or more sensors of the first device, changing a data capture rate for the one or more sensors, or changing a data communication rate associated with the one or more sensors; tail audio prompts to the first user responsive to the determined user activity, not required by Group I or III.

The special technical feature of the Group III invention is execute at least a first API configured to: capture biologic data for a first user from at least one of: a first user device for monitoring health data, a second user device (e.g., mobile computing device) configured to pair with any one or more health monitoring devices, or a remote resource at a fitness center; execute at least a second API configured to: integrate physician systems and provide an interface for physician access to the first user's biologic data, wherein the second API is configured to limit access responsive to the first user providing electronic confirmation of access privileges to the first user's biologic data for a specific physician or physician group; manage trainer access to the first user's data, wherein the third API is configured to limit trainer access to biologic data collected in real time during a training sessions or to historic biologic data collected during a training session conducted by a specific trainer or trainer group; and access a plurality of fitness center systems to capture resource information and availability information associated with the resources, and reserve the resources responsive to a scheduling request; and a scheduling component, executed by the at least one processor, configured to interface with a plurality of APIs to coordinate scheduling between at least one of: a user undertaking a fitness activity, a trainer or physician to guide the fitness activity, fitness resources necessary for the fitness activity, a fitness center and internal location in which to conduct the fitness activity, not required by Group II-III.

Groups I-III share the technical features of, in various combination, utilizing at least one user device configured to be paired with at least one other device, capturing/collating biologic data for at least one user, store biologic data from at least one user as a time series indexed with a known or inferred activity of the user.

However, these shared technical features fail to represent a contribution over the prior art of US 2014/0257047 A1 to Sillay et al. (hereinafter "Sillay"), which discloses utilizing at least one user device configured to be paired with at least one other device (para [0151]-[0153]), Fig. 105A, Fig. 105B - "personal devices such as smart phones (Fig. 8) or other wearable computers (Fig. 105), which may contain data acquisition components"; "Once the data are acquired, or intermittently as the data are acquired, the data can be transferred to a server computer using wired or wireless networks or other communications media"; capturing/collating biologic data for at least one user, store biologic data from at least one user as a time series indexed with a known or inferred activity of the user (para [0151]-[0153]), "developing a special cohort database permissively from EHR records in disbursed databases with permissive data sharing"; "input components, such as an antenna, may facilitate communications with devices attached to or embedded within an individual with disease in order to either collect data from the device or to adjust parameters of the device to effect improvements in the individual with disease's comfort, well-being, health, or prognosis"; "It is desirable that OM data be collected on a regular or periodic basis (FIG. 107), either by the individual with disease or with the assistance of a caregiver, or in a clinical setting, and that the collected OM data be analyzed (FIG. 92) to determine long-term trends"; "associate with collected data a time stamp of when the data are collected".

(See next extra sheet)
In continuation of previous extra sheet:

Groups I & II share the technical features of, in various combination, utilizing at least one user device configured to be paired with at least one other device, capturing/collecting biologic data for at least one user; store biologic data from at least one user as a time series indexed with a known or inferred activity of the user; a database having an associated plurality of access tiers, the plurality of access tiers including at least a first access tier including the first user, a second access tier including additional users granted electronic permission by the first user on the system to access data associated with the first user, and an access tier for administrative functions executed by the system.

However, these shared technical features fail to represent a contribution over the prior art of Sillay, which discloses utilizing at least one user device configured to be paired with at least one other device, capturing/collecting biologic data for at least one user; store biologic data from at least one user as a time series indexed with a known or inferred activity of the user (para [0151]-[0153], Fig. 105A, Fig. 105B); a database having an associated plurality of access tiers (para [0159]) - "The disclosed medical information system can differentiate stored data into multiple groups of data, each group having different privacy or security attributes used to control the distribution or dissemination of data associated with that group", the plurality of access tiers including at least a first access tier including the first user, a second access tier including additional users granted electronic permission by the first user on the system to access data associated with the first user (para [0160]-[0163], [0206], [0240], Fig. 17 - "whereby a individual with disease or authorized individual with disease's representative can direct the exchange of individual with disease-related data, including data that contain sensitive, private, or personally-identifiable information, between servers, computers, or computer systems"; "reporting permissions matrix"; "permission-based interfacing with either insurance carriers' data systems or hospital data systems permit selected extraction of information for insurance purposes, with individual with disease consent"), and an access tier for administrative functions executed by the system (para [0176] - "a map, graph, or report may be made accessible to researchers, to a group such as individuals or organizations within a government, a company, or an association, or to administrators or medical professionals associated with clinical or hospital facilities using a Server that implements a web site on which this information is published"; "to utilize multiple Servers to process and or aggregate individual with disease data in the chain from the Server that initially stored data received from a device used by the individual with disease a individual with disease's caregiver, or a clinician or other medical professional to perform the steps of anonymization, analysis, which may include statistical modeling and analysis, aggregation, generation of specific cohort database, preparation of maps, graphs, or reports, and presentation or dissemination of the prepared data").

Groups I & III share the technical features of, in various combination, utilizing at least one user device configured to be paired with at least one other device, capturing/collecting biologic data for at least one user; store biologic data from at least one user as a time series indexed with a known or inferred activity of the user; utilizing at least one API in conjunction with scheduling and/or accessing resource availability information.

However, these shared technical features fail to represent a contribution over the prior art of Sillay, which discloses utilizing at least one user device configured to be paired with at least one other device, capturing/collecting biologic data for at least one user; store biologic data from at least one user as a time series indexed with a known or inferred activity of the user (para [0151]-[0153], Fig. 105A, Fig. 105B); utilizing at least one API in conjunction with scheduling and/or accessing resource availability information (para [0158], [0202] - "Parallel programming paradigms such as those using the Message Passing Interface (MPI) software library and Hadoop may be used to coordinate the computing activities across multiple processors and multiple physical computers"; "A unique data structure element is to be encoded in the data structure used by all exchange partners. This facilitates the addition of future modules ... and an industry interface 1510 representing, for example, device manufacturers and programmers, all communicating to form a community registry 1500 for sharing data on a permissive basis whereby the common EHR may generate specific cohort databases for specific purposes responsive to the querying entity").

Thus, the inventions listed as Groups I-III lack unity of invention because they do not share a same or corresponding special technical feature providing a contribution over the prior art.