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AUGMENTATION METHOD AND MECHANISM FOR AN AUTOMATED REAL PROPERTY MERCHANDISING SYSTEM

Abstract

A system for presenting properties includes: a server, coupled to client devices via the internet, the server including: a unification module, that periodically accesses data sources for listings, where the data sources include on-market sources and off-market sources, and that retrieves the listings from the sources, converts the listings to a common format, and stores the listings in the common format, and that detects deficiencies in the listings that cannot be resolved by accessing public data sources; and an intelligence module, that receives a request from the unification module for data that can resolve the deficiencies, and that accesses an external entities database to select external entities that can provide the data, and that automatically generates requests to the external entities to provide the data, and that automatically receives the data to enable the unification module to update a parcel record in a parcel database associated with the deficiencies.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of the following U.S. Nonprovisional Application, which is herein incorporated by reference in its entirety. TABLE-US-00001 SERIAL FILING NUMBER DATE TITLE 18671415 May 22, 2024 METHOD AND SYSTEM FOR DATA (ZL.0104-C1) AUGMENTATION IN AN AUTOMATED REAL PROPERTY MERCHANDISING SYSTEM [0002] U.S. Nonprovisional application Ser. No. 18/671,415 is a continuation of the following U.S. Nonprovisional Application, which is herein incorporated by reference in its entirety. TABLE-US-00002 SERIAL FILING NUMBER DATE TITLE 16/989,126 Aug. 10, 2020 METHOD AND APPARATUS FOR (ZL.0104) AUTOMATED REAL PROPERTY AGGREGATION, UNIFICATION, AND COLLABORATION [0003] U.S. Nonprovisional application Ser. No. 16/989,126 claims the benefit of the following U.S. Provisional Application, which is herein incorporated by reference in its entirety. TABLE-US-00003 SERIAL FILING NUMBER DATE TITLE 62/884,803 Aug. 9, 2019 METHOD AND APPARATUS FOR AUTOMATED (ZL.0101) REAL PROPERTY AGGREGATION, UNIFICATION, AND COLLABORATION [0004] This application is related to the following co-pending U.S. Patent Applications, each of which has a common assignee and common inventors, the entireties of which are herein incorporated by reference. TABLE-US-00004 SERIAL FILING NUMBER DATE TITLE 16/989,009 Aug. 10, 2020 METHOD AND APPARATUS FOR AUTOMATED REAL (ZL.0102) PROPERTY AGGREGATION, UNIFICATION, AND COLLABORATION 16/989,098 Aug. 10, 2020 METHOD AND APPARATUS FOR AUTOMATED (ZL.0103) COLLABORATION IN A REAL PROPERTY MERCHANDISING SYSTEM 16/989,147 Aug. 10, 2020 METHOD AND APPARATUS FOR DATA (ZL.0105) UNIFICATION IN AN AUTOMATED REAL PROPERTY MERCHANDISING SYSTEM

BACKGROUND OF THE INVENTION

Field of the Invention

[0005] This invention relates in general to the field of automated, large-scale real estate parcel search and retrieval, and more particularly to a method and apparatus for real property aggregation,

unification, and collaboration.

Description of the Related Art

[0006] Real estate agents are still the primary way that people find homes. Via this process, a buyer enters into contract with a listing agent, the buyer conveys to the agent hard requirements and desires for a property, the agent performs a manual search of a market listing database, and sends results of the search to the buyer, generally in a list form where the most likely candidate properties are at the top of the list. The buyer then reviews the list, selects one or more of the properties, and collaborates with the agent, often iteratively, to ask for more data above certain listings, to schedule showings, and eventually to reach a purchase decision. This collaboration primarily occurs in-person, via phone calls, texts, and emails.

[0007] An alternative way that buyers find properties is through searching one of the common web search portals such as Zillow or Trulia. In this scenario, a buyer enters search criteria for properties and then views results of the search that show properties available within the respective portal's database that meet the buyer's search criteria. Following this, the buyer may ask their listing agent to set up showings the seller's agent, or the buyer may contact the seller's agent directly. Like the first case, collaboration primarily occurs in-person, via phone calls, texts, and emails.

[0008] The present inventors have observed that the above two techniques for finding and purchasing properties are problematic for several reasons. First, listing agents generally only have access to listing services, such as the ubiquitous Multiple Listing Service (MLS), to which they subscribe. They may subscribe to other services or in-house services to obtain pre-market and off-market listings, but data for these listings are generally sparse and in a different format than MLS data. Consequently, agents must be skilled in operating two or more different search engines because there is not consistent service that provides all the listings in a market in a unified format.

[0009] In addition, when a buyer enters into contract with a listing agent, the agent typically enters the buyer's hard requirements (e.g., location, price point, number of bedrooms and baths) and desires (e.g., fireplace, pool, good schools, near good restaurants) into a tracking system, and this hard requirements and desires are employed to search the available listing services. If the buyer's requirements and desires diverge over time, it is up to the agent to revise this data in the tracking system, which often doesn't happen. Buyers are frequently handed lists of properties that meet their initial set of requirements and desires, but that don't satisfy their diverged requirements and desires.

[0010] Moreover, collaboration between buyers and agents is hodgepodge more often than not because there is no systematic technique for determining and obtaining additional data for a property or for determining the most effective communication medium for certain classes of messages. This form of ad hoc collaboration is rife with potential for errors and missed opportunities.

[0011] Accordingly, the present inventors have sensed a need in the art for techniques, mechanisms, systems, and methods that bring together buyers, agents, and other collaborators to improve the overall efficiency, accuracy, and experience of a search for one or more real properties. These techniques, mechanisms, systems, and methods must provide for: 1) unification/aggregation of all real property listing data into a centralized and normalized dataset; 2) improved collaboration between buyers, other collaborators (friends, family), and agents; 3) analytics and intelligence functions that supply buyers with answers to questions they didn't (yet) know to ask; and improved communication between all parties through optimized communication strategies.

SUMMARY OF THE INVENTION

[0012] The present invention, among other applications, is directed to solving the above-noted problems and addresses other problems, disadvantages, and limitations of the prior art. The present invention provides a superior technique for effectively storing real properties, searching the properties, and enhancing collaboration between buyers and agents.

[0013] A first aspect of the present invention contemplates an automated method for obtaining, storing, searching, and presenting requested information for real estate properties, the method

including: periodically accessing a plurality of data sources for property listings, where the plurality of data sources includes on-market property sources and off-market property sources, the periodically accessing including: retrieving the property listings from the plurality of sources; converting the property listings to a common format; and storing the property listings in the common format in a parcel database; displaying, on a graphical user interface (GUI) of a client device, icons corresponding to initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitoring actions of a buyer when searching for and viewing initial property listings, calculating machine intelligence provided analytics of the actions, and generating revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; rearranging and displaying, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order base on the analytics of the actions; removing, from the GUI, one or more of the icons corresponding to the initial property listings and displaying, on the GUI, additional icons corresponding to the revised property listings; and examining communications between the buyer and the agent within an automated system, the examining including: noting a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parsing the query; in response to determining that information corresponding to the query is within the parcel database, retrieving the information; in response to determining that the information corresponding to the query is not within the parcel database, processing images or videos corresponding to the query to extract relevant data and generating the information from the extracted relevant data; if a different language is required to communicate with the buyer, translating the information into the different language; inserting the information into a conversation on the client device and indicating whether the information is a response to the normal query or to the urgent query, where the information is inserted via a message bubble, a popup window, or voice; detecting a change in buyer criteria by detecting a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, where the additional information is not available in the parcel database; updating the machine intelligence provided analytics based on the change in buyer criteria; and employing updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the initial information; generated the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are transmitted from the agent back to the buyer.

[0014] Another aspect of the present invention envisages a non-transitory computer-readable storage medium storing instructions that, when executed by a computer, cause the computer to perform a method searching, generating, and presenting requested information for real estate properties, the method including: periodically accessing a plurality of data sources for property listings, where the plurality of data sources includes on-market property sources and off-market property sources, the periodically accessing including: retrieving the property listings from the plurality of sources; converting the property listings to a common format; and storing the property listings in the common format in a parcel database; displaying, on a graphical user interface (GUI) of a client device, icons corresponding to initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitoring actions of a buyer when searching for and viewing initial property listings, calculating machine intelligence provided analytics of the actions, and generating revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; rearranging and displaying, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order base on the analytics of the actions; removing, from the GUI, one or more of the icons corresponding to the initial property

listings and displaying, on the GUI, additional icons corresponding to the revised property listings; and examining communications between the buyer and the agent within an automated system, the examining including: noting a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parsing the query; in response to determining that information corresponding to the query is within the parcel database, retrieving the information; in response to determining that the information corresponding to the query is not within the parcel database, processing images or videos corresponding to the query to extract relevant data and generating the information from the extracted relevant data; if a different language is required to communicate with the buyer, translating the information into the different language; inserting the information into a conversation on the client device and indicating whether the information is a response to the normal query or to the urgent query, where the information is inserted via a message bubble, a popup window, or voice; detecting a change in buyer criteria by detecting a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, where the additional information is not available in the parcel database; updating the machine intelligence provided analytics based on the change in buyer criteria; and employing updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the initial information; generate the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are transmitted from the agent back to the buyer.

[0015] A further aspect of the present invention comprehends a system for obtaining, storing, searching, and presenting requested information for real estate properties, the system including: a collaborative real estate server, coupled to one or more client devices via the internet cloud, configured to execute one or more applications programs including modules, the modules including: a unification module, configured to: periodically access a plurality of data sources for property listings, where the plurality of data sources includes on-market property sources and off-market property sources; retrieve the property listings from the plurality of sources; convert the property listings to a common format; and store the property listings in the common format in a parcel database; a relationship module, configured to: direct a client device to display, on a graphical user interface (GUI) of the client device, icons corresponding to the initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitor actions of the buyer when searching for and viewing the initial property listings, calculate machine intelligence provided analytics of the actions, and generate revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; direct the client device to rearrange and display, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order based on the analytics of the actions; direct the client device to remove, from the GUI, one or more of the icons corresponding to the initial property listings and display, on the GUI, additional icons corresponding to the revised property listings; and a collaboration module, configured to: note a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parse the query; in response to determining that information corresponding to the query is within the parcel database, retrieve the information; in response to determining that the information corresponding to the query is not within the parcel database, process images or videos corresponding to the query to extract relevant data and generate the information from the extracted relevant data; translate the information into a different language if required to communicate with the buyer; insert the information into a conversation on the client device and indicate whether the information is a response to the normal query or to the urgent query, where the information is inserted via a message bubble, a popup window, or voice; examine communications between the

buyer and the agent; detect change in buyer criteria by receiving a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, where the additional information is not available in the parcel database; update the machine intelligence provided analytics based on the change in buyer criteria; and employ updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the additional information; generate the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are transmitted from the agent back to the buyer.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] These and other objects, features, and advantages of the present invention will become better understood with regard to the following description, and accompanying drawings where:

[0017] FIG. 1 is a block diagram illustrating an automated real property aggregation, unification, and collaboration system according to the present invention;

[0018] FIG. 2 is a block diagram depicting interactions between a collaboration module and relationship module within the system of FIG. 1;

[0019] FIG. 3 is a flow diagram featuring an exemplary collaboration enhancement augmentation method according to the present invention, such as may be performed by the collaboration module of FIGS. 1 and 2;

[0020] FIG. 4 is a flow diagram showing an exemplary communication medium selection method according to the present invention, such as may be performed by the collaboration module of FIGS. 1 and 2;

[0021] FIG. 5 is a block diagram detailing a virtual assistant according to the present invention that is called upon by the relationship module of FIG. 1;

[0022] FIG. 6 is a flow diagram illustrating an exemplary relationship module method for property information retrieval according to the present invention;

[0023] FIG. 7 is a flow diagram depicting an exemplary virtual assistant requests method according to the present invention;

[0024] FIG. 8 is a block diagram featuring an intelligence module according to the present invention configured to augment parcel data that is stored within the parcel database of FIG. 1;

[0025] FIG. 9 is a flow diagram showing an exemplary intelligence module method for augmenting parcel data, such as may be performed by the system of FIGS. 1 and 8;

[0026] FIG. 10 is a block diagram detailing a unification module according to the present invention that is configured to aggregate and unify real property data within the system of FIG. 1;

[0027] FIG. 11 is a flow diagram illustrating an exemplary unification module property information retrieval method according to the present invention;

[0028] FIG. 12 is a flow diagram depicting an exemplary unification module property information update method according to the present invention;

[0029] FIG. 13 is a block diagram featuring a collaborative real property server according to the present invention;

[0030] FIG. 14 is a block diagram showing a client device according to the present invention;

[0031] FIG. 15 is a diagram detailing an exemplary agent display according to the present invention, such as may be presented on a client device; and

[0032] FIG. 16 is a diagram illustrating an exemplary buyer display according to the present invention, such as may be presented on a client device.

DETAILED DESCRIPTION

[0033] Exemplary and illustrative embodiments of the invention are described below. It should be understood at the outset that although exemplary embodiments are illustrated in the figures and described below, the principles of the present disclosure may be implemented using any number of techniques, whether currently known or not. In the interest of clarity, not all features of an actual implementation are described in this specification, for those skilled in the art will appreciate that in the development of any such actual embodiment, numerous implementation specific decisions are made to achieve specific goals, such as compliance with system-related and business-related constraints, which vary from one implementation to another. Furthermore, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure. Various modifications to the preferred embodiment will be apparent to those skilled in the art, and the general principles defined herein may be applied to other embodiments. Therefore, the present invention is not intended to be limited to the particular embodiments shown and described herein, but is to be accorded the widest scope consistent with the principles and novel features herein disclosed.

[0034] The present invention will now be described with reference to the attached figures. Various structures, systems, and devices are schematically depicted in the drawings for purposes of explanation only and so as to not obscure the present invention with details that are well known to those skilled in the art. Nevertheless, the attached drawings are included to describe and explain illustrative examples of the present invention. Unless otherwise specifically noted, articles depicted in the drawings are not necessarily drawn to scale.

[0035] The words and phrases used herein should be understood and interpreted to have a meaning consistent with the understanding of those words and phrases by those skilled in the relevant art. No special definition of a term or phrase (i.e., a definition that is different from the ordinary and customary meaning as understood by those skilled in the art) is intended to be implied by consistent usage of the term or phrase herein. To the extent that a term or phrase is intended to have a special meaning (i.e., a meaning other than that understood by skilled artisans) such a special definition will be expressly set forth in the specification in a definitional manner that directly and unequivocally provides the special definition for the term or phrase. As used in this disclosure, “each” refers to each member of a set, each member of a subset, each member of a group, each member of a portion, each member of a part, etc.

[0036] Applicants note that unless the words “means for” or “step for” are explicitly used in a particular claim, it is not intended that any of the appended claims or claim elements are recited in such a manner as to invoke 35 U.S.C. § 112 (f).

Definitions

[0037] Central Processing Unit (CPU): The electronic circuits (i.e., “hardware”) that execute the instructions of a computer program (also known as a “computer application,” “application,” “application program,” “app.” “computer program,” or “program”) by performing operations on data, where the operations may include arithmetic operations, logical operations, or input/output operations. A CPU may also be referred to as a “processor.”

[0038] Module As used herein, the term “module” may refer to, be part of, or include an application specific integrated circuit (ASIC), an electronic circuit, a processor (shared, dedicated, or group) and/or memory (shared, dedicated, or group) that execute one or more computer programs, a combinational logic circuit, and/or other suitable components that provide the described functionality.

[0039] In view of the above background discussion on real property marketing and associated techniques employed within present day systems that provide agents and buyers the ability to search for parcels that satisfy constraints of the buyers, a discussion of the present invention will now be presented with reference to FIGS. 1-11.

[0040] Referring to FIG. 1, a block diagram is presented illustrating an automated real property aggregation, unification, and collaboration system according to the present invention. The system **100** may include a collaborative real property server **130** that is coupled to one or more client devices **101-103** through the internet cloud **110**. The client devices **101-103** may include one or more desktop/laptop computers **101** that execute desktop/laptop client applications **104** for communication and interaction with the valuation server **130** through the internet cloud **110**. The client devices **101-103** may also include one or more smart tablet computers **102** that execute tablet client applications **105** for communication and interaction with the valuation server **130** through the internet cloud **110**. The client devices **101-103** may further include one or more smartphone devices **103** that execute smartphone client applications **106** for communication and interaction with the valuation server **130** through the internet cloud **110**.

[0041] The real property server **130** is coupled to an on-market database **121**, an off-market database **122**, a public database **123**, and an external entities database **124**. Though represented in the block diagram as single databases **121-124**, each of the databases **121-124** may comprise a substantial number of databases through which the real property server **130** may access on-market real estate parcel data, off-market real estate parcel data, publicly and commercially available data corresponding to properties, and contact information data for external entities.

[0042] Preferably, entries within the on-market database **121** include parcel data retrieved from one or more multiple listing services (M L Ss) in a regional market for which the real property server **130** is configured to service, web data retrieved from other MLS-like services (e.g., Zillow, Trulia), past market activities, seller disclosed information, real estate franchise notes on parcels, and real estate agent notes on properties. Entries within the off-market database **122** include pre-market listings, pocket listings, and listings for properties that are off-market for other reasons. Entries in the public database **123** include data retrieved from map services (e.g., location coordinates and street view photos), public institutions (tax assessors, county records, school districts), satellite imagery, etc. Entries in the external entities database **124** include contact information data for external entities such as, but not limited to, remodeling contractors, architects, structural engineers, utilities, home goods sellers, and issuers of building permits. The contact information data may also include whether the entities may be contacted to supply information (e.g., bids, schedules, etc.) automatically or manually, and preferred communications media (e.g., web form, email, SM S/text message, snail mail, telephone, etc.).

[0043] The real property server **130** may include a presentation processor **141** that is coupled to a parcel database **151**. The presentation processor **141** comprises a user interface (UX) component **142**, a search engine component **143**, and an analytics database **144**.

[0044] The real property server **130** may further comprise a collaboration module **152**, a relationship module **153**, an intelligence module **154**, and a unification module **154**, all of which are coupled to the parcel database **151**.

[0045] In operation, access to the server **130** along with type of information that may be retrieved from the parcel database **151** are controlled by login credentials entered through one of the client devices **101-103** through one of the client applications **104-106**. For example, a real estate agent's credentials may allow access to more parcels within the parcel database **151** along with access to more functions, as will be described in further detail below. A buyer's credentials, who is under contract with the real estate agent, may allow access to fewer parcels within the parcel database **151** along with access to fewer functions.

[0046] Entries ("records") within the parcel database **151** are all of the same unified format regardless of the database **121-124** that sourced the data. As one skilled in the art will appreciate, parcels in the on-market database **121** may comprise up to 500 data fields, while parcels in the off-market database **122** may comprise only a few data fields (e.g., address, price number of bedrooms, number of bathrooms). Accordingly, as will be described below, it is a feature of the present invention to aggregate real estate parcel information within a market region from disparate sources

121-122, to unify how this data is stored and accessed within the parcel database **151**, to augment entries within the parcel database **151** with data obtained from the public database **123** and external entities, and to synthesize data for entries in the parcel database **151** from data obtained from the public database **123** and external entities, when actual data is not available.

[0047] The records are stored in the parcel database **151** for access by the presentation processor **141**, the collaboration module **152**, the relationship module **153**, the intelligence module **154**, and the unification module. Users (e.g., buyers, agents, and other collaborators) may execute the client applications **104-106** on the client devices **101-103** to specify constraints, weights, freeform search parameters, and discrete search parameters for one or more parcel records stored within the parcel database **151**. The user interface processor **142** executes in order to transmit information and display windows to the client devices **101-103** via their respective client applications **104-106** to enable the users to specify the constraints, weights, and freeform/discrete search parameters. The client applications **104-106** may transmit the constraints, weights, and freeform/discrete search parameters to the presentation processor **141** through the internet cloud **110**. Historical and current constraints, weights, freeform search parameters, and discrete search parameters are stored in corresponding user records within the analytics database **144** to accelerate subsequent searches along with analytics (e.g., statistical figures of merit) corresponding to the historical and current search parameters entered by the buyers and collaborators. Upon receipt of the constraints, weights, freeform search parameters, and discrete search parameters, the search engine processor **143** may perform pre-searches of freeform parameter entries by the user, and may cause the presentation processor **141** to transmit suggested freeform parameter entries to the user via the internet cloud **110**. The user may accept one of the suggested freeform parameter entries or the user may continue entering freeform entry characters. The additional characters are transmitted to the presentation processor **141** and the search engine processor **143** may revise suggested freeform entries and cause the entries to be displayed to the user. The user may continue to add freeform characters, resulting in more refine freeform parameter suggestions by the search engine processor **143**, or the user may delete some characters and add different characters. In one embodiment, suggestions of a plurality of freeform entries based upon characters entered by the user are transmitted for display to the user in less than 100 milliseconds.

[0048] Upon selection of a suggested freeform entry, the search engine processor **143** may execute a query of the parcel database **151** using the suggested freeform entry and discrete search parameters to access one or more records within the parcel database **151** that satisfy the suggested freeform entry and discrete search parameters. The one or more records within the parcel database **151** that satisfy the suggested freeform entry and discrete search parameters may also be stored in corresponding user records within the user database **144** to accelerate subsequent searches, and the one or more records within the parcel database **151** that satisfy the suggested freeform entry and discrete search parameters are provided by the search engine processor **143** to the user interface processor **142**, which formats the one or more records for display by the client applications **104-106** on the client devices **101-103** according to device type, and the presentation processor **141** transmits the one or more records to the client devices **101-103** along with location contextual metadata corresponding to the one or more parcels (e.g., parcels shown on a map) that enable the users to visualize and better comprehend results of their searches.

[0049] In one embodiment, users may iteratively refine searches by specifying additional freeform/discrete search parameters to further target search results that are of interest, and these results are additionally stored in the corresponding user records within the user database **144**.

[0050] Upon selection of a specific parcel record, the presentation processor **141** may transmit fields within the records that are formatted by the user interface processor **142** for display to the user along with metadata that enable the user to visualize and comprehend the record fields associated with the parcel, thus providing the user with a substantially improved method for making an informed decision regarding a corresponding parcel.

[0051] As is alluded to above, one of the significant disadvantages of present-day real estate search systems is limited functionality of those systems to foster collaboration between agents, buyers, and other collaborators. For example, consider that a buyer initially desires to purchase a 3-bedroom, 2-bath home in a given area, for a given price. Accordingly, the agent may specify these parameters in an MLS (or other service) search, and provide the buyer/collaborators with a list of properties that satisfy the initial constraints. But then the buyer/collaborators begin searching for properties having different constraints (more or less bedrooms and baths, different fixtures, different price, different area). Presently, there is no present-day system that will note and track such a divergence of constraints, and the present inventors have noted that it is an object of the present invention to employ analytics generated by the relationship module **153** and stored within the analytics database **144** to inform the agent of such divergence and to automatically suggest parcels that meet the changed constraints. Such analytics may include, but are not limited to, average property features that are viewed by a user, time spent viewing properties, number of times a user has viewed particular parcels, messages and frequency of communications between users and agents regarding particular properties. Such automatic suggestion of parcels, as will be described in further detail below, may result in automatic arrangement of icons and/or hyperlinks displayed on both an agent's client device **101-103** and a buyer's/collaborator's client device **101-103** so that the automatic arrangement of icons and/or hyperlinks promotes the properties that more closely correlate with the buyer's diverging interests to more prominent positions on the devices **101-103**.

[0052] As noted above, the user interface processor **142** provides an access mechanism for each user (buyer, agent, collaborator) interacting with the real property aggregation, unification, and collaboration system **100**. The format of the information presented via the client applications **104-106**, as well as the type and amount of information presented may vary between user type, and the collaboration module **152** provides common elements that advantageously facilitate collaboration between users, providing near-real-time interaction and communication, and further enable each user to independently interact with each parcel under view. The collaboration module provides for the following functions: [0053] Creation of a common collaboration space (e.g., analogy of a physical worktable) for each user to add, remove, and interact with real property listings and materials related to a real property transaction; [0054] Provision of a communication mechanism to facilitate low latency interaction between users within a collaboration space (e.g., users around a virtual table); [0055] Employment of an interface mechanism, described below, to create queries about real properties, where the queries are evaluated and dispatched to either an agent, a virtual agent assistant, or that are formatted as queries to the unification module **155** to retrieve additional real property information or, if the information is evaluated as important but unavailable, to notify the intelligence module **154** so that steps can be taken (e.g., estimates requested, quotes requested,) to obtain the requested information; [0056] Providing an optimized experience among the users; [0057] Providing contextually relevant augmentation of conversations with data on topics discussed (e.g., retrieving relevant statistics on schools mentioned in discussion; automatically calculating commute time to properties being discussed, etc.). The augmented data is presented in near-real-time during a conversational interaction, or via a separate augmentation window that displays the contextually relevant information that was retrieved but not available in real time; [0058] Reducing latency in communication between parties by directing large payloads to more appropriate transmission mediums; and [0059] Reducing latency in communications by choosing the most appropriate medium for a given discussion type (e.g., SMS for quick short questions; email for topics that will take longer to respond in a complete and appropriate manner, etc.) [0060] The present inventors note that it is useful to consider the topic monitoring and information augmentation functions of the collaboration module **152** as being analogous to a smart assistant (e.g., A lexia, Siri, Hey Google, etc.), where a buyer (or other collaborator) converses with an agent saying (or writing/typing), for example, "I wonder how big the master closet is?" This smart

assistant functionality would note the question, parse the topic (i.e., size of master closet), retrieve the information from the parcel database **151**, and insert the information into the conversation (e.g., via a message bubble; in a separate popup window; or even with voice if it is a voice conversation, to make it seem like the smart assistant function of the system **100** is one of the people in the conversation (e.g., “Hello, I checked the master closet and it is 8”×8”). Additionally, the smart assistant function may perform language translation in the even the agent is working with a buyer who speaks a different language.

[0061] To provide for communication efficiency functions the collaboration module **152** is configured to recognize keywords when a buyer is sending a message to an agent. In one example, the buyer asks the agent, “Urgent: I need to see this property today,” and the communication efficiency component recognized the keyword, “urgent,” sends an SMS/text/iMessage, and sets a timer to ping the agent every few minutes. In a second example, consider that the buyer sends a message: “Just FYI, here is a video of the property I took when I drove by.” In this example, the keyword “FY I” would indicate low priority, and since the message contained a video, it would upload it from the buyer, store it in the unified real property database for that property entry, and just send an email with a link to the agent.

[0062] The relationship module **153** controls interaction between the buyer (and collaborators), the agent, and interactions with the virtual agent assistant functionality. Accordingly, the relationship module **153** observes defined preferences (provided by a buyer) and synthesized preferences (by analyzing buyer actions that are retrieved from the analytics database **144**) to accommodate the buyer's needs by optimizing real property lists, listing change notifications (e.g., new, changed, removed), connecting a buyer with an agent in the most appropriate medium (e.g., low latency, such as SM S, for urgent questions; higher latency, such as email, for extensive questions or media requiring analysis), and performing the functions of an agent assistant by facilitating showings (i.e., scheduling), responding to concise buyer requests for information (e.g., which school district is a given real property in) and providing directions to real properties. This relationship module **153** performs the following functions: [0063] Monitoring and calculating analytics associated with activities of a buyer using the system **100** through the client devices **101-103** [0064] Monitoring and calculating analytics associated with buyer-agent interactions (e.g., response latency of agent to buyer initiated queries); [0065] Prioritizing and rearranging icons and/or a list of real properties for display on the client devices **101-103** that result from analyzing viewing patterns, providing additional desired icons or parcels as a result of buyer analytics, removing icons or parcels that result from the analytics, and/or initiating requests for additional information to the unification module **155**; [0066] Providing relevant analytics from the analytics database **144** for display on the client devices **101-103** to the agent in order to optimize buyer experience; [0067] Providing analytics to the agent's franchise demonstrating agent successes and deficiencies (e.g., response latency to buyer queries, correctness of information provided to buyer, etc.); [0068] Retrieving real property data from the real property unification engine; [0069] Providing a virtual agent assistant for buyer queries of data already available in parcel database **151**; [0070] Scheduling interactions between buyers, agents, and real properties (e.g., showings); and [0071] Optimizing schedules to reduce unproductive time and excessive transport energy use.

[0072] The intelligence module **154** is configured to resolve identified data deficiencies on a property within the parcel database **151**, whether generated by the unification module **155** or generated via a deficiency identified by a user (e.g., as a request for additional info on a property). The intelligence module **154** controls retrieval of property data deficiencies and also identifies the best method for obtaining information to resolve the identified deficiencies. The intelligence module may facilitate retrieval of the information by performing tasks such as formatting/filling request for quote forms, managing outstanding requests for information made to external entities, and also by performing conversions between mediums of communication by text-to-speech and speech-to-text conversions in order to facilitate request for information directly in a more

conversational manner than is available by prefilled forms.

[0073] The unification module **155** is configured to continuously query the on-market database **121**, the off-market database **122**, and the public database **123** for new and modified property listings, and to aggregate these properties within the parcel database **151** in a unified format. As noted above, a portion of the data may be retrieved from existing sources, such as the MLS, other web-based brokers, discount broker information, broker posts on social media, broker franchise web sites, data provided by sellers, and public records (e.g., taxes, boundary maps, and other external textual, image-based, or video-based content, previous listings of parcels, crime statistics, school ratings, etc.). This unification module **155** may also detect deficiencies of available information for parcels in the parcel database **151**. The unification module may further retrieve parcels from the parcel database **151** by performing additional searches as a result of parameters provided by a user.

[0074] Advantageously, the real property aggregation, unification, and collaboration system **100** according to the present invention provides a platform **100** an overarching, consolidated, “ground truth” repository **151** for all available information on properties within a market area, where the data for the parcels is stored in a common format. The system **100** further is configured to synthesize new data by analyzing geospatial information contained in images and video media (e.g., identifying views from specific windows in a home, or estimating sunlight entering a window, illuminating a deck, etc.) as initiated by the relationship module **153**, where the information is created to satisfy a specific identified contextual interest expressed by a buyer. Examples of this information might include the estimated costs of replacing kitchen appliances, cabinets and countertops, replacing a roof, or adding a deck onto the real property. In the example of determining the estimated costs for replacing kitchen cabinets, the system **100** might query commercial and/or public data sources to provide information on the property that estimates the build quality of real properties within a neighborhood, and would employ this estimate of build quality to formulate a query to identified cabinet makers whose contact information is stored within the external entities database **124** that serve the area in which the real property is located, and would initiate an estimate request with the identified companies. The system **100** would also manage providing physical access to the real property by scheduling access through the agent or seller and would also parse all received estimates and integrate the cabinet replacement costs into the available data for the given real property.

[0075] The collaborative real property server **130** according to the present invention may comprise one or more application programs executing thereon to perform the operations and functions described above, and which will be disclosed in further detail with reference to FIG. **13**.

[0076] Now turning to FIG. **2**, a block diagram **200** is presented depicting interactions between a collaboration module and relationship module within the system of FIG. **1**. The collaboration module **252** is coupled through the internet cloud **110** to one or more client devices **201-203** as discussed above, where the client devices **201-203** may be employed by a buyer, a listing agent, or another collaborator. The collaboration module **252** may be operationally coupled to a communications optimizer **211**, the relationship module **253**, a translator **212**, a converter **213**, and a context statistics and augmentation processor **214**. The translator **212**, a converter **213**, and a context statistics and augmentation processor **214** are coupled to public data sources **215**. The relationship module **253** is coupled to an analytics database **244** via a parcel database, as discussed above with reference to FIG. **1**.

[0077] As noted above, the collaboration module **252** is configured to improve communications between the agent, buyer, and other collaborators by providing contextually relevant augmentation of conversations with data on topics discussed, to reduce latency in communications between parties by directing large payloads to more appropriate communication mediums, and to reduce latency in communications by selecting the most appropriate medium for a given discussion. For example, the communications optimizer **211** may select SM S/text for quick and short questions to

the agent and may select email for topics that take a longer time to address. The translator **212** may be employed to perform language translation when the buyer and agent speak different languages by querying the data sources **215**. The converter **213** may perform distance-to-travel time conversions and currency conversions by querying the data sources **215**. And the context statistics and augmentation processor **214** may query the data sources **215** to augment topics noted during agent/buyer discussions with relevant information (e.g., info on schools, neighborhoods, taxes, crime rates, shopping, etc.). Such information is provided to the buyer/agent in near real time. The collaboration module **252** may issue a request for data on a property to the relationship module **253** for information that is unavailable in the parcel database **151**, and the relationship module **253** may request and receive augmented and/or synthesized information that is provided via the intelligence module. The relationship module **253** may further update and employ analytics stored in the analytics database **244** to inform the buyer/agent of changes in buyer criteria.

[0078] Referring to FIG. 3, a flow diagram **300** is presented featuring an exemplary collaboration enhancement augmentation method according to the present invention, such as may be performed by the collaboration module of FIGS. 1 and 2. Flow begins at block **302** where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **304**.

[0079] At block **304**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100**. Flow then proceeds to decision block **306**.

[0080] At decision block **306**, an evaluation is made to determine if a topic of the discussion has been detected. If not, then flow proceeds back to block **304**. If so, then flow proceeds to block **308**.

[0081] At block **308**, the collaboration module **252** determines the specific topic that was detected. Flow then proceeds to block **310**.

[0082] At block **310**, the collaboration module **252** issues a request for information to augment the detected topic and the translator **212**, converter **213**, and/or the context stats and augmentation processor **214** queries the data sources **215** to retrieve the information. The retrieved information is then provided to the collaboration module **252**. Flow then proceeds to block **312**.

[0083] At block **312**, the retrieved information is then inserted by the collaboration module **252** into the discussion stream between the users. Flow then proceeds to block **314**.

[0084] At block **314**, the users receive the augmented information on their respective client devices **101-103**. Flow then proceeds to block **304** as the users continue the discussion.

[0085] Turning now to FIG. 4, a flow diagram **400** is presented showing an exemplary communication medium selection method according to the present invention, such as may be performed by the collaboration module of FIGS. 1 and 2. Flow begins at block **402** where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **404**.

[0086] At block **404**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100**. Flow then proceeds to decision block **406**.

[0087] At decision block **406**, an evaluation is made to determine if a communication has been detected. If not, then flow proceeds to block **404**. If so, then flow proceeds to block **408**.

[0088] At block **408**, the collaboration module **252** directs the communications optimizer **211** to determine payload size and latency requirements for the detected communication. Flow then proceeds to decision block **410**.

[0089] At decision block **410**, an evaluation is made to determine if the communication is an urgent short message. If not, then flow proceeds to decision block **414**. If so, then flow proceeds to block **412**.

[0090] At block **412**, the communication is sent via SMS/Text. Flow then proceeds to block **424**.

[0091] At decision block **414**, an evaluation is made to determine if the communication is a large urgent message. If not, then flow proceeds to decision block **418**. If so, then flow proceeds to block **416**.

[0092] At block **416** the recipient is notified of the communication via SMS/Text message and the payload of the communication is transmitted to the recipient via email. Flow then proceeds to block **424**.

[0093] At decision block **418**, an evaluation is made to determine if the communication is a large non-urgent message. If not, then flow proceeds to block **422**. If so, then flow proceeds to block **420**.

[0094] At block **420**, the communication is sent via email to the recipient. Flow then proceeds to block **424**.

[0095] At block **422**, the communication is sent to the recipient via messaging internal to the system **100**. Flow then proceeds to block **424**.

[0096] At block **424**, the recipient receives the communication. Flow then proceeds to block **426**.

[0097] At block **426**, the method completes.

[0098] Referring to FIG. 5, a block diagram **500** is presented detailing a virtual assistant according to the present invention that is called upon by the relationship module of FIG. 1. A collaboration module **552** is coupled through the internet cloud **110** to one or more client devices **501-503** as discussed above, where the client devices **501-503** may be employed by a buyer, a listing agent, or another collaborator. The collaboration module **552** may be operationally coupled to a relationship module **553**. The relationship module **553** is coupled to an analytics database **244** via a parcel database, as discussed above with reference to FIG. 1. The relationship module **553** is also coupled to a virtual assistant module **511** and to an intelligence module **554**.

[0099] As noted above, the collaboration module **252** is configured to improve communications between the agent, buyer, and other collaborators by providing contextually relevant augmentation of conversations with data on topics discussed. Accordingly, when topics are detected by the collaboration module **552**, the collaboration module **552** issues requests for data related to one or more parcels to the relationship module **553**. The relationship module **553** may employ analytics of the ongoing discussion, as supplied by an analytics database **554** to determine if the requests for data can be satisfied by the virtual assistant **511** and/or the intelligence module **554**. The virtual assistant **511** may be configured to schedule agent/buyer appointments within the system **100**, to schedule property showings, to provide directions to the property showings, and to monitor pending messages to agents withing and external to the system **100**. The virtual assistant **511** may further escalate these messages to secondary contacts if the agents fail to respond.

[0100] In one embodiment, requests for virtual assistant functions described above and directly initiated by users of the system **100** in form of a virtual assistant request from the client devices **501-503**.

[0101] Turning to FIG. 6, a flow diagram **600** is presented illustrating an exemplary relationship module method for property information retrieval according to the present invention. Flow begins at block **602** where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **604**.

[0102] At block **604**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100** and a user requests information on the size of a kitchen for a given parcel. Flow then proceeds to block **606**.

[0103] At block **606**, the collaboration module **552** detects the query and forward the request to the relationship module **553**. Flow then proceeds to block **608**.

[0104] At block **608**, the relationship module **553** forwards the request to the intelligence module **554**. Flow proceeds to block **610**.

[0105] At block **610**, the relationship module **553** sets a timer to ensure a timely response to the request. Flow then proceeds to decision block **612**.

[0106] At decision block **612**, an evaluation is made to determine if the timer has expired. If not, then flow proceeds to decision block **618**. If so, then flow proceeds to block **614**.

[0107] At block **614**, the relationship module **553** requests the intelligence module **554** to estimate

the time that is required to obtain an appropriate response to the request. Flow then proceeds to block **616**.

[0108] At block **612**, a notification to the requestor is provided that the requested information will be available in the time estimated by the intelligence module **554**. This time, T, is passed from the relationship module **553** to the collaboration module **552**, which then provides the notification in the system **100** to the requestor. Flow then proceeds to block **610** where the timer is updated to reflect the estimated time, T.

[0109] At decision block **618**, an evaluation is made to determine if a response for the requested information has been received from the intelligence module **554**. If not, then flow proceeds to block **620**. If so, then flow proceeds to block **622**.

[0110] At block **620**, a notification to the requestor is provided that the requested information is not available. The notification is passed from the relationship module **553** to the collaboration module **552**, which then provides the notification in the system **100** to the requestor. Flow then proceeds to block **624**.

[0111] At block **622**, the requested information is provided to the requestor via the relationship module **553** and collaboration module **552**. The relationship module **553** ends any timers that have been set and marks the transaction as complete. Flow then proceeds to block **624**.

[0112] At block **624**, the method completes.

[0113] Now referring to FIG. 7 a flow diagram **700** is presented depicting an exemplary virtual assistant requests method according to the present invention. Flow begins at block **702** where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **704**.

[0114] At block **704**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100** and a user requests a showing of a particular parcel. Flow then proceeds to block **706**.

[0115] At block **706**, the collaboration module **552** detects the parcel showing request and forwards the request to the relationship module **553**. Flow then proceeds to block **708**.

[0116] At block **708**, the relationship module **553** identifies the action associated with the showing request and formats a request to the virtual assistant **511** to schedule the showing. Flow then proceeds to block **710**.

[0117] At block **710**, the request to the virtual assistant **511** is sent and a response timer is set. If the time limit is exceeded, the request to the virtual assistant **511** is escalated to be scheduled through a secondary contact for a seller's agent. Flow then proceeds to block **712**.

[0118] At block **712**, the virtual assistant **511** employs an appropriate communication medium to schedule a property showing with the seller's agent and the showing is scheduled. Flow then proceeds to block **714**.

[0119] At block **714**, a response indicated the scheduled showing is provided by the virtual assistant **511** to both the buyer and agent by routing the response through the relationship module **553**, the collaboration module **552**, through the cloud **110** to the appropriate client devices **501-503**. Flow then proceeds to block **716**.

[0120] At block **716**, the parcel type, results (scheduled showing), and response latency are stored by the relationship module **553** in the analytics database **544**. Flow then proceeds to block **720**.

[0121] At block **720**, the method completes.

[0122] Now turning to FIG. 8, a block diagram **800** is presented featuring an intelligence module according to the present invention configured to augment parcel data that is stored within the parcel database of FIG. 1. The diagram **800** shows a relationship module **853** that issues requests for the parcel data to the intelligence module **854**, as discussed above. The intelligence module **854** includes an external entity interface module **810** that is coupled to an external entities database **824**, such as the external entities database **124** of FIG. 1. The external entity interface module **810** is also operationally coupled to external entities (e.g., contractors, architects, etc.) via one or more

communications mediums **812-817** as are noted in respective entries in the external entities database **824**. The intelligence module **854** is also coupled to a unification module **855** and to a parcel database **851**. The parcel database **851** is also coupled to the unification module.

[0123] In operation, as a request is received from the relationship module **853** for data corresponding to a parcel, the intelligence module **810** first queries the parcel database **851** to determine if the requested data is available. If so, the data is provided by the requestor. If not, the intelligence module **854** determines an appropriate type of external entity to provide the requested data and finds contact information within the external entities database **824** for one or more external entities **811** within the area who can provide the information. Accordingly, the external entity interface **810** issues requests for the data to the one or more external entities **811** via the communications medium **812-817** that are stored within the external entities database **824** for each of the one or more external entities.

[0124] As the one or more external entities respond with the requested data, the intelligence module **854** provides the data to the requestor and also to the unification module **855**, which in turn updates the corresponding parcel record in the parcel database **851**.

[0125] Referring now to FIG. **9**, a flow diagram **900** is presented showing an exemplary intelligence module method for augmenting parcel data, such as may be performed by the system of FIGS. **1** and **8**. Flow begins at block **902**, where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **904**.

[0126] At block **904**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100** and a user requests data corresponding to a particular parcel. The collaboration module (not shown) forwards the request to the relationship module **853**. Flow then proceeds to block **906**.

[0127] At block **906**, the relationship module **853** detects the request. Flow then proceeds to block **908**.

[0128] At block **908**, the relationship module **853** forwards the request to the intelligence module **854**. Flow then proceeds to block **910**.

[0129] At block **910**, the intelligence module **854** queries parcel database **851** via the unification module **855** for the requested data. Flow then proceeds to decision block **912**.

[0130] At decision block **912**, an evaluation is made to determine if the requested data is available in the parcel database **851**. If not, flow proceeds to decision block **916**. If so, then flow proceeds to block **914**.

[0131] At block **914**, the unification module **855** retrieves the requested data from the parcel database **851**. The intelligence module **854** generates a response including the requested data, which is routed to the requestor as is described above. Flow then proceeds to block **930**.

[0132] At decision block **916**, the intelligence module **854** determines if the data is available from known commercial and/or public data sources (not shown). If not, then flow proceeds to decision block **920**. If so, then flow proceeds to block **918**.

[0133] At block **918**, the intelligence module **854** retrieves the requested data from the known data sources. The intelligence module **854** generates a response including the requested data, which is routed to the requestor as is described above. Flow then proceeds to block **930**.

[0134] At decision block **920**, the intelligence module determines if the requested data is available from one or more external entities. If not, then flow proceeds to block **926**. If so, then flow proceeds to block **922**.

[0135] At block **926**, the intelligence module **854** formats a “data unavailable” response and the response is routed to the requestor as is described above. Flow then proceeds to block **928**.

[0136] At block **928**, the data unavailable response is sent to the unification module **855**, which in turn updates the corresponding parcel record in the parcel database **851** to indicate that the requested information is not available. Flow then proceeds to block **930**.

[0137] At block **922**, a request for the data is formatted as noted above to one or more external

entities **811** and an estimated response time is sent to the requestor based upon entity type and communication medium type. Flow then proceeds to block **924**.

[0138] At block **924**, the requested data is received from the one or more external entities **811**. A response with the requested data is then sent to the requestor and to the unification module **855**, which updates the corresponding parcel record in the parcel database **851** with the requested data provided by the one or more external entities **811**. Flow then proceeds to block **930**.

[0139] At block **930**, the method completes.

[0140] Turning now to FIG. **10**, a block diagram **1000** is presented detailing a unification module according to the present invention that is configured to aggregate and unify real property data within the system of FIG. **1**. The unification module **1055** is coupled as described above to data sources **1001-1005** including, but not limited to, property sellers **1001**, multiple listing services **1002**, discount broker property lists **1003**, real estate franchises **1004**, and other parcel data source **1005** (e.g., Zillow, Trulia, social media, etc.). The unification module **1055** is also coupled to an intelligence module **1054** and to a parcel database **1051**.

[0141] Operationally, the unification module **1055** continuously queries the data sources **1001-1005** for new or changed listings. In one embodiment, the unification module **1055** polls the data sources **1001-1005** every 2 seconds. Other polling times are contemplated depending upon market and source type. The unification module **1055** then converts the retrieved data to a common format and stores the parcel data in records within the parcel database **1051**.

[0142] The intelligence module **1054** may issue requests from an external source (buyer, agent, collaborator) for data, which are provided to the unification module **1055**. Then unification module, in turn, queries the parcel database **1051** and either provides the requested data to the intelligence module **1054** or informs the intelligence module that the data is not available. If the intelligence module **1054** is above to determine the requested data via the above techniques, then the data is provided to the unification module **1055**, which updates corresponding records within the parcel database **1051**.

[0143] Referring to FIG. **11**, a flow diagram **1100** is presented illustrating an exemplary unification module property information retrieval method according to the present invention. Flow begins at block **1102**, where users engage within a contractual arrangement for purposes of purchasing one or more real properties. Flow then proceeds to block **1104**.

[0144] At block **904**, the users (buyer, collaborators, and agent) discuss parcels under consideration via communications through the system **100** and a user requests data corresponding to a particular parcel. A collaboration module (not shown) forwards the request to a relationship module (not shown), which passes the request on to the intelligence module **1054**, which issues the request to the unification module **1055**. Flow then proceeds to block **1106**.

[0145] At block **1106**, the unification module **1055** receives the request from the intelligence module **1054**. Flow then proceeds to decision block **1108**.

[0146] At decision block **1108**, the unification module **1055** determines if the requested data is available in the parcel database **1051**. If not, then flow proceeds to decision block **1110**. If so, then flow proceeds to block **1112**.

[0147] At block **1112**, the unification module **1055** retrieves the requested data from the parcel database **1051** and the data is sent in a response to the requestor. Flow then proceeds to block **1122**.

[0148] At decision block **1110**, the unification module determines if the data is available from known data sources **1001-1005**. If so, then flow proceed to block **1114**. If not, then flow proceeds to block **1118**.

[0149] At block **1118**, the unification module formats a data unavailable response to be sent to the requestor and creates a deficiency entry in the parcel database **1051** that the data is not available from known data source **1001-1005**. The unification module **1005** then generates a request to the intelligence module to check if the requested data can be obtained from an external entity. Flow then proceeds to block **1120**.

[0150] At block **1120**, the data provided by the external entity is received by the unification module **1055**, which in turns updates the corresponding record in the parcel database **1051**. Flow then proceeds to block **1122**.

[0151] At block **1114**, the unification module **1055** retrieves the requested data from the known data source **1001-1005** and updates the parcel database. Flow then proceeds to block **1122**.

[0152] At block **1122**, the method completes.

[0153] Turning to FIG. **12**, a flow diagram **1200** is presented depicting an exemplary unification module property information update method according to the present invention. Flow begins at block **1202**, where a system **100** according to the present invention initiates an update cycle to update entries in the parcel database **1051** with new and/or changed information from the data sources **1001-1005**. Flow then proceeds to block **1204**.

[0154] At block **1204**, the unification module **1055** selects a next data source and queries the next data source for new and/or modified listings. Flow then proceed to decision block **1206**.

[0155] At decision block **1206**, the unification module **1055** determines if the next data source has new and/or modified listings. If not, then flow proceeds to decision block **1210**. If so then flow proceeds to block **1208**.

[0156] At block **1208**, the unification module **1055** retrieves the updated listings data from the next source, converts the data to the unified format, and stores the data in the parcel database **1051**. Flow then proceeds to block **1204** where a next data source is selected, and the update cycle continues.

[0157] At decision block **1210**, the unification module **1055** determines if a new source of data is available. If not, then flow proceeds to block **1204** where a next data source is selected, and the update cycle continues. If so, then flow proceeds to block **1212**.

[0158] At block **1212**, the new data source is selected as the next source for query and is added to the data source list maintained by the unification module **1055**. Flow then proceeds to block **1204** where a next data source is selected, and the update cycle continues.

[0159] Referring now to FIG. **13**, a block diagram is presented featuring a collaborative real property server **1300** according to the present invention, such as the server **130** of FIG. **1**. The server **1300** may include one or more central processing units (CPU) **1301** that are coupled to memory **1306** having both transitory and non-transitory memory components therein. The CPU **1301** is also coupled to a communications circuit **1302** that couples the server **1300** to the internet cloud **110** via one or more wired and/or wireless links **1303**. The links **1303** may include, but are not limited to, Ethernet, cable, fiber optic, and digital subscriber line (DSL). As part of the network path to and through the cloud **110**, providers of internet connectivity (e.g., ISPs) may employ wireless technologies from point to point as well.

[0160] The server **600** may also comprise input/output circuits **1304** that include, but are not limited to, data entry and display devices (e.g., keyboards, monitors, touchpads, etc.). The memory **1306** may be coupled to a parcel database **1351** and to databases **121-124** described with reference to FIG. **1** above. Though the server **1300** is shown directly coupled to databases **121-124** and **1351**, the present inventors note that interfaces to these data sources may exclusively be through the communications circuit **1302** or may be through a combination of direct interface and through the communications circuit **1302**, according to the source of data.

[0161] The memory **1306** may include an operating system **1307** such as, but not limited to, Microsoft Windows, Mac OS, Unix, and Linux, where the operating system **1307** is configured to manage execution by the CPU **1301** of program instructions that are components of one or more application programs. In one embodiment, a single application program comprises a plurality of code segments **1308-1311** and **1352-1355** resident in the memory **1306** and which are identified as a configuration code segment CONFIG MOD **1308**, a client communications code segment CLIENT COMM MOD **1309**, a presentation processor code segment PRESENTATION MOD **1310**, a web services code segment WEB SERVICES MOD **1311**, an collaboration module code

segment COLLABORATION MOD **1352**, a relationship module code segment RELATIONSHIP MOD **1353**, an intelligence module code segment INTELLIGENCE MOD **1354**, and a unification module code segment UNIFICATION MOD **1355**.

[0162] Operationally, the server **1300** may execute one or more of the code segments **1308-1311**, **1352-1355** under control of the OS **1307** as required to enable the server **600** to ingest new data from external data sources **121-124**, to employ data from the sources **121-124** in a unified format, and to store this unified listings data in the parcel database **1351** in a manner that can be rapidly and easily searched and accessed by users that communicate with the server **1300** over the communications circuit **1302** via client applications **104-106** executing on their respective client devices **101-103**. The server **1300** may further be configured to execute one or more of the code segments **1308-1311**, **1352-1355** under control of the OS **1307** as required to enable the server **600** to format and present search results and corresponding parcel data to the client applications **104-106** executing on their respective client devices **101-103** with acceptable latencies, and to receive communications therefrom that users specify to narrow search results, to perform new searches altogether, and to calculate analytics corresponding to search criteria entered by the users over time.

[0163] CONFIG MOD **1308** may be executed to place the server **1300** into an operational or maintenance mode, where the maintenance mode may be entered to allow for ingestion of new data from the data sources **121-124** via automated or manual means. CLIENT COMM **1309 609** may be executed to perfect reliable transfer of information between the server **1300** and client applications **104-106** executing on respective client devices **101-103**. PRESENTATION MOD **610** may be executed to suggest reorganization and reprioritization of real property listings as a result of buyer search analytics, and to perform searches of the parcel database **1351**, to provide search results, and to interact with client applications **104-106** executing on respective client devices **101-103** as is described above. WEB SERV MOD **1311** may be executed to provide for formatting of information provided by PRESENTATION PROC MOD **1310** for transmission to the client applications **104-106** and for formatting of information that is provided to PRESENTATION PROC **610** which has been received from the client applications **104-106**.

[0164] COLLABORATION MOD **1352** may be executed to perform any of the functions and operations described above with reference to the collaboration module **152** of FIG. 1. RELATIONSHIP MOD **1353** may be executed to perform any of the functions and operations described above with reference to the relationship module **153** of FIG. 1. INTELLIGENCE MOD **1354** may be executed to perform any of the functions and operations described above with reference to the relationship module **154** of FIG. 1. And UNIFICATION MOD **1355** may be executed to perform any of the functions and operations described above with reference to the unification module **155** of FIG. 1.

[0165] Now referring to FIG. **14**, a block diagram is presented depicting a client device **700** according to the present invention, such as the client devices **101-103** discussed above with reference to FIG. 1. The client device **1400** may include one or more central processing units (CPU) **1401** that are coupled to memory **1405** having both transitory and non-transitory memory components therein. The CPU **1401** is also coupled to a communications circuit **1402** that couples the client device **1400** to internet cloud **110** via one or more wired and/or wireless links **1403**. The links **1403** may include, but are not limited to, Ethernet, cable, fiber optic, and digital subscriber line (DSL).

[0166] The client device **1400** may also comprise input/output circuits **1404** that include, but are not limited to, data entry and display devices (e.g., keyboards, monitors, touchpads, etc.).

[0167] The memory **1405** may include an operating system **1406** such as, but not limited to, Microsoft Windows, Mac OS, Unix, Linux, IOS, and Android OS, where the operating system **1406** is configured to manage execution by the CPU **1401** of program instructions that are components of a collaboration client application program **1407**. In one embodiment, the

collaboration client application program **1407** comprises a server communications code segment **SERVER COMM 1408** and an I/O interface code segment **I/O INTERFACE 1409**.

[0168] When executing on the client device **1400**, the client **707** provides for display of information provided by the collaborative real property server **130** on the input/output circuits **1404** that help a user make decisions for performing searches of the parcel database **151**. The **SERVER COMM 1408** segment may execute to receive this information and the **I/O INTERFACE** segment **1409** may execute to transmit this information to the input/output circuit **1404**. Likewise, the collaboration client **1407** provides for input of freeform and discrete search parameters provided by the user via the input/output circuit **1404** for transmission to the server **130** that direct the server **130** to refine an ongoing search in order to narrow down a number of parcels that satisfy the search parameters, and to specify freeform and discrete parameters that direct the server **130** to perform new searches altogether. The **SERVER COMM 1408** segment may execute to transmit this information and the **I/O INTERFACE** segment **1409** may execute to receive this information to the input/output circuit **1404**.

[0169] Now referring to FIG. **15**, a diagram is presented detailing an exemplary agent display **1500** according to the present invention, such as may be presented on a client device **101-103**. The display **1500** may include a buyer information window **1501** that identifies a buyer to the agent and that provides other relevant buyer information such as contact information, priority, and indications of divergence. The display **1500** may also comprise an agent listing window **1502** that shows property listings in order of relevancy to the buyer as have been previously noted by the system **100** in the analytics database **144**. The display **1500** may further include an analytics window **1503** presenting relevant analytics for the buyer that have been determined from the buyer's interactions and searches with the system **100**. The display **1500** may additionally include a diverged listings window **1504** that presents property listings in order of relevancy to the buyer as are currently noted by the system **100** in the analytics database **144**. Note that as a result of analysis of the buyer's interactions with the system **100**, listings A, B, C, E, F, and H have been removed, listings D, F, and G have been promoted, and listings I, J, K, M, and N have been added. In one embodiment, these listings comprise icons that may be selected. Another embodiment contemplates hyperlinks to additional data.

[0170] The display **1500** may further comprise a communications window **1505** that presents both urgent communication entries **1506** and normal communication entries **1507** between the parties.

[0171] Now turning to FIG. **16**, a diagram is presented illustrating an exemplary buyer display **1600** according to the present invention, such as may be presented on a client device **101-103**. The display **1600** may include an agent information window **1601** that identifies the buyer's agent and that provides other relevant agent information. The display **1600** may also comprise a listing window **1604** that shows property listings in order of relevancy to the buyer as is currently noted by the system **100** in the analytics database **144**. Note that as a result of analysis of the buyer's interactions with the system **100**, the listings and their order of relevancy match the diverged listings **1504** presented to the agent. In one embodiment, these listings comprise icons that may be selected. Another embodiment contemplates hyperlinks to additional data.

[0172] The display **1600** may further comprise a communications window **1605** that presents both urgent communication entries **1606** and normal communication entries **1607** between the parties.

[0173] Advantageously, the system **100** according to the present invention provides for Aggregation and unification of all real property data from numerous sources to enable all interested parties (e.g., agents, buyers, and collaborators) to collaborate for all interactions by providing a unified source of all available on-market and off-market listings as well as additional augmented/synthesized real property data and features useful to buyers. The system **100** according to the present invention also provides for facilitation of collaboration between real estate professionals, buyers, and other authorized collaborators (e.g., family, friends, etc.) via a central portal.

[0174] Although the present invention and its objects, features, and advantages have been described in detail, other embodiments are encompassed by the invention as well. For example, the present invention contemplates creation of value through the use of machine intelligence to provide extensive analytics of interested parties as well as creation of valuable data by processing information from multiple sources. Extraction of data via machine intelligence may include: [0175] processing pictures of properties to identify features, finish qualities, views from property windows, etc.; [0176] Employing geographic data to facilitate understanding of property location within a community (e.g., proximity to schools, businesses, open space, noise sources, environmental contaminants); [0177] Employing energy use data to facilitate understanding of energy footprint of property; and [0178] Using public data sources and records to facilitate understanding of area and property history (e.g., flooding, structural fire/wildfire risk, local vehicle accident rates, etc.).

[0179] Portions of the present invention and corresponding detailed description are presented in terms of software, or algorithms and symbolic representations of operations on data bits within a computer memory. These descriptions and representations are the ones by which those of ordinary skill in the art effectively convey the substance of their work to others of ordinary skill in the art. An algorithm, as the term is used here, and as it is used generally, is conceived to be a self-consistent sequence of steps leading to a desired result. The steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of optical, electrical, or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It has proven convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like.

[0180] It should be borne in mind, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities. Unless specifically stated otherwise, or as is apparent from the discussion, terms such as “processing” or “computing” or “calculating” or “determining” or “displaying” or the like, refer to the action and processes of a computer program product, a computer system, a microprocessor, a central processing unit, or similar electronic computing device, that manipulates and transforms data represented as physical, electronic quantities within the computer system's registers and memories into other data similarly represented as physical quantities within the computer system memories or registers or other such information storage, transmission or display devices. The devices may comprise one or more CPUs that are coupled to a computer-readable storage medium. Computer program instructions for these devices may be embodied in the computer-readable storage medium. When the instructions are executed by the one or more CPUs, they cause the devices to perform the above-noted functions, in addition to other functions.

[0181] Note also that the software implemented aspects of the invention are typically encoded on some form of program storage medium or implemented over some type of transmission medium. The program storage medium may be electronic (e.g., read only memory, flash read only memory, electrically programmable read only memory), random access memory magnetic (e.g., a floppy disk or a hard drive) or optical (e.g., a compact disk read only memory, or “CD ROM”), and may be read only or random access. Similarly, the transmission medium may be metal traces, twisted wire pairs, coaxial cable, optical fiber, or some other suitable transmission medium known to the art. The invention is not limited by these aspects of any given implementation.

[0182] The particular disclosed above are illustrative only, and those skilled in the art will appreciate that they can readily use the disclosed conception and specific embodiments as a basis for designing or modifying other structures for carrying out the same purposes of the present invention, and that various changes, substitutions and alterations can be made herein without departing from the scope of the invention as set forth by the appended claims. For example, components/elements of the systems and/or apparatuses may be integrated or separated. In

addition, the operation of the systems and apparatuses disclosed herein may be performed by more, fewer, or other components and the methods described may include more, fewer, or other steps. Additionally, unless otherwise specified steps may be performed in any suitable order. [0183] Although specific advantages have been enumerated above, various embodiments may include some, none, or all of the enumerated advantages.

Claims

1. An automated method for obtaining, storing, searching, and presenting requested information for real estate properties, the method comprising: periodically accessing a plurality of data sources for property listings, wherein the plurality of data sources comprises on-market property sources and off-market property sources, the periodically accessing comprising: retrieving the property listings from the plurality of sources; converting the property listings to a common format; and storing the property listings in the common format in a parcel database; displaying, on a graphical user interface (GUI) of a client device, icons corresponding to initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitoring actions of a buyer when searching for and viewing initial property listings, calculating machine intelligence provided analytics of the actions, and generating revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; rearranging and displaying, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order base on the analytics of the actions; removing, from the GUI, one or more of the icons corresponding to the initial property listings and displaying, on the GUI, additional icons corresponding to the revised property listings; and examining communications between the buyer and the agent within an automated system, the examining comprising: noting a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parsing the query; in response to determining that information corresponding to the query is within the parcel database, retrieving the information; in response to determining that the information corresponding to the query is not within the parcel database, processing images or videos corresponding to the query to extract relevant data and generating the information from the extracted relevant data; if a different language is required to communicate with the buyer, translating the information into the different language; inserting the information into a conversation on the client device and indicating whether the information is a response to the normal query or to the urgent query, wherein the information is inserted via a message bubble, a popup window, or voice; detecting a change in buyer criteria by detecting a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, wherein the additional information is not available in the parcel database; updating the machine intelligence provided analytics based on the change in buyer criteria; and employing updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the initial information; generate the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are transmitted from the agent back to the buyer.

2. The automated method as recited in claim 1, wherein: the custom request comprises a contextual interest expressed by the buyer; the particular data source comprises a service provider, wherein the service provider is listed in an external entities database, and wherein a request is issued to the service provider via an automated communications medium for the data; and the data is automatically employed to generate the additional information to fulfil the custom request.

3. The automated method as recited in claim 2, wherein the custom request comprises a remodeling

cost, the particular data source comprises a remodeling contractor, and the data comprises a remodeling bid.

4. The automated method as recited in claim 2, wherein the custom request comprises a home goods cost, the particular data source comprises a home goods seller, and the data comprises a home goods bid.

5. The automated method as recited in claim 2, wherein the custom request comprises a building permit request for a remodeling project, the data source comprises a building permit issuer, and the particular data comprises a schedule for obtaining the building permit.

6. The automated method as recited in claim 2, wherein the custom request comprises a request for a street view, the data source comprises a public map service, and the particular data comprises location coordinates and street photos.

7. The automated method as recited in claim 2, wherein the custom request comprises an estimate of sunlight entering a fixture, the particular data source comprises satellite imagery provider, and the data comprises images corresponding to sun positions.

8. A non-transitory computer-readable storage medium storing instructions that, when executed by a computer, cause the computer to perform a method searching, generating, and presenting requested information for real estate properties, the method comprising: periodically accessing a plurality of data sources for property listings, wherein the plurality of data sources comprises on-market property sources and off-market property sources, the periodically accessing comprising: retrieving the property listings from the plurality of sources; converting the property listings to a common format; and storing the property listings in the common format in a parcel database; displaying, on a graphical user interface (GUI) of a client device, icons corresponding to initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitoring actions of a buyer when searching for and viewing initial property listings, calculating machine intelligence provided analytics of the actions, and generating revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; rearranging and displaying, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order base on the analytics of the actions; removing, from the GUI, one or more of the icons corresponding to the initial property listings and displaying, on the GUI, additional icons corresponding to the revised property listings; and examining communications between the buyer and the agent within an automated system, the examining comprising: noting a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parsing the query; in response to determining that information corresponding to the query is within the parcel database, retrieving the information; in response to determining that the information corresponding to the query is not within the parcel database, processing images or videos corresponding to the query to extract relevant data and generating the information from the extracted relevant data; if a different language is required to communicate with the buyer, translating the information into the different language; inserting the information into a conversation on the client device and indicating whether the information is a response to the normal query or to the urgent query, wherein the information is inserted via a message bubble, a popup window, or voice; detecting a change in buyer criteria by detecting a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, wherein the additional information is not available in the parcel database; updating the machine intelligence provided analytics based on the change in buyer criteria; and employing updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the initial information; generate the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are

transmitted from the agent back to the buyer.

9. The non-transitory computer-readable storage medium as recited in claim 8, wherein: the custom request comprises a contextual interest expressed by the buyer; the particular data source comprises a service provider, wherein the service provider is listed in an external entities database, and wherein a request is issued to the service provider via an automated communications medium for the data; and the data is automatically employed to generate the additional information to fulfil the custom request.

10. The non-transitory computer-readable storage medium as recited in claim 9, wherein the custom request comprises a remodeling cost, the particular data source comprises a remodeling contractor, and the data comprises a remodeling bid.

11. The non-transitory computer-readable storage medium as recited in claim 9, wherein the custom request comprises a home goods cost, the particular data source comprises a home goods seller, and the data comprises a home goods bid.

12. The non-transitory computer-readable storage medium as recited in claim 9, wherein the custom request comprises a building permit request for a remodeling project, the data source comprises a building permit issuer, and the particular data comprises a schedule for obtaining the building permit.

13. The non-transitory computer-readable storage medium as recited in claim 9, wherein the custom request comprises a request for a street view, the data source comprises a public map service, and the particular data comprises location coordinates and street photos.

14. The non-transitory computer-readable storage medium as recited in claim 9, wherein the custom request comprises an estimate of sunlight entering a fixture, the particular data source comprises satellite imagery provider, and the data comprises images corresponding to sun positions.

15. A system for obtaining, storing, searching, and presenting requested information for real estate properties, the system comprising: a collaborative real estate server, coupled to one or more client devices via the internet cloud, configured to executed one or more applications programs comprising modules, the modules comprising: a unification module, configured to: periodically access a plurality of data sources for property listings, wherein the plurality of data sources comprises on-market property sources and off-market property sources; retrieve the property listings from the plurality of sources; convert the property listings to a common format; and store the property listings in the common format in a parcel database; a relationship module, configured to: direct a client device to display, on a graphical user interface (GUI) of the client device, icons corresponding to the initial property listings from the parcel database that meet initial requirements of a buyer arranged on the GUI in a first order; monitor actions of the buyer when searching for and viewing the initial property listings, calculate machine intelligence provided analytics of the actions, and generate revised property listings from the parcel database that meet revised requirements of the buyer based on the machine intelligence provided analytics; direct the client device to rearrange and display, on the GUI, the icons corresponding to the initial property listings rearranged on the GUI in a second order different from the first order based on the analytics of the actions; direct the client device to remove, from the GUI, one or more of the icons corresponding to the initial property listings and display, on the GUI, additional icons corresponding to the revised property listings; and a collaboration module, configured to: note a query from the buyer that is entered via a communications window on the client device and whether the query is a normal query or an urgent query, and parse the query; in response to determining that information corresponding to the query is within the parcel database, retrieve the information; in response to determining that the information corresponding to the query is not within the parcel database, process images or videos corresponding to the query to extract relevant data and generate the information from the extracted relevant data; translate the information into a different language if required to communicate with the buyer; and insert the information into a conversation on the client device and

indicate whether the information is a response to the normal query or to the urgent query, wherein the information is inserted via a message bubble, a popup window, or voice; examine communications between the buyer and the agent; detect change in buyer criteria by receiving a custom request for additional information from the buyer within the communications based on information provided in the revised property listings, where the additional information is not available in the parcel database; update the machine intelligence provided analytics based on the change in buyer criteria; and employ updated machine intelligence provided analytics to: match the custom request with a particular data source and obtain data from the data source corresponding to the additional information; generate the additional information based upon the data obtained from the particular data source; translate the information into the different language if required to communicate with the buyer; and insert the additional information into the communications that are transmitted from the agent back to the buyer.

16. The system as recited in claim 15, wherein: the custom request comprises a contextual interest expressed by the buyer; the particular data source comprises a service provider, wherein the service provider is listed in an external entities database, and wherein a request is issued to the service provider via an automated communications medium for the data; and the data is automatically employed to generate the additional information to fulfil the custom request.

17. The system as recited in claim 16, wherein the custom request comprises a remodeling cost, the particular data source comprises a remodeling contractor, and the data comprises a remodeling bid.

18. The system as recited in claim 16, wherein the custom request comprises a home goods cost, the particular data source comprises a home goods seller, and the data comprises a home goods bid.

19. The system as recited in claim 16, wherein the custom request comprises a request for a street view, the particular data source comprises a public map service, and the data comprises location coordinates and street photos.

20. The system as recited in claim 16, wherein the custom request comprises an estimate of sunlight entering a fixture, the particular data source comprises satellite imagery provider, and the data comprises images corresponding to sun positions.
