(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
20 December 2012 (20.12.2012)   WIPO | PCT

(10) International Publication Number
WO 2012/172386 A1

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(81) **Designated States** *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) **Title:** SYSTEM AND METHOD FOR ON DEMAND DATA ENTRY

Figure 1

(57) **Abstract**: A comprehensive system for virtual data entry is disclosed. The system includes bursting data forms into multiple snippets, distributing the snippets for data entry purposes, receiving entered data from two data entry resources, validating the data and aggregating the validated data. The system utilizes optical techniques, digital image processing and enhancement methods, certification and testing processes, business rules, workflows management, load management and/or prioritization rules.

GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *with amended claims (Art. 19(1))*

SYSTEM AND METHOD FOR ON DEMAND DATA ENTRY

Field of Invention

The present disclosure generally relates to providing automated on-demand distributed data entry.

Background of the Invention

Data entry is often a time consuming and error prone task. Companies have developed systems for their customers to enter their own data (e.g., for a credit application) directly into a computing system using the Internet and associated web site functionality. However, processing of hand written data forms remains a significant task for many industries in various parts of the world. Furthermore, because of the privacy and security issues associated with some data (e.g., financial data, healthcare data, etc.) the method of data entry, and the resource that provides the data entry, can be limited.

As such, a long felt need exists for an automated, scalable, distributed, virtual data entry solution that increases the accuracy, timeliness and security of the entered data.

Summary of the Invention

Methods and systems provide an automated solution for entering, securing and verifying data. In one embodiment, the system is configured to receive a facsimile image or scanned image of handwritten data for the banking industry (e.g. a credit application), decompose the data into subparts, distribute the subparts to numerous data entry resources and reassemble the entered data.

In one embodiment, a computer based method includes receiving, by the computer, a digital image of a first form. The computer matches the first form to a first document template and uses the document template to decompose the first form into a plurality of images (or "snippets") that can be sent to a data entry resource for data entry purposes. Each snippet is associated with a field of the first document template. For each of the snippets, the computer determines a first data entry resource and a second data entry resource that can accomplish the data entry task for the snippet. The computer distributes the snippet to the first data entry resource and the second data entry resource and, in return, receives first data from the first data entry resource and second data from the second data entry resource. The computer determines final data based upon at least the first data and the

second data. Determining the final data may involve determining that there is a mismatch between the first data and the second data, and resolving the mismatch. Snippets are distributed, data is entered by entered by the respective data entry resources, final data is determined for each field of the document template and the final data is aggregated into a

5   complete data set representing verified, digitized data for the originally received digitized form.

Brief Description of the Drawings

A more complete understanding of the present inventions may be derived by
10   referring to the detailed description and claims when considered in connection with the Figures, wherein like reference numbers refer to similar elements throughout the Figures, and:

Figure 1 is a block diagram illustrating major system components for enabling a virtual data entry system, in accordance with an exemplary embodiment; and

15   Figure 2 is a flow chart illustrating an exemplary process for enabling virtual data entry in accordance with an exemplary embodiment.

Detailed Description

The systems and methods provide an improved, tangible, integrated, distributed,
20   scalable, secure, efficient and/or virtual data entry and aggregation system. An embodiment may be implemented by a system, computer readable medium or a method or any combination thereof. The systems and methods include a unique combination of one or more features associated with an automated data entry and verification system. In one embodiment, the comprehensive data management system allows a business to automate and
25   assign data entry tasks, verify data accuracy, implement and prioritize work flows, manage data entry resources (e.g., data entry contractors) and/or improve data security. The system may be implemented as a web-based system that provides a data entry interface to geographically distributed data entry resources.

Exemplary benefits of the system include providing increased security, accuracy,
30   speed and/or flexibility for data entry tasks. For example, the system decomposes image data into sub-elements called snippets and distributes the snippets to a distributed network of data entry resources in order to increase data entry speeds and/or to protect confidentiality of sensitive data. Since no data entry resource is assigned a complete "picture" of data, the

customer data confidentiality is protected. Efficiencies are gained by allowing for distributed processing and on demand acquisition of data entry resources. The system allows management to set data entry task priorities, monitor status, implement incentive based pay and constantly evaluate data accuracy at the data entry resource level.

5   The detailed description of exemplary embodiments herein makes reference to the accompanying drawings and pictures, which show the exemplary embodiment by way of illustration and its best mode. While these exemplary embodiments are described in sufficient detail to enable those skilled in the art to practice the disclosure, it should be understood that other embodiments may be realized and that logical and mechanical changes

10   may be made without departing from the spirit and scope of the disclosure. Thus, the detailed description herein is presented for purposes of illustration only and not of limitation. For example, the steps recited in any of the method or process descriptions may be executed in any order and are not limited to the order presented. Moreover, any of the functions or steps may be outsourced to or performed by one or more third parties.

15   Furthermore, any reference to singular includes plural embodiments, and any reference to more than one component may include a singular embodiment.

          Systems, methods and computer program products for virtual and/or distributed data entry are provided. In the detailed description herein, references to "one embodiment", "an embodiment", "an example embodiment", etc., indicate that the embodiment described may

20   include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular feature, structure, or characteristic. Moreover, such phrases are not necessarily referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with an embodiment, it is submitted that it is within the knowledge of one skilled in the art to affect such feature,

25   structure, or characteristic in connection with other embodiments whether or not explicitly described. After reading the description, it will be apparent to one skilled in the relevant art(s) how to implement the disclosure in alternative embodiments.

          In various embodiments, the methods described herein are implemented using the various particular machines described herein. The methods described herein may be

30   implemented using the below particular machines, and those hereinafter developed, in any suitable combination, as would be appreciated immediately by one skilled in the art. Further, as is unambiguous from this disclosure, the methods described herein may result in various transformations of certain articles.

For the sake of brevity, conventional data networking, application development and other functional aspects of the systems (and components of the individual operating components of the systems) may not be described in detail herein. Furthermore, the connecting lines shown in the various figures contained herein are intended to represent

5   exemplary functional relationships and/or physical couplings between the various elements. It should be noted that many alternative or additional functional relationships or physical connections may be present in a practical system.

In one embodiment, the system includes a user interface (UI), a software module, logic engines, numerous databases and computer networks. While the system may

10   contemplate upgrades or reconfigurations of existing processing systems, changes to existing databases and system tools are not necessarily required by the system and method.

While the description references specific technologies, hardware, equipment, system architectures and data management techniques, practitioners will appreciate that this description is but one embodiment and that other devices and/or methods may be

15   implemented without departing from the scope of the invention. Similarly, while the description may reference a user interfacing with the system via a personal computer user interface, practitioners will appreciate that other interfaces may include mobile devices, kiosks and handheld devices such as personal digital assistants.

"Entity" includes any individual, consumer, customer, contractor, group, business,

20   organization, government entity, merchant, consortium of merchants, account holder, charitable organization, software, hardware, and/or any other entity.

"User" may include any entity that interacts with a system.

"Data entry resource" includes any user that provides data entry services.

Figure 1 shows block diagram illustrating major system components for enabling

25   virtual data entry system ("VDES") 115. Users of the VDES 115 include internal resources (e.g., company employees) and external resources (e.g., data entry resources and/or contractors). These participants interact with the VDES 115 via user interfaces. In various embodiments, the system may include online entry forms, workload management interfaces, a system dashboard, online training and testing interfaces, and the like. System 100

30   facilitates interaction between a user 105 and VDES 115 through, in one embodiment, client 110 with a network connection to an Internet server 125 by way of the Internet. In one embodiment, Internet server 125 employs authentication server 130 to validate credentials,

assign proper permissions, and retrieve preferences information for authorized user's 105 of VDES 115.

In an embodiment, Internet server 125 employs application server 145 to manage various applications and utilities that are utilized by system 100. In an embodiment, application server utilizes APL+Win, Richfaces JBPM, and other Java libraries (jQuery and Javascript), JBOSS, JAX-WS, Apache POI, and Quartz. In various embodiments, Internet server 125 interacts directly with the various systems and components disclosed herein.

System 100 may include any number of computing platforms and databases such as, for example, data entry management engine (DEME) 147, workflow engine 148 and central data repository (CDR) 150. Other systems may include, for example, accounting systems, financial transaction systems, reporting systems, new accounts systems, management information systems, business information systems, external data sources, proprietary systems and the like. Each of the systems may be interconnected within by a network in via any method and/or device described herein. A middleware server and/or application server 145 may serve as an intermediary between the various systems to ensure appropriate communications between disparate platforms. A report engine retrieves and/or is provided with data from certain of the various systems in order to generate notices, bills, contracts, messages, audit reports, and the like.

System 100, VDES 115 and/or any other components discussed herein may further include one or more of the following a host server or other computing systems including a processor for processing digital data; a memory coupled to the processor for storing digital data; an input digitizer coupled to the processor for inputting digital data; an application program stored in the memory and accessible by the processor for directing processing of digital data by the processor; a display device coupled to the processor and memory for displaying information derived from digital data processed by the processor; and a plurality of databases. Various databases used herein may include: client data; merchant data; financial institution data; and/or like data useful in the operation of the system. As those skilled in the art will appreciate, user computer may include an operating system (e.g., Windows NT, 95/98/2000, XP, Vista, OS2, UNIX, Linux, Solaris, MacOS, etc.) as well as various conventional support software and drivers typically associated with computers.

As will be appreciated by one of ordinary skill in the art, one or more of the components of system 100 may be embodied as a customization of an existing system, an add-on product, upgraded software, a stand alone system (e.g., kiosk), a distributed system,

a method, a data processing system, a device for data processing, a computer and/or a computer program product. Accordingly, individual system 100 components may take the form of an entirely software embodiment, an entirely hardware embodiment, or an embodiment combining aspects of both software and hardware. In one embodiment, a

5   system 100 component (e.g. a computer) may include a processor, a memory, a communications interface, a network interface, etc. Furthermore, individual system 100 components may take the form of a computer program product on a computer-readable storage medium having computer-readable program code means embodied in the storage medium. Any suitable computer-readable storage medium may be utilized, including hard

10   disks, CD-ROM, flash memory, optical storage devices, magnetic storage devices, and/or the like.

The system contemplates uses in association with web services, transaction processing, utility computing, pervasive and individualized computing, security and identity solutions, autonomic computing, commodity computing, mobility and wireless solutions,

15   open source, biometrics, grid computing and/or mesh computing.

User 105 may include any user or entity that utilizes system 100 or accesses system 100 functionality. User 105 may include, for example, a remote individual that has participated in a system 100 registration, testing and/or certification process and who is available to perform assigned data entry tasks. User 105 may also include an internal user or

20   system administrator. User 105 may also include a computer program or other automated logic engine that performs data entry, interpretation, validation, authentication, etc. In various embodiments, user 105 may interface with VDES 115 via any communication protocol, device or method discussed herein or known in the art.

Client 110 comprises any hardware and/or software suitably configured to facilitate

25   requesting, retrieving, updating, analyzing, entering and/or modifying data. For example, in one embodiment, client 110 is configured to facilitate input, analysis and/or review of information relating to data entry or work queue management. Client 110 includes any device (e.g., personal computer) which communicates (in any manner discussed herein) with VDES 115 via any network discussed herein. For example, user 105 may interact with

30   VDES 115 by way of an Internet browser at client 110. Such browser applications comprise Internet browsing software installed within a computing unit or system to conduct online transactions and/or communications. These computing units or systems may take the form of a computer or set of computers, although other types of computing units or systems may

be used, including laptops, notebooks, hand held computers, set-top boxes, workstations, computer-servers, main frame computers, mini-computers, PC servers, pervasive computers, network sets of computers, and/or the like. Practitioners will appreciate that client 110 may or may not be in direct contact with VDES 115. For example, client 110 may access the

5   data, logic or services of VDES 115 through another server, which may have a direct or indirect connection to Internet server 125. Client 110 may be mobile or may be located in a home or business environment with access to a network. In an exemplary embodiment, access is through a network or the Internet through a commercially-available web-browser software package.

10   As those skilled in the art will appreciate, client 110 includes an operating system (e.g., Windows NT, 95/98/2000, OS2, UNIX, Linux, Solaris, MacOS, Android, iPhone OS etc.) as well as various conventional support software and drivers typically associated with computers or computing devices. Client 110 may include any suitable personal computer, mobile device, phone, network computer, workstation, minicomputer, mainframe or the like.

15   Client 110 can be in a home or business environment with access to a network. In an exemplary embodiment, access is through a network or the Internet through a commercially available web-browser software package.

Client 110 may be independently, separately or collectively suitably coupled to the network via data links which includes, for example, a connection to an Internet Service

20   Provider (ISP) over the local loop as is typically used in connection with standard modem communication, cable modem, Dish networks, ISDN, Digital Subscriber Line (DSL), or various wireless communication methods, see, e.g., Gilbert Held, Understanding Data Communications (1996), which is hereby incorporated by reference. It is noted that the network may be implemented as other types of networks, such as an interactive television

25   (ITV) network.

Client 110 may include any number of applications, code modules, cookies, and the like to facilitate interaction with VDES 115 in order to, for example, input data, complete templates/forms, view reports, validate data, approve data, manage workflow, submit payment requests, etc. In one embodiment, client 110 may store user 105 preferences and/or

30   any other information disclosed herein on a hard drive or any other local memory device. Accordingly, client 110 may retrieve and store user information within a memory structure of client 110 in the form of a browser cookie, for example. In another embodiment, client

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110 retrieves information relating to user 105 from VDES 115 on establishing a session with Internet server 125.

Firewall 120, as used herein, may comprise any hardware and/or software suitably configured to protect VDES 115 components from users of other networks. Firewall 120 may reside in varying configurations including stateful inspection, proxy based and packet filtering among others. Firewall 120 may be integrated as software within Internet server 125, any other VDES 115 components or may reside within another computing device or may take the form of a standalone hardware component. Although depicted as a single firewall in Figure 1, one skilled in the art will recognize that a firewall or multiple firewalls may be implemented throughout system 100 to enable system and data security.

Internet server 125 may include any hardware and/or software suitably configured to facilitate communications between client 110 and one or more VDES 115 components. Further, Internet server 125 may be configured to transmit data to client 110 within markup language documents (e.g., XML, HTML, etc.). As used herein, "data" may include encompassing information such as commands, queries, business rules, algorithms, images, files, data for storage, and/or the like in digital or any other form. Internet server 125 may operate as a single entity in a single physical location or as separate computing components located together or in separate physical locations.

Internet server 125 may provide a suitable web site, web service, browser based application or other Internet-based graphical user interface which is accessible by consumers. In an embodiment, Internet server 125 employs RedHat Linux Enterprise 5.x Server and Apache Http server. In one embodiment, the Microsoft Internet Information Server (IIS), Microsoft Transaction Server (MTS), and Microsoft SQL Server, are used in conjunction with the Microsoft operating system, Microsoft NT web server software, a Microsoft SQL Server database system, and a Microsoft Commerce Server. Additionally, components such as Access or Microsoft SQL Server, Oracle, Sybase, Informix MySQL, InterBase, etc., may be used to provide an Active Data Object (ADO) compliant database management system.

Any of the communications, inputs, storage, databases or displays discussed herein may be facilitated through a web site having web pages. The term "web page" as it is used herein is not meant to limit the type of documents and applications that might be used to interact with the user. For example, a typical web site might include, in addition to standard HTML documents, various forms, Java applets, JavaScript, active server pages (ASP),

common gateway interface scripts (CGI), extensible markup language (XML), dynamic HTML, cascading style sheets (CSS), helper applications, plug-ins, and/or the like. A server may include a web service that receives a request from a web server, the request including a URL (e.g. http://yahoo.com/stockquotes/ge) and an IP address (e.g. 123.4.56.789). The web

5   server retrieves the appropriate web pages and sends the data or applications for the web pages to the IP address. Web services are applications that are capable of interacting with other applications over a communications means, such as the Internet. Web services are typically based on standards or protocols such as XML, SOAP, WSDL and UDDI. Web services methods are well known in the art, and are covered in many standard texts. See,

10 e.g., Alex Nghiem, IT Web Services: A Roadmap for the Enterprise (2003), hereby incorporated by reference.

In order to control access to components of VDES 115, Internet server 125 may invoke authentication server 130 in response to user 105 submissions of authentication credentials received at Internet server 125 from client 110. Authentication server 130 may

15 include any hardware and/or software suitably configured to receive authentication credentials, encrypt and decrypt credentials, authenticate credentials, and grant access rights according to privileges (e.g., pre-defined privileges) attached to the credentials. Authentication server 130 may grant varying degrees of application and data level access to users based on information stored within a database and/or any other known memory

20 structure.

DEME 147 comprises hardware and/or software modules that execute processes, access data from CDE 150 and interact with workflow engine 148 to enable the functionality of VDES 115. For example, DEME 147 may include a software module that manages and prioritizes work tasks and distributes data entry tasks to various data entry resources.

25 Workflow engine 148 comprises hardware and/or software modules that implement process and task definition, tracking, prioritization and execution. Workflow engine 148 may comprise one or more software applications, modules or data objects (e.g., IBM's® FileNet® P8 Platform). The software may be any executable code written in any software programming language, such as, for example Java®. For example, workflow engine 148

30 reads data from CDE 150 and instantiates a data object (e.g. a Java Bean®) to store the data for use by software modules or other objects. In one embodiment, workflow engine 148 executes an automated or partially automated process such as data entry task load balancing. In an embodiment, workflow engine 148 enables users 105 to document a process and track

progress toward completion of the process. Workflow engine 145 reads schedules, sends notices and triggers report creation.

CDE 150 may include any hardware and/or software suitably configured to facilitate storing data relating to, for data input forms, digitized forms, input data, user profiles,

5   business rules, security rules, task prioritization, legal requirements, data matching algorithms, and the like. In one embodiment CDE 150 stores a data dictionary that defines data fields for a plurality of document templates each comprising a plurality of fields. CDE also stores snippets (e.g., or decomposed segments of data entry images).

One skilled in the art will appreciate that system 100 may employ any number of

10   databases in any number of configurations. Further, any databases discussed herein may include relational, hierarchical, graphical, or object-oriented structure and/or any other database configurations. Common database products that may be used to implement the databases include DB2 by IBM (Armonk, NY), various database products available from Oracle Corporation (Redwood Shores, CA), Microsoft Access or Microsoft SQL Server by

15   Microsoft Corporation (Redmond, Washington), MySQL by MySQL AB (Uppsala, Sweden), or any other suitable database product. Moreover, the databases may be organized in any suitable manner, for example, as data tables or lookup tables. Each record may be a single file, a series of files, a linked series of data fields or any other data structure. Association of certain data may be accomplished through any desired data association

20   technique such as those known or practiced in the art. For example, the association may be accomplished either manually or automatically. Automatic association techniques may include, for example, a database search, a database merge, GREP, AGREP, SQL, using a key field in the tables to speed searches, sequential searches through all the tables and files, sorting records in the file according to a known order to simplify lookup, and/or the like.

25   The association step may be accomplished by a database merge function, for example, using a "key field" in pre-selected databases or data sectors. Various database tuning steps are contemplated to optimize database performance. For example, frequently used files such as indexes may be placed on separate file systems to reduce In/Out ("I/O") bottlenecks.

More particularly, a "key field" partitions the database according to the high-level

30   class of objects defined by the key field. For example, certain types of data may be designated as a key field in a plurality of related data tables and the data tables may then be linked on the basis of the type of data in the key field. The data corresponding to the key field in each of the linked data tables is preferably the same or of the same type. However,

data tables having similar, though not identical, data in the key fields may also be linked by using AGREP, for example. In accordance with one embodiment, any suitable data storage technique may be utilized to store data without a standard format. Data sets may be stored using any suitable technique, including, for example, storing individual files using an ISO/IEC 7816-4 file structure; implementing a domain whereby a dedicated file is selected that exposes one or more elementary files containing one or more data sets; using data sets stored in individual files using a hierarchical filing system; data sets stored as records in a single file (including compression, SQL accessible, hashed via one or more keys, numeric, alphabetical by first tuple, etc.); Binary Large Object (BLOB); stored as ungrouped data elements encoded using ISO/IEC 7816-6 data elements; stored as ungrouped data elements encoded using ISO/IEC Abstract Syntax Notation (ASN.1) as in ISO/IEC 8824 and 8825; and/or other proprietary techniques that may include fractal compression methods, image compression methods, etc.

In one exemplary embodiment, the ability to store a wide variety of information in different formats is facilitated by storing the information as a BLOB. Thus, any binary information can be stored in a storage space associated with a data set. As discussed above, the binary information may be stored on the financial transaction instrument or external to but affiliated with the financial transaction instrument. The BLOB method may store data sets as ungrouped data elements formatted as a block of binary via a fixed memory offset using either fixed storage allocation, circular queue techniques, or best practices with respect to memory management (*e.g.*, paged memory, least recently used, etc.). By using BLOB methods, the ability to store various data sets that have different formats facilitates the storage of data associated with the financial transaction instrument by multiple and unrelated owners of the data sets. For example, a first data set which may be stored may be provided by a first party, a second data set which may be stored may be provided by an unrelated second party, and yet a third data set which may be stored, may be provided by an third party unrelated to the first and second party. Each of these three exemplary data sets may contain different information that is stored using different data storage formats and/or techniques. Further, each data set may contain subsets of data that also may be distinct from other subsets.

One skilled in the art will also appreciate that, for security reasons, any databases, systems, devices, servers or other components of system 100 may consist of any combination thereof at a single location or at multiple locations, wherein each database or

system 100 includes any of various suitable security features, such as firewalls, access codes, encryption, decryption, compression, decompression, and/or the like.

As used herein, the term "network" includes any cloud, cloud computing system or electronic communications system or method which incorporates hardware and/or software

5   components. Communication among the parties may be accomplished through any suitable communication channels, such as, for example, a telephone network, an extranet, an intranet, Internet, point of interaction device (point of sale device, personal digital assistant (e.g., iPhone®, Palm Pilot®, Blackberry®), cellular phone, kiosk, etc.), online communications, satellite communications, off-line communications, wireless

10   communications, transponder communications, local area network (LAN), wide area network (WAN), virtual private network (VPN), networked or linked devices, keyboard, mouse and/or any suitable communication or data input modality. Moreover, although the system is frequently described herein as being implemented with TCP/IP communications protocols, the system may also be implemented using IPX, Appletalk, IP-6, NetBIOS, OSI,

15   any tunneling protocol (e.g. IPsec, SSH), or any number of existing or future protocols. If the network is in the nature of a public network, such as the Internet, it may be advantageous to presume the network to be insecure and open to eavesdroppers. Specific information related to the protocols, standards, and application software utilized in connection with the Internet is generally known to those skilled in the art and, as such, need not be detailed

20   herein. See, for example, Dilip Naik, Internet Standards and Protocols (1998); Java 2 Complete, various authors, (Sybex 1999); Deborah Ray and Eric Ray, Mastering HTML 4.0 (1997); and Loshin, TCP/IP Clearly Explained (1997) and David Gourley and Brian Totty, HTTP, The Definitive Guide (2002), the contents of which are hereby incorporated by reference.

25   The various system components may be independently, separately or collectively suitably coupled to the network via data links which includes, for example, a connection to an Internet Service Provider (ISP) over the local loop as is typically used in connection with standard modem communication, cable modem, Dish networks, ISDN, Digital Subscriber Line (DSL), or various wireless communication methods, see, e.g., Gilbert Held,

30   Understanding Data Communications (1996), which is hereby incorporated by reference. It is noted that the network may be implemented as other types of networks, such as an interactive television (ITV) network. Moreover, the system contemplates the use, sale or

distribution of any goods, services or information over any network having similar functionality described herein.

"Cloud" or "Cloud computing" includes a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Cloud computing may include location-independent computing, whereby shared servers provide resources, software, and data to computers and other devices on demand. For more information regarding cloud computing, see the NIST's (National Institute of Standards and Technology) definition of cloud computing at http://csrc.nist.gov/groups/SNS/cloud-computing/cloud-def-v15.doc (last visited February 4, 2011), which is hereby incorporated by reference in its entirety.

As used herein, "transmit" may include sending electronic data from one system component to another over a network connection. Additionally, as used herein, "data" may include encompassing information such as commands, queries, files, data for storage, and the like in digital or any other form.

The invention may be described herein in terms of functional block components, screen shots, optional selections and various processing steps. It should be appreciated that such functional blocks may be realized by any number of hardware and/or software components configured to perform the specified functions. For example, system 100 may employ various integrated circuit components, e.g., memory elements, processing elements, logic elements, look-up tables, and/or the like, which may carry out a variety of functions under the control of one or more microprocessors or other control devices.

Similarly, the software elements of system 100 may be implemented with any programming or scripting language such as C, C++, JBOSS, GWT, Java, COBOL, assembler, PERL, Visual Basic, SQL Stored Procedures, extensible markup language (XML), with the various algorithms being implemented with any combination of data structures, objects, processes, routines or other programming elements. Software elements (e.g., modules, engines, etc) may be implemented as a web service. In an embodiment, web services are implemented using Webservice Interoperability Organization Basic Profile 1.1.

In an embodiment, various components, modules, and/or engines of system 100 may be implemented as micro-applications or micro-apps. Micro-apps are typically deployed in the context of a mobile operating system, including for example, a Palm mobile operating

system, a Windows mobile operating system, an Android Operating System, Linux, Apple iOS, a Blackberry operating system and the like. The micro-app may be configured to leverage the resources of the larger operating system and associated hardware via a set of predetermined rules which govern the operations of various operating systems and hardware

5   resources. For example, where a micro-app desires to communicate with a device or network other than the mobile device or mobile operating system, the micro-app may leverage the communication protocol of the operating system and associated device hardware under the predetermined rules of the mobile operating system. Moreover, where the micro-app desires an input from a user, the micro-app may be configured to request a

10   response from the operating system which monitors various hardware components and then communicates a detected input from the hardware to the micro-app.

Further, it should be noted that system 100 may employ any number of conventional techniques for data transmission, signaling, data processing, network control, and/or the like. Still further, system 100 could be used to detect or prevent security issues with a client-side

15   scripting language, such as JavaScript, VBScript or the like. For a basic introduction of cryptography and network security, see any of the following references: (1) "Applied Cryptography: Protocols, Algorithms, And Source Code In C," by Bruce Schneier, published by John Wiley & Sons (second edition, 1995); (2) "Java Cryptography" by Jonathan Knudson, published by O'Reilly & Associates (1998); (3) "Cryptography &

20   Network Security: Principles & Practice" by William Stallings, published by Prentice Hall; all of which are hereby incorporated by reference.

These software elements may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions that execute on the computer or other programmable data

25   processing apparatus create means for implementing the functions specified in the flowchart block or blocks. These computer program instructions may also be stored in a computer-readable memory (or "computer-readable medium") that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture

30   including instruction means which implement the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational steps to be performed on the computer or other programmable apparatus to produce a computer-

implemented process such that the instructions which execute on the computer or other programmable apparatus provide steps for implementing the functions specified in the flowchart block or blocks.

Accordingly, functional blocks of the block diagrams and flowchart illustrations

5   support combinations of means for performing the specified functions, combinations of steps for performing the specified functions, and program instruction means for performing the specified functions. It will also be understood that each functional block of the block diagrams and flowchart illustrations, and combinations of functional blocks in the block diagrams and flowchart illustrations, can be implemented by either special purpose

10   hardware-based computer systems which perform the specified functions or steps, or suitable combinations of special purpose hardware and computer instructions. Further, illustrations of the process flows and the descriptions thereof may make reference to user windows, web pages, web sites, web forms, prompts, etc. Practitioners will appreciate that the illustrated steps described herein may comprise in any number of configurations

15   including the use of windows, web pages, web forms, popup windows, prompts and/or the like. It should be further appreciated that the multiple steps as illustrated and described may be combined into single web pages and/or windows but have been expanded for the sake of simplicity. In other cases, steps illustrated and described as single process steps may be separated into multiple web pages and/or windows but have been combined for simplicity.

20   Practitioners will appreciate that there are a number of methods for displaying data within a browser-based document. Data may be represented as standard text or within a fixed list, scrollable list, drop-down list, editable text field, fixed text field, pop-up window, and/or the like. Likewise, there are a number of methods available for modifying data in a web page such as, for example, free text entry using a keyboard, selection of menu items,

25   check boxes, option boxes, and/or the like.

VDES 115 enables user 105 (e.g., a data entry resource) to receive data entry task, accept data entry tasks, complete data entry, submit requests for payment, participate in training and certification programs, etc. VDES 115 combines unique standardization, process improvement, workflow, data integration, searching, and data security features to

30   enable a seamless, feature-rich virtual data entry system. Furthermore, while embodiments may be described in terms of providing a virtual data entry system for the banking industry, practitioners will appreciate that the present invention enables any type of data management,

security, verification, validation, decomposition and/or aggregation for any type of data in any industry and/or for any task that lends itself to decentralized, distributed work processes.

Referring again to Figure 1, in one embodiment, when user 105 logs onto an application, Internet server 125 may invoke an application server 145. Application server

5   145 invokes logic in the DEME 147 by passing parameters relating to the user's 105 requests. VDES 115 manages requests for data from DEME 147 and communicates with system 101 components. Transmissions between user 105 and Internet server 125 may pass through a firewall 120 to help ensure the integrity of VDES 115 components. Practitioners will appreciate that the invention may incorporate any number of security schemes or none

10   at all. In one embodiment, Internet server 125 receives requests from client 110 and interacts with various other system 100 components to perform tasks related to requests from client 110.

Internet server 125 may invoke an authentication server 130 to verify the identity of user 105 and assign roles, access rights and/or permissions to user 105. In order to control

15   access to the application server 145 or any other component of VDES 115, Internet server 125 may invoke an authentication server 130 in response to user 105 submissions of authentication credentials received at Internet server 125. When a request to access VDES 115 is received from Internet server 125, Internet server 125 determines if authentication is required and transmits a prompt to client 110. User 105 enters authentication data at client

20   110, which transmits the authentication data to Internet server 125. Internet server 125 passes the authentication data to authentication server which queries the user database 140 for corresponding credentials. When user 105 is authenticated, user 105 may access various applications and their corresponding data sources.

With reference now to Figure 2, in one embodiment, VDES 115 is configured to

25   facilitate entry of data received from manual and/or hand written forms. A form may be a credit application, an account application, a customer profile form, a customer request form or the like. For example, a form may be filled out by a customer and submitted to an entity (e.g. a bank) for processing. The form may scanned, uploaded or may be submitted via facsimile and received by VDES 115. Thus, VDES 115 receives a digital image of a form

30   (Step 205).

In an embodiment, VDES 115 performs various digital image enhancement and processing techniques in order to improve the digital image quality. Such techniques may include, for example, line removal, noise removal, de-skewing, auto rotation, border

removal, scaling, blank page detection, format conversion, compression, decompression, cropping, dilating, sharpening, soothing, rotating, zooming, brightness adjustment and/or contrast adjustment.

VDES 115 matches the submitted digital image with a document template (Step 210). In an embodiment, the data forms that are to be filled out and submitted by customers are stored as document templates in CDR 150. Each form is decomposed into various data fields and metadata defining the fields, data validation rules, data security and privacy rules, input requirements, etc. are also stored in CDR 150. Based upon the document template that has been identified as matching the digital image, VDES 115 decomposes the digital image into multiple data entry images (Step 215). In an embodiment, such data entry images or "snippets" comprise a unit of work for a data entry resource.

In the illustrated embodiment, VDES 115 determines two data entry resources for each data entry image (Step 220). In an embodiment, both a first data entry resource and a second data entry resource may be a human user. In other embodiments, data entry resources may be computer programs or other automated machine processes. VDES 115 distributes the first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource (Step 225). The first data entry image is associated with a first data entry field of the matched document template. In an embodiment, distributing the first data entry field may include assigning the first data entry image as an assigned task for a data entry resource. For example, the data entry resource (i.e., user 105) may have a work management interface that displays work units or tasks that have been assigned to the resource. In one embodiment the work management interface allows a resource to choose which tasks to work on.

In an embodiment, distributing the first data entry field to a resource may include transmitting data associated with the data entry field to a user interface of the resource. For example, a data entry resource may be logged in to VDES 115 or otherwise registered with VDES 115 to indicate that the data entry resource is available to complete assigned tasks. The resource receives an assigned task at client 110. The assigned task includes the digital image snippet, form information and/or data entry rules or guidelines. The data entry resource enters data based upon the snippet and submits (e.g., transmits) the entered data to VDES 115.

VDES 115 receives first data from the first data entry resource and second data from the second data entry resource (Step 230). VDES 115 determines final data based upon at

least the first data and the second data entered by the respective data entry resources (Step 235). In an embodiment, data accuracy and integrity is ensured by comparing the data from the two different data entry resources. If the first data and the second data are different, VDES 115 employs mismatch data processes in order to reconcile the mismatch. For example, VDES 115 may distribute the snippet to a third data entry resource and attempt to determine a best match from among the three data entry inputs received from the three data entry resources. In an embodiment, VDES 115 may resolve a mismatch via self learning; that is, VDES is configured to analyze data entered for a particular input field based upon historical data entered for the same or similar filed and apply a rule set based upon the historical data that resolves the data mismatch. In this way VDES 115 may be configured to employ artificial intelligence technology or aspects of an expert system in order to aid in data mismatch reconciliation. In one embodiment, VEDS may employ manual inspection to resolve a data mismatch. For example, a quality assurance user may be employed to inspect and resolve data mismatches by, for example, conducting follow up research and/or follow up contact with an entity (e.g. a customer) associated with the data.

VDES 115 may also be configured with sophisticated resource registration, testing and certification components. In an embodiment, data entry resources are administered testing and other evaluation techniques for data entry speed, language skills, industry knowledge, confidentiality/trustworthiness, data entry accuracy etc. VDES 115 evaluates and rates data entry resources and, in some embodiments, provides certification for various data entry tasks and/or task types. For example, based upon a high speed rating but a low accuracy rating, a first data entry resource may be certified for basic data entry but not for mission critical data entry. Similarly, a second data entry resource may be certified to handle highly sensitive or confidential data but not certified for data entry tasks for which data entry speed is desirable.

In an embodiment, DEME 147 includes a task prioritization engine. The task prioritization engine optimizes use of data entry resources, balances work loads, schedules tasks, monitors task completion, reassigns tasks, tracks resource availability, and/or the like. For example, DEME 147 may determine two data entry resources for each data entry task (e.g., snippet). DEME 147 may determine which resources to assign a particular task based upon a variety of factors such as a skill level, a pay rate, an accuracy rate, a data entry speed, a language, a country, a certification level, a workload and/or an availability associated with a data entry resource. For example, DEME 147 may minimize cost by choosing a data entry

resource with a low pay rate. Or, DEME 147 may choose a data entry resource located in a particular country (e.g., India) due to a legal requirement associated with the data or industry involved.

In an embodiment, VDES 115 compiles statistics regarding a variety of tasks and
5   entities associated with the system and uses the statistics to increase system efficiency. For example, VDES 115 may be configured to track and store detailed speed and accuracy information for a data entry resource (e.g. a particular user 105), a type of data entry resource (e.g., human user or machine) and/or a region or other demographic associated with a data entry resource (e.g., users in Western Australia entering numeric data while working a
10   night shift). VDES 115 analyzes the statistics in order to create task assignment strategies and other algorithms for managing work loads. VDES 115 also uses the statistics in order to track efficiencies of the data entry resources and determine when a recertification may be recommended. VDES 115 also enables incentive based pay by offering or adjusting a pay rate for a particular resource to address superior (or sub-par) performance.

15   In one embodiment, VDES 115 manages the on-demand nature of fluctuating work loads by formulating offers (e.g. pay rates) for particular work completed during a particular time. For example, if a bank expects an influx of new credit applications, VDES 115 may be configured to forecast the increased workload associated with processing the influx. VDES 115 sends offers to a subset of data entry resources offering an increased pay rate for
20   a given period of time. In various embodiments, VDES 115 may determine a pay rate for a data entry resource based upon an anticipated work load, a skill level, a data entry accuracy, a data entry speed, a country, a language skill, a security level, a user availability or any combination of these and other factors.

As described above, DEME 147 increases security associated with data entry by
25   decomposing digital images into a number of disassociated fields. For example, a data entry resource may be sent a snippet of a first name of a person applying for a credit card with instructions to type in the data and submit it to VDES 115. However, the data entry resource may not be sent the snippet associated with the applicant's last name or with the applicant's address. Furthermore, depending on the security level and other factors the data entry
30   resource may not be made aware what the snippet pertains to (e.g., whether it is data for a credit application or for an account with the local telephone company). For some data fields, an increased level of security is desired. In this case, a data image may be further decomposed into sub-snippets before distributing to data entry resources for entry into

VDES 115. For example, a credit card number may be arbitrarily split by DEME 147 into two separate data fields and the two parts sent to separate data entry resources so that any single data entry resource never has knowledge of a complete credit card number.

In an embodiment, VDES 115 security is also enhanced using a system time out feature. For example, a data entry resource (i.e. user 105) may log into VDES 115 and begin receiving data entry tasks (e.g. snippet for data entry). The system may detect that data entry has slowed or stopped and automatically log the data entry resource off the system. In an embodiment, VDES 115 is configured to reassign a data entry task if the task has not been completed within a particular timeframe. The timeframe may be a set amount of time or may be a calculation based upon a variety of factors such as the complexity or length of to the data entry task. In an embodiment, VDES 115 is also configured to help ensure data accuracy by monitoring error rates for data entry resources and revoking a certification level or system privileges all together if a error rate surpasses a particular threshold in a particular period of time; for example VDES 115 may implement a rule that revokes privileges for a first data entry resource if the average error rate surpasses $X\%$ twice during any given month.

In one embodiment, the timeframes may be associated with a service level agreement ("SLA"). For example, VDES 115 may provide virtual data entry services for, for example, multiple business units of the same company or for multiple companies. Whatever the case, different entities often have different needs for the speed and accuracy associated with various data processing tasks. Thus, VDES 115 is configured to track and manage SLA's. For example, VDES 115 may assign a particular set of data entry tasks to a particular type of data entry resource based upon an SLA that promises high accuracy and a maximum processing time of, for example, twenty four hours. VDES 115 is further configured to proactive manage SLA commitments by adjusting task assignments.

In an embodiment, VDES 115 also includes a management user interface. The management user interface may be a "dashboard" or other console like interface. The dashboard is useful for providing a consolidated view of operations being conducted by VDES 115. For example, the dashboard shows unassigned data entry tasks, assigned data entry tasks, resource availability, resource demographics, average resource pay rate, accuracy rates, speed data, mismatch reconciliation tasks, priority data, and/or the like. The management dashboard also includes planning and forecasting functionality and allows management to run simulations in order to help plan for future activities. In an embodiment,

VDES 115 enables determining a work load associated with, for example, a number of received digital images, a forecast, a data entry completion rate or an error rate, and generating a task plan to assign the a plurality of associated data entry tasks to data entry resources. The dashboard also provides a reporting interface that may be used to generate and distribute reports and an accounting interface that aids in distributing payments to data entry resources.

Benefits, other advantages, and solutions to problems have been described herein with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and any elements that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as critical, required, or essential features or elements of the invention. The scope of the invention is accordingly to be limited by nothing other than the appended claims, in which reference to an element in the singular is not intended to mean "one and only one" unless explicitly so stated, but rather "one or more." Moreover, where a phrase similar to 'at least one of A, B, or C' is used in the claims or specification, it is intended that the phrase be interpreted to mean that A alone may be present in an embodiment, B alone may be present in an embodiment, C alone may be present in an embodiment, or that any combination of the elements A, B and C may be present in a single embodiment; for example, A and B, A and C, B and C, or A and B and C. All structural, chemical, and functional equivalents to the elements of the above-described exemplary embodiments that are known to those of ordinary skill in the art are expressly incorporated herein by reference and are intended to be encompassed by the present claims. Further, a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus.

We Claim:

1.   A distributed outsourcing system, comprising:

a network interface communicating with a memory;

the memory communicating with a processor for distributed outsourcing, wherein the

5   memory stores a computer program; and

the processor, when executing the computer program, performs operations comprising:

receiving, by the processor, a first digital image of a first form;

matching, by the processor, the first digital image to a first document template in a

10   plurality of document templates each comprising a plurality of fields;

decomposing, by the processor and based upon the document template, the first form into a plurality of data entry images each associated with a data entry field of the first document template;

determining, by the processor, a first data entry resource and a second data entry

15   resource;

distributing, by the processor, a first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource, wherein the first data entry image is associated with a first data entry field;

receiving, by the processor and in response to the distributing, first data from the first

20   data entry resource and second data from the second data entry resource; and

determining, by the processor, final data based upon the first data and the second data.

2.   The system of claim 1, wherein the digital image is at least one of a facsimile

25   document and a scanned document.

3.   The system of claim 2, wherein the form comprises hand written data.

4.   The system of claim 1, the operations further comprising improving the

30   quality of the digital image by at least one of line removal, noise removal, de-skewing, auto rotation, border removal, scaling, blank page detection, format conversion, compression, decompression, cropping, dilating, sharpening, soothing, rotating, zooming, brightness adjustment and contrast adjustment.

5.   The system of claim 1, the operations further comprising registering the first data entry resource.

6.   The system of claim 5, wherein the registering comprises at least one of testing the first data entry resource and certifying the first data entry resource.

7.   The system of claim 1, wherein the determining the first data entry resource is based upon at least one of a skill level, a pay rate, an accuracy rate, a data entry speed, a language, a country, a certification level, a workload and an availability associated with the first data entry resource.

8.   The system of claim 1, wherein the first data entry resource is a human and the second data entry resource is a machine.

9.   The system of claim 1, the operations further comprising determining that the first data entry field is a sensitive field and decomposing the first data entry field into a plurality of subfields.

10.   The system of claim 1, the operations further comprising determining that the first data and the second data are a mismatch.

11.   The system of claim 10, wherein a third data entry resource determines the final data, in response to determining a mismatch.

12.   The system of claim 1, the memory comprising a data dictionary comprising a data definition of the plurality of fields and an association with at least one of the plurality of document templates.

13.   The system of claim 1, wherein the data definition comprises at least one of a validation rule, a verification rule, a business rule and a security rule.

14.   The system of claim 1, the operations further comprising determining that a timeframe for receiving the first data has been surpassed and distributing the first data entry image to a third data entry resource.

5   15.   The system of claim 1, further comprising distributing a second data entry image from the plurality of data entry fields to a third data entry resource and a fourth data entry resource.

16.   The system of claim 15, further comprising determining the third data entry
10   resource and the fourth data entry resource based upon at least one of a timeframe for completion of the first form, a priority of the first form relative to a priority of a second form, a service level agreement associated with the first form, a legal compliance rule associated with the first form and a load balancing algorithm.

15   17.   The system of claim 1, the operations further comprising creating, for the first data entry field, a default rule based upon a data history associated with the first data entry field and determining the final data based at least partially upon the default rule.

18.   The system of claim 1, the operations further comprising creating an audit log
20   associated with the first data entry resource, wherein the first data entry resource is associated with a unique tracking identifier.

19.   The system of claim 1, the operations further comprising:
        determining at least one of an inactivity timeframe associated with a user device of
25   the first data entry resource has been exceeded, and that an inaccuracy threshold associated with the first data entry resource has been exceeded; and
        at least one of logging the first data entry resource off of the system and disabling a user account associated with the first data entry resource.

30   20.   The system of claim 1, the operations further comprising determining a payment for the first data entry resource, wherein the determining the payment is based upon at least one of a skill level, a data entry accuracy, a data entry speed, a user country, a language skill, a security level and a user availability.

21.   The system of claim 1, the operations further comprising determining a work load associated with at least one of a number of received digital images, a forecast, a data entry completion rate and an error rate, and sending an offer to a plurality of data entry resources, the offer comprising an increased pay rate.

22.   The system of claim 1, further comprising a management user interface, wherein the management user interface comprises at least one of workload information, accuracy information, data entry resource availability, priority information, mismatch information and data entry resource information.

23.   The system of claim 1, the operations further comprising determining a plurality of final data comprising all data entry images associated with the first form, and aggregating the final data.

24.   A computer based method, comprising:

receiving, by a distributed outsourcing computer, a digital image of a first form;

matching, by the computer, the first digital image to a first document template in a plurality of document templates each comprising a plurality of fields;

decomposing, by the computer and based upon the document template, the first form into a plurality of data entry images;

determining, by the computer, a first data entry resource and a second data entry resource;

distributing, by the computer, a first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource, wherein the first data entry image is associated with a first data entry field;

receiving, by the computer and in response to the distributing, first data from the first data entry resource and second data from the second data entry resource; and

determining, by the computer, final data based upon the first data and the second data.

25.   A non-transitory computer-readable storage medium having computer-executable instructions stored thereon that, if executed by a distributed outsourcing computer, causes the computer perform a operations comprising:

receiving, by the computer, a digital image of a first form;

5   matching, by the computer, the first digital image to a first document template in a plurality of document templates each comprising a plurality of fields;

decomposing, by the computer and based upon the document template, the first form into a plurality of data entry images;

determining, by the computer, a first data entry resource and a second data entry

10   resource;

distributing, by the computer, a first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource, wherein the first data entry image is associated with a first data entry field;

receiving, by the computer and in response to the distributing, first data from the first

15   data entry resource and second data from the second data entry resource; and

determining, by the computer, final data based upon the first data and the second data.

AMENDED CLAIMS
received by the International Bureau on 18 May 2012

We Claim:

1. A distributed outsourcing system, comprising:

a network interface communicating with a memory;

the memory communicating with a processor for distributed outsourcing, wherein the

5   memory stores a computer program; and

the processor, when executing the computer program, performs operations comprising:

receiving, by the processor, a first digital image of a first form, wherein the first form is

completed with first data;

analyzing, by the processor, the first digital image in order to match a first form format of

10   the first form at least one of a plurality of document templates each comprising a plurality of

fields;

determining, by the processor, that the first digital image matches a first document

template in the plurality of document templates;

decomposing, by the processor and based upon the document template, the first form into

15   a plurality of data entry images each associated with a data entry field of the first document

template;

determining, by the processor, a first data entry resource and a second data entry

resource;

distributing, by the processor, a first data entry image from the plurality of data entry

20   images to the first data entry resource and the second data entry resource, wherein the first data

entry image is associated with a first data entry field;

receiving, by the processor and in response to the distributing, first data from the first

data entry resource and second data from the second data entry resource; and

determining, by the processor, final data based upon the first data and the second data.

25

2. The system of claim 1, wherein the digital image is at least one of a facsimile document and a

scanned document.

3. The system of claim 2, wherein the form comprises hand written data.

30

4. The system of claim 1, the operations further comprising improving the quality of the digital image by at least one of line removal, noise removal, de-skewing, auto rotation, border removal, scaling, blank page detection, format conversion, compression, decompression, cropping, dilating, sharpening, soothing, rotating, zooming, brightness adjustment and contrast adjustment.

5. The system of claim 1, the operations further comprising registering the first data entry resource.

6. The system of claim 5, wherein the registering comprises at least one of testing the first data entry resource and certifying the first data entry resource.

7. The system of claim 1, wherein the determining the first data entry resource is based upon at least one of a skill level, a pay rate, an accuracy rate, a data entry speed, a language, a country, a certification level, a workload and an availability associated with the first data entry resource.

8. The system of claim 1, wherein the first data entry resource is a human and the second data entry resource is a machine.

9. The system of claim 1, the operations further comprising determining that the first data entry field is a sensitive field and decomposing the first data entry field into a plurality of subfields.

10. The system of claim 1, the operations further comprising determining that the first data and the second data are a mismatch.

11. The system of claim 10, wherein a third data entry resource determines the final data, in response to determining a mismatch.

12. The system of claim 1, the memory comprising a data dictionary comprising a data definition of the plurality of fields and an association with at least one of the plurality of document templates.

AMENDED SHEET (ARTICLE 19)

13. The system of claim 1, wherein the data definition comprises at least one of a validation rule, a verification rule, a business rule and a security rule.

14. The system of claim 1, the operations further comprising determining that a timeframe for
5   receiving the first data has been surpassed and distributing the first data entry image to a third data entry resource.

15. The system of claim 1, further comprising distributing a second data entry image from the plurality of data entry fields to a third data entry resource and a fourth data entry resource.
10
16. The system of claim 15, further comprising determining the third data entry resource and the fourth data entry resource based upon at least one of a timeframe for completion of the first form, a priority of the first form relative to a priority of a second form, a service level agreement associated with the first form, a legal compliance rule associated with the first form and a load
15   balancing algorithm.

17. The system of claim 1, the operations further comprising creating, for the first data entry field, a default rule based upon a data history associated with the first data entry field and determining the final data based at least partially upon the default rule.
20
18. The system of claim 1, the operations further comprising creating an audit log associated with the first data entry resource, wherein the first data entry resource is associated with a unique tracking identifier.

25   19. The system of claim 1, the operations further comprising:
         determining at least one of an inactivity timeframe associated with a user device of the first data entry resource has been exceeded, and that an inaccuracy threshold associated with the first data entry resource has been exceeded; and
         at least one of logging the first data entry resource off of the system and disabling a user
30   account associated with the first data entry resource.

AMENDED SHEET (ARTICLE 19)

20. The system of claim 1, the operations further comprising determining a payment for the first data entry resource, wherein the determining the payment is based upon at least one of a skill level, a data entry accuracy, a data entry speed, a user country, a language skill, a security level and a user availability.

5

21. The system of claim 1, the operations further comprising determining a work load associated with at least one of a number of received digital images, a forecast, a data entry completion rate and an error rate, and sending an offer to a plurality of data entry resources, the offer comprising an increased pay rate.

10

22. The system of claim 1, further comprising a management user interface, wherein the management user interface comprises at least one of workload information, accuracy information, data entry resource availability, priority information, mismatch information and data entry resource information.

15

23. The system of claim 1, the operations further comprising determining a plurality of final data comprising all data entry images associated with the first form, and aggregating the final data.

24. A computer based method, comprising:

20   receiving, by a distributed outsourcing computer, a first digital image of a first form, wherein the first form is completed with first data;

            analyzing, by the computer, the first digital image in order to match a first form format of the first form to at least one of a plurality of document templates each comprising a plurality of fields;

25   determining, by the computer, that the first digital image matches a first document template in the plurality of document templates;

            decomposing, by the computer and based upon the document template, the first form into a plurality of data entry images;

            determining, by the computer, a first data entry resource and a second data entry resource;

30   resource;

AMENDED SHEET (ARTICLE 19)

distributing, by the computer, a first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource, wherein the first data entry image is associated with a first data entry field;

receiving, by the computer and in response to the distributing, first data from the first

5   data entry resource and second data from the second data entry resource; and

determining, by the computer, final data based upon the first data and the second data.

25. A non-transitory computer-readable storage medium having computer-executable instructions stored thereon that, if executed by a distributed outsourcing computer, causes the

10   computer perform operations comprising:

receiving, by the computer, a first digital image of a first form, wherein the first form is completed with first data;

analyzing, by the computer, the first digital image in order to match a first form format of the first form to at least one of a plurality of document templates each comprising a plurality of

15   fields;

determining, by the computer, that the first digital image matches a first document template in the plurality of document templates;

decomposing, by the computer and based upon the document template, the first form into a plurality of data entry images;

20   determining, by the computer, a first data entry resource and a second data entry resource;
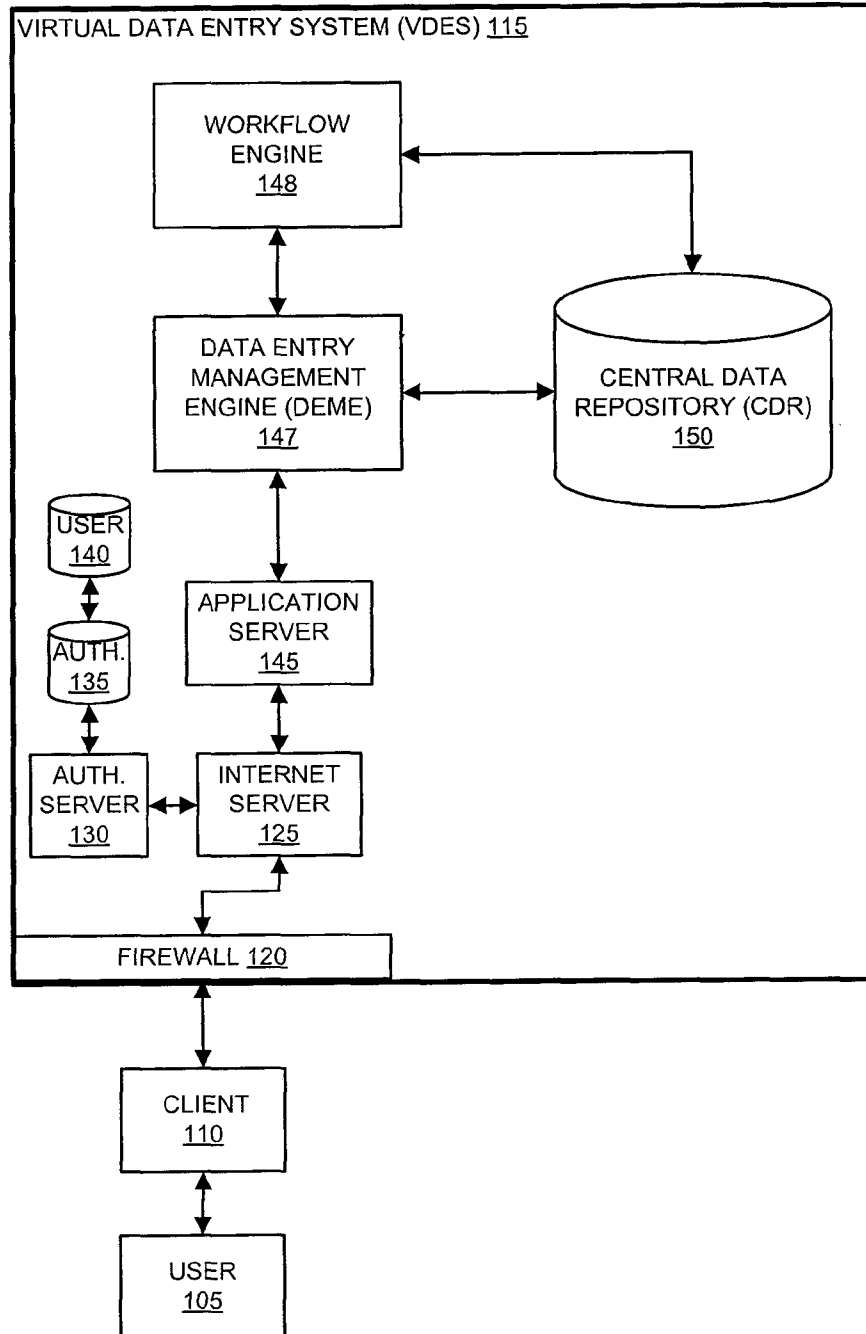
distributing, by the computer, a first data entry image from the plurality of data entry images to the first data entry resource and the second data entry resource, wherein the first data entry image is associated with a first data entry field;

25   receiving, by the computer and in response to the distributing, first data from the first data entry resource and second data from the second data entry resource; and

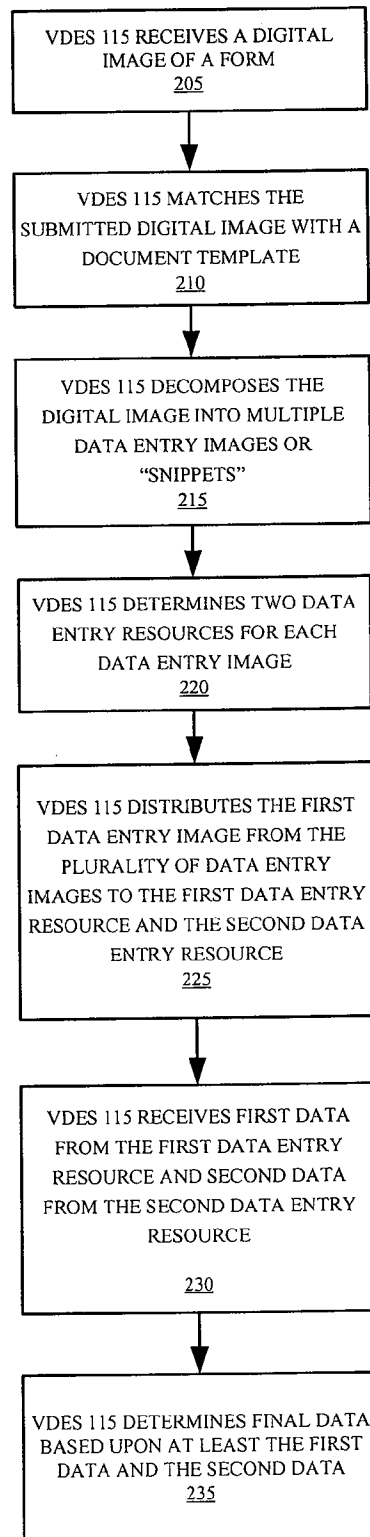determining, by the computer, final data based upon the first data and the second data.

AMENDED SHEET (ARTICLE 19)

Figure 1

<u>200</u>

VDES 115 RECEIVES A DIGITAL
IMAGE OF A FORM
<u>205</u>

VDES 115 MATCHES THE
SUBMITTED DIGITAL IMAGE WITH A
DOCUMENT TEMPLATE
<u>210</u>

VDES 115 DECOMPOSES THE
DIGITAL IMAGE INTO MULTIPLE
DATA ENTRY IMAGES OR
"SNIPPETS"
<u>215</u>

VDES 115 DETERMINES TWO DATA
ENTRY RESOURCES FOR EACH
DATA ENTRY IMAGE
<u>220</u>

VDES 115 DISTRIBUTES THE FIRST
DATA ENTRY IMAGE FROM THE
PLURALITY OF DATA ENTRY
IMAGES TO THE FIRST DATA ENTRY
RESOURCE AND THE SECOND DATA
ENTRY RESOURCE
<u>225</u>

VDES 115 RECEIVES FIRST DATA
FROM THE FIRST DATA ENTRY
RESOURCE AND SECOND DATA
FROM THE SECOND DATA ENTRY
RESOURCE

<u>230</u>

VDES 115 DETERMINES FINAL DATA
BASED UPON AT LEAST THE FIRST
DATA AND THE SECOND DATA
<u>235</u>

Figure 2

INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G06F 17/00 (2012.01)
USPC - 715/221
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)
IPC: G06F 17/00 (2012.01)
USPC: 715/221
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
IPC: G06F 17/00 (2012.01)
USPC: 715/229,221,226 |707/999.104 | 707/999.003 | 707/999.005 | 707/E17.008 | 707/E17.109 (keyword limited; terms below)
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
pubWEST(USPT,PGPB,EPAB,JPAB,USOCR); Google(Web); Search terms used: Document for entry fields outsourcing distribution workflow department expert regulator reviewer template DOM model scanned OCR validation correction checking accuracy turnaround error rate expiration management matching forwarding operator role decompose regulators auditors review

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010/0211515 A1 (Woodings et al.) 19 August 2010 (19.08.2010), entire document especially para [0116], [0123], [0190], [0279], [0284], [0293], [0298], [0321], [0324], [0338], [0464], [0580], [0582], [0677]	1-25
Y	US 2009/0254572 A1 (Redlich et al.) 08 October 2009 (08.10.2009), entire document especially para [0188], [0315], [2191], [2456], [2468], [2798], [3107]	1-25
A	US 2005/0182667 A1 (Metzger et al.) 18 August 2005 (18.08.2005), entire document	1-25
A	US 7,934,149 B1 (Raje) 26 April 2011 (26.04.2011), entire document	1-25
A	US 7,937,651 B2 (Kelkar et al.) 03 May 2011 (03.05.2011), entire document	1-25
A	US 2008/0155540 A1 (Mock et al.) 26 June 2008 (26.06.2008), entire document	1-25

☐ Further documents are listed in the continuation of Box C. ☐

*	Special categories of cited documents:	"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
"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	"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
"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)	"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
"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	"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 March 2012 (07.03.2012)	**2 1 MAR 2012**

Name and mailing address of the ISA/US	Authorized officer:
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