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(54) Title: ARRIVAL TIME ESTIMATE

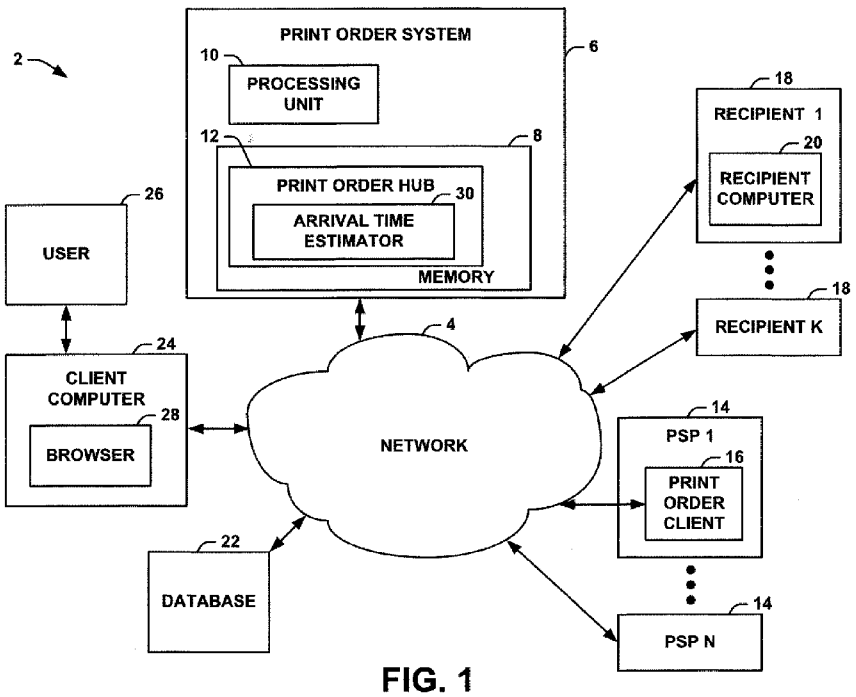

FIG. 1

(57) Abstract: One example discloses a system comprising a memory for storing machine readable instructions and a processing unit for accessing the memory and executing the machine readable instructions. The machine readable instructions can comprise a print order hub comprising an arrival time estimator to estimate an arrival timeframe for material provided from a print service provider (PSP). The material corresponds to a print order based on historical data related to a plurality of prior print orders, a delivery address of the print order and a job type corresponding to the print order.

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ARRIVAL TIME ESTIMATE

BACKGROUND

[0001] Print on demand (POD), sometimes referred to as publish on demand, is a printing technology and business process in which new copies of a document (e.g., a book, a magazine, a pamphlet, etc.) are printed after an order has been received. A print service provider (PSP) is a factory (e.g., businesses) that can process and fulfill print orders to provide POD services. In one example, the PSP can receive a print order, and print a document requested in the print order. The PSP can include capabilities to print in color, bind printed documents, print in multiple languages, print on different types of paper, etc. Moreover, the PSP can ship a completed print job of the print order to another entity (e.g., a customer).

BRIEF DESCRIPTION OF THE DRAWINGS

[0002] FIG. 1 illustrates an example of a system for estimating an arrival time of a print order.

[0003] FIG. 2 illustrates an example of a label that includes a feedback request.

[0004] FIG. 3 illustrates an example of a screenshot of a graphical user interface that includes a survey.

[0005] FIG. 4 illustrates an example of a statistical record.

[0006] FIG. 5 illustrates an example of a print service provider record.

[0007] FIG. 6 illustrates an example of a print order system.

[0008] FIG. 7 illustrates an example of a flowchart of a example method for estimating an arrival time for a print order.

[0009] FIG. 8 illustrates another example of a flowchart of an example method for estimating an arrival time for a print order

[0010] FIG. 9 illustrates an example of a computer system that can be employed to implement the systems and methods illustrated in FIGS. 1-8.

DETAILED DESCRIPTION

[0011] FIG. 1 illustrates an example of a system 2 for providing an estimated arrival time for a print order over a network 4. The print order can be a request for a relatively large and/or complex print job, such as book and/or magazine printing and/or shipping. The print order can be implemented, for example as a print on demand request. The network 4 could be implemented, for example as a network that employs the Transmission Control Protocol/Internet Protocol (TCP/IP), Internet Protocol version 6 (IPv6), etc. In some examples, the network 4 could be implemented as the Internet, and/or a mobile network. A print order system 6 can be coupled to the network 4 and can communicate with other nodes on the network 4.

[0012] The print order system 6 can include a memory 8 for storing machine readable instructions and a processing unit 10 for accessing the memory 8 and executing the machine readable instructions. The memory 8 could be implemented, for example, as volatile memory (e.g., random access memory) or nonvolatile memory (e.g., a hard drive, flash memory, etc.). The processing unit 10 can include a processing core.

[0013] In one example, the machine readable instructions can include a print order hub 12. The print order hub 12 can communicate with N number of print service providers (PSPs) 14 that can receive and fulfill print orders, wherein N is an integer greater than or equal to two. In some examples, the print order hub 12 can include functionality to operate as a receiver and director of a print job, based on efficient routing.

[0014] Each PSP 14 can include a print order client 16 that communicates with the print order hub 12 over the network 4. For purposes of simplification of explanation, only the print order client 16 included in PSP 1 of the PSPs 14 is shown and described herein, but it is to be understood that PSPs 2-N of the PSPs 14 can also include a print order client 16. Each PSP 14 can provide certain printing parameters, including but not limited to format, finishing, binding, ink type, substrate, language, lead time, production capacity, value added services, etc. For instance, in one example, PSP 1 of the PSPs 14 can include capabilities of printing in color, multiple types of paper, multiple types of bindings, etc.

[0015] Each PSP 14 can be registered with the print order hub 12. Registration with the print order hub 12 can include, for example, providing a list of plurality of job types for a given PSP 14. Each job type can correspond, for example, to a specific set of printing parameters that are within the capabilities of the given PSP 14. Such parameters could include, for example, format, binding, finishing, ink type, substrate, language, lead time, production capacity, value added services, etc. for the job type. Moreover, registration can also include providing a geographic location (e.g., an address) of the given PSP 14. In this manner, the print order hub 12 has access to information that characterizes job types that can be processed by the given PSP 14, as well as information that allows the print order hub 12 to determine a distance between the given PSP 14 and another location.

[0016] In one example, upon receiving a print order, PSP 1 of the plurality of PSPs 14 can fulfill the print order. Fulfillment of the print order can include, for example, preparing material for the print order. Preparation of the material for the print order can include printing and binding a document associated with the print order based on specifications set forth in the print order. Further, preparation of the material for the print order can include generation of a material identification code that identifies the print order. In some examples, the material identification code can be generated by the print order hub 12 and provided to the PSP 1. Additionally, fulfillment of the print order can include shipping the prepared material to K number of recipients 18, wherein K is an integer greater than or equal to one.

[0017] The recipients 18 can be implemented, for example, as an entity that can receive the material prepared at the PSP 1. For instance, the recipient 1 of the recipients 18 can be representative of a user at a given location. The material shipped to the recipients 18 can include a feedback request. The feedback request could be printed on a label, a separate sheet of paper, etc.

[0018] FIG. 2 illustrates an example of a label 50 that could include a feedback request that could be employed as the feedback request of FIG. 1. The label 50 can include a feedback message that directs a recipient (e.g., a recipient 18 illustrated in FIG. 1) to a website (labeled in FIG. 2 as "WWW.EXAMPLE.COM"). Additionally or alternatively, the label 50 can include a barcode 52, such as a two-

dimensional barcode. The barcode 52 can be scanned for example, with a device that includes a barcode scanner and/or a camera, such as a mobile phone (e.g., a smart phone or a personal digital assistant). In some examples, the barcode 52 can include data for directing a recipient to the website identified with text on the label 50. The feedback request can also include a material identification code (labeled in FIG. 2 as "MATERIAL ID CODE") corresponding to an identification code for the material provided to the recipient.

[0019] Referring back to FIG. 1, upon receipt of the material, the recipient 1 can employ a recipient computer 20 to contact the print order hub 12 via the feedback request. In some examples, the feedback request can include an enticement (e.g., an offer to the recipient 1) for the recipient 1 that may encourage the recipient 1 to respond to the feedback request. It is noted that in some examples, the recipient 1 may not contact the print order hub 12 directly, but instead be directed to a website associated with the print order hub 12. The recipient computer 20 could be implemented, for example, has a desktop computer, a laptop computer, a mobile phone, such as a smart phone, a personal digital assistant, etc. Upon contacting the website identified in the feedback request, the recipient 1 can be presented with graphical user interface (GUI) (e.g., a webpage) that includes a survey regarding the material shipped to the recipient 1.

[0020] FIG. 3 illustrates an example of a screenshot of a GUI 100 (e.g., a webpage) that includes a survey that could be implemented at the survey provided to the recipient 1 in FIG. 1. In the example illustrated in FIG. 3, the survey can include a request for a material identification code (labeled in FIG. 3 as "MATERIAL ID CODE"). The survey can include a request for an address of the recipient. The address can include, for example the street address, city, state and zip code of the recipient. The survey can also include a request identifying a date the material from the PSP 14 was received by the recipient. The survey can also include a request for a quality of the material provided to the recipient. The quality can represent, for example, a printing quality (e.g., alignment of colors, tactile feel, etc.) of the material provided to the recipient. Such a request can be, for example, on a scale of 1 to 10. Upon entering the information requested in the survey, the recipient can actuate

(e.g., click) a send button 102 that will provide the answers to the survey to a print order hub (e.g., the print order hub 12 of FIG. 1).

[0021] Referring back to FIG. 1, the print order hub 12 can receive the answers of the survey from the recipient 1, which answers can be referred to as feedback data. The print order hub 12 can store the feedback data from the survey in a feedback record in a database 22. Moreover, over time, the print order hub 12 can receive feedback data from a plurality of surveys related to a plurality of different materials provided to the recipients 18 and store data from each survey in a corresponding feedback record in the database 22. The print order hub 12 can generate historical data from the feedback records.

[0022] The historical data can represent a statistical analysis of the feedback data. As noted, each feedback record can include a material identification code. For a given feedback record, the print order hub 12 can employ the material identification code of the given feedback record to determine the PSP 14 of the plurality of PSPs 14 that prepared material corresponding to the given feedback record. Moreover, the print order hub 12 can examine feedback records with a common material identification code to determine a statistically determined time to arrival for material corresponding to the common material identification code for a plurality of zones (e.g., time zones, zip codes, area codes, etc.) for a plurality of timeframes (e.g., shipment request timeframes).

[0023] Such a statistical analysis can include determining, for a given material identification code, a statistical mean (e.g., an arithmetic mean or an average) time to arrival for the plurality of zones. The statistical mean time to arrival can represent a central tendency of a time to arrival of feedback records received with a common material identification code for each of the plurality of zones. The determination of the zone can be based, for example, on an address (e.g., a zip code) of a given recipient 18 of a given feedback record and a date that material is received by the given recipient 18 for the given feedback record. To determine the time to arrival for the given feedback record, the print order hub can compare the date that the material is received against a date that a print order corresponding to the material identification code was provided to the PSP 14. It is noted that in some examples,

due to traffic patterns and/or population densities, a first zone may actually be farther from a given PSP than a second zone, but still have a lower statistical mean time to arrival than the second zone. Additionally, in a similar manner, a statistical variance for the statistical mean time to arrival, (which can be represented as a percentage) can be calculated by the print order hub 12 for each zone of the plurality of zones. The statistical variance for a given zone can represent a probability distribution of the statistical mean time to arrival for the given zone. The print order hub 12 can also calculate an average quality of material for the material identification code. In some examples, a shipping method (e.g., air, ground, boat or a combination thereof) employed to provide the material with the common identification code can be determined for the statistical mean time to arrival for each of the plurality of zones. The statistical mean time to arrival for each of the plurality of zones, the corresponding statistical variance for each of the plurality of zones, the corresponding shipping method and the average quality of material for the material identification code can be stored, along with the material identification code in a statistical record in the database 22.

[0024] FIG. 4 illustrates an example of a statistical record 150, such as the statistical record explained with respect to FIG. 1. The statistical record 150 can include a material identification code that can identify material provided to a plurality of recipients (e.g., the recipients 18 illustrated in FIG. 1). A print order identifier (labeled in FIG. 4 as "PRINT ORDER ID") can identify the particular print order associated with the material ID code. The statistical record 150 can further include a PSP identifier (labeled in FIG. 4 as "PSP ID") that identifies the PSP employed to prepare the material corresponding to the material identification code. Yet further, the statistical record 150 can include a job type that identifies the job type of the print order identified by the print order identifier. Moreover, the statistical record 150 can include an average quality. The statistical record 150 can also include a statistical mean time to arrival (e.g., 24 hours, 2 days, 3 days, etc.) for each of a plurality of zones, such as described herein. The statistical record 150 can further include a statistical variance for each of the plurality of zones. The statistical record 150 can include a shipping method (labeled in FIG. 4 as "SHIPPING METHOD 1") that

characterizes a mode of transportation employed to provide the statistical mean time to arrival and the statistical variance for each of the plurality of zones. Accordingly, multiple layers of the statistical mean time to arrival and the statistical variance for each of the plurality of zones can be included for different shipping methods. In other examples, more or less data fields could be employed.

[0025] Referring back to FIG. 1, the print order hub 12 can employ each material identification code to determine a statistical mean time to arrival and a statistical variance for a given job type for a plurality of different zones (e.g., zip codes, time zones, area codes, etc.) for each of the PSPs 14 registered with the print order hub 12. The statistical mean time to arrival for a given job type can be calculated by the print order hub 12 for a given PSP 14 by the of the plurality of PSPs 14, for example, by calculating a statistical mean (e.g., arithmetic mean or average) for each of the plurality of zones of each material identification code associated with the given PSP 14. In a similar manner, a statistical variance for each zone for the given job type can also be calculated. Moreover, an average quality of material can also be calculated for the given PSP 14 of each of the plurality of job types. In some examples, the print order hub 12 can determine a shipping method (e.g., air, ground, boat or a combination thereof) employed to provide material for the statistical mean time to arrival for each zone for the plurality of job types. The print order hub 12 can store the statistical mean time to arrival and the corresponding statistical variance for each of the plurality of zones for each of the plurality of job type, the corresponding shipping method, as well the average quality for the plurality of job types in a PSP record associated with a given PSP 14. Each PSP record can be stored in the database 22.

[0026] FIG. 5 illustrates an example of a PSP record 200, such as the PSP record described with respect to FIG. 1. In FIG. 5, a PSP identifier (labeled in FIG. 5 as "PSP ID") can identify a PSP corresponding to the PSP record 200. The PSP record 200 can also include an address that identifies a geographical location of the corresponding PSP. The PSP record 200 can further include a statistical mean time to arrival for a plurality of zones for a plurality of different job types. For instance, in the example illustrated in FIG. 5, for Zone 2, there is a statistical mean time to arrival

for a job of type 'A' of 3 days with a variance of 55%, for a job type 'B' of 2 days with a variance of 75% and a job of type 'C' of 3 days with a variance of 90%. Stated differently, in the example illustrated in FIG. 5, PSP 1 on average has been able to provide material corresponding to job type 'B' to recipients (e.g., the recipients 18 illustrated in FIG. 1) within Zone 2 within two days 75% of the time. It is noted that although three different zones and job types are illustrated in FIG. 5, more or less zones and/or job types could also be employed. The statistical record 200 can include a shipping method (labeled in FIG. 5 as "SHIPPING METHOD 1") that characterizes a mode of transportation employed to provide the statistical mean time to arrival and the statistical variance for each zone for each of the plurality of job types. Accordingly, multiple layers of the statistical mean time to arrival and the statistical variance to each zone for each of the plurality of job types can be included for different shipping methods. Furthermore, the PSP record 200 can include an average quality for each job type. In other examples, more or less data fields could be employed.

[0027] Referring back to FIG. 1, the print order hub 12 can communicate with a client computer 24. The client computer 24 could be implemented, for example, in a manner similar to the recipient computer 20. In one example, a user 26 can employ the client computer 24 to communicate with the print order hub 12 via a browser 28 (e.g. a web browser). The print order hub 12 can include an arrival time estimator 30 that can prompt the user 26 for parameters of a print order. Such parameters could include, for example, delivery address (or a plurality of addresses), format, finishing, binding, ink type, substrate, language, lead time, value added services, etc. for the print order. In response, the arrival time estimator 30 can determine a job type and a delivery zone for a given PSP 14 (or PSPs 14) that corresponds to the print order. The delivery zone can be a geographic area encompassing the delivery address of the print order. In some examples, the delivery zone can correspond to a geographic area defined by a zip code, an area code, a time zone, etc. In this manner, the delivery zone can correspond to zone in a statistical record and/or a PSP record. Moreover, the arrival time estimator 30 can estimate an arrival timeframe that corresponds to an estimation of a timeframe that

the delivery zone can be serviced (e.g., material being prepared for and received at the delivery zone).

[0028] The estimation of the arrival timeframe can be based, for example, on a statistical mean time to arrival for a zone corresponding to the delivery zone stored in a PSP record corresponding to the given PSP 14. In such a situation, the given PSP 14 can be, for example, the PSP 14 of the plurality of PSPs 15 that has a shortest estimated arrival timeframe for the delivery zone that can provide a job type within the parameters set forth by the print order. Further, a plurality of PSPs can be selected by the print order hub 12 as the given PSPs in situations where the print order includes a plurality of addresses corresponding to different delivery zones. In these situations, the given PSPs 14 can be a subset of the plurality of PSPs 14 that such that each PSP 14 of the subset of the plurality of PSPs 14 has a shortest estimated arrival timeframe for a given delivery zone of the different delivery zones and can provide a job type within the parameters set forth by the print order.

[0029] In a similar manner, the arrival time estimator can calculate a confidence percentage for the print order. The confidence percentage can represent likelihood that the given PSP will be able to deliver material to the delivery address within the estimated arrival timeframe. The confidence percentage can be based on a statistical variance that corresponds to the statistical mean time to arrival for the zone that corresponds to the delivery zone stored in the PSP record corresponding to the given PSP 14.

[0030] In some examples, the print order hub 12 can modify the estimated arrival timeframe and/or the confidence percentage based on environmental factors. The environmental factors can include, for example, a date the print order is provided, weather conditions, etc. For instance, if the user provides the print order at or near a holiday season, the print order hub 12 can increase the estimated arrival timeframe (e.g., by one or two days) and/or decrease the confidence percentage to reflect a work load at the given PSP.

[0031] The arrival time estimator 30 can determine an average quality based on a PSP record for the given PSP 14 and/or the determined job type. In some examples, the arrival time estimator 30 can determine a mode of transportation (e.g.,

truck, train, plane, boat or a combination thereof) needed to deliver the material to the delivery address within the estimated arrival timeframe, which can be referred to as a shipping method. Further, in some examples, the print order hub 12 can calculate a "green" value for the print order. The green value could characterize, for example carbon emissions needed to deliver material to the delivery address identified in the print order. The green value could vary based on the shipping method, travel distance from the given PSP to the delivery address, etc. In one example, the arrival time estimator 30 can provide the client computer 24 with a GUI (e.g., a webpage) that can provide the estimated arrival timeframe, the confidence percentage, the estimated quality, shipping method and the green value for the print order.

[0032] Referring back to FIG. 1, upon the client computer 24 receiving the GUI that provides the estimated arrival timeframe, confidence value, the estimated quality, shipping method and the green value, the user 26 can decide whether to proceed with the print order. If the user 26 elects not to proceed with the print order, the user 26 may decide to modify the parameters of the print order and resubmit the print order to the print order hub 12 for a new estimate of arrival timeframe, the confidence percentage, the quality, shipping method and the green value. If the user 26 elects to proceed with the print order, the user 26 can employ the client computer 24 to interface with the print order hub 12 to fulfill the print order at a PSP 14 (or PSPs 14).

[0033] By employment of the system 2, the user 26 can be provided with a relatively accurate estimate of an arrival timeframe for a given job type to a delivery address identified with the print order. Moreover, since the estimate of the arrival timeframe is based on historical data, greater reliance can be made by the user 26 as to the accuracy of the estimate.

[0034] FIG. 6 illustrates an example of a print order system 300 that can be utilized to implement, for example, the print order system 6 illustrated in FIG. 1. The print order system 300 can include a memory 302 for storing machine readable instructions. The memory 302 could be implemented, for example, as random access memory, flash memory, a hard disk, a combination thereof, etc. The print

order system 300 can also include a processing unit 304 that can access the memory 302 and executes machine readable instructions. The processing unit 304 can be implemented, for example, as a processor core.

[0035] The print order system 300 can be coupled to a network 306 (e.g., the Internet) via a network interface 308, which could be implemented as a network interface card. The memory 302 can include a print order hub 310 that can estimate a time to arrival for a print order.

[0036] The print order hub 310 can include a historical data manager 312 that can receive and analyze feedback data provided from a computer employed by a recipient regarding material provided to the recipient from a PSP registered with the print order hub 310 for a print order. In one example, the historical data manager 312 can receive feedback data provided by a given recipient through an online survey. In some examples, the online survey could be implemented in a manner similar to the survey 100 illustrated in FIG. 3. In response to the feedback data for the given recipient, the historical data manager 312 can store the feedback data in a feedback record in a database that can be stored in data storage 314. The data storage 314 can include, for example, a database. The data storage 314 can be implemented, for example as volatile memory (e.g., RAM) or non-volatile memory (e.g. a hard disk and/or a flash drive). In a similar manner, the historical data manager 312 can receive feedback data for a plurality of materials provided to a plurality of recipients and store the feedback data in a plurality of feedback records in the database.

[0037] The historical data manager 312 can employ the feedback records to generate a statistical record based on feedback records that have a common material identification code. The statistical record could be implemented in a manner similar to the statistical record 150 illustrated in FIG. 4. In this manner, the historical data manager 312 can generate a plurality of statistical records. The statistical records can be stored in the database. Moreover, the historical data manager 312 can employ the plurality of statistical records to generate a PSP record for each PSP registered with the print order hub 310. The PSP record could be implemented, for example in a manner similar to the PSP record 200 illustrated in FIG. 5.

[0038] The print order hub 310 can include a data collector 316 that can receive data related to a print order from a client computer. The data could include, for example, parameters of a print order (e.g., delivery address (or addresses), format, finishing, ink type, substrate, language, lead time, value added services, etc.). The data collector 316 can provide the data related to the print order to an arrival time estimator 318 of the print order hub 310. The arrival time estimator 318 can employ the parameters of the print order to determine a job type and a delivery zone for the print order. The arrival time estimator 318 can employ the determined job type, the delivery zone and the PSP records to estimate an arrival timeframe, a confidence percentage, an estimated quality, a shipping method and a green value for the print order. The estimated arrival timeframe can represent an average arrival timeframe for the delivery address from a given PSP (or a plurality of PSPs), while the confidence percentage can represent the likelihood that that estimated arrival timeframe is accurate. The shipping method can characterize a mode (or modes) of transportation needed to deliver material for the print order to the delivery address (or addresses) by the given PSP (or the plurality of PSPs) within the estimated arrival timeframe. The green value can represent an estimate of environmental conditions (e.g., carbon emissions) needed to deliver material to the delivery address by the given PSP (or the plurality of PSPs) in the estimated timeframe.

[0039] The arrival time estimator 318 can provide data characterizing the estimated arrival time, the confidence value, the estimated quality and green value in a GUI (e.g., a webpage) to the client computer. A user of the client computer can employ such data to determine whether to proceed with the print order.

[0040] In view of the foregoing structural and functional features described above, example methods will be better appreciated with reference to FIGS. 7-8. While, for purposes of simplicity of explanation, the example methods of FIGS. 7-8 are shown and described as executing serially, it is to be understood and appreciated that the present examples are not limited by the illustrated order, as some actions could in other examples occur in different orders and/or concurrently from that shown and described herein. Moreover, it is not necessary that all described actions be performed to implement a method.

[0041] FIG. 7 illustrates a flow chart of an example method 400 for estimating an arrival timeframe for a print order. The method 400 could be executed, for example, by a print order system (e.g., the system 2 illustrated in FIG. 1 and/or the print order system 300 illustrated in FIG. 6). At 410, feedback data can be received at a print order hub of the print order system from a computer employed by a recipient of material prepared for a print order. Moreover, multiple instances of the feedback data can be received at the print order hub. The feedback data can represent, for example, answers to a survey entered by a plurality of recipients of material prepared for a plurality of print orders. In one example, the survey could be implemented in a manner similar to the survey 100 illustrated in FIG. 3. In some examples, the feedback data can be stored as feedback records in a database.

[0042] At 420, statistical records can be generated by the print order hub based on the feedback records. Each statistical record can include data characterizing a statistical mean time to arrival for a plurality zones (e.g., zip codes, area codes, time zones, etc.) for material with a given material identification code. In one example, the statistical records could be implemented in a manner similar to the statistical record 150 illustrated in FIG. 4. At 430, PSP records for each PSP registered with the print order hub can be generated by the print order hub based on the statistical records. Each PSP record could be implemented, for example in a manner similar to the PSP record 200 illustrated in FIG. 5.

[0043] At 440, the print order hub can receive parameters for a print order from a client computer. The parameters could specify, for example, a delivery address (or a plurality of addresses), format, finishing, ink type, substrate, language, lead time, value added services, etc., of the print order. At 450, an arrival time estimator of the print order hub can determine arrival data that can include an estimated arrival timeframe, a confidence percentage, an estimated quality, a shipping method and an estimated green value for a delivery zone for that encompasses the delivery address included with the print order. The determination of the estimated arrival time and the confidence value can be based, for example, on a job type for a given PSP (or a plurality of PSPs) corresponding to the parameters of the print order, the delivery address included with the print order and data in the

PSP records. The given PSP (or PSPs) can be, for example, the PSP of the plurality of PSPs for which the estimated arrival time for the delivery zone is the shortest and wherein the PSP of the plurality of PSPs can provide the job type corresponding to the print order. In some examples, the estimation of the arrival timeframe and the confidence percentage can also be based on environmental factors (e.g., date of print order, weather conditions, etc.).

[0044] At 460, the print order hub can provide data (e.g., a GUI, such as a webpage) to a client computer that characterizes the arrival data (or some subset thereof). By employment of the method 400, a user of the client computer could be provided with an accurate estimate of an arrival timeframe for the print order. In this manner, the user would be able to make an informed decision as to whether to proceed with the print order.

[0045] FIG. 8 illustrates another flowchart of an example method 500 for estimating an arrival timeframe for a print order. The method 500 could be executed, for example, by a print order system (e.g., the system 2 illustrated in FIG. 1 and/or the print order system 300 illustrated in FIG. 6). At 510 a statistical mean time to arrival for a plurality of print orders from a print service provider (PSP) for a plurality of zones can be determined, for example, by a historical data manager of the print order system. The statistical mean time to arrival for a given zone of the plurality of zones can be based on feedback data corresponding to a subset of the plurality of prior print orders. At 520, a data that characterizes an estimated arrival timeframe to a delivery address for material for a print order can be generated, for example, by an arrival time estimator of the print order system. The estimated arrival time can be based, for example on the statistical mean time to arrival for the given zone

[0046] FIG. 9 is a schematic block diagram illustrating an example system 600 of hardware components capable of implementing examples disclosed in FIGS. 1-8, such as the print order system 6, the client computer 24, and portions of the of the PSPs 14 illustrated in FIG. 1 and/or the print order system 300 illustrated in FIG. 6. The system 600 can include various systems and subsystems. The system 600 can be a personal computer, a laptop computer, a workstation, a computer system, an appliance, an application-specific integrated circuit (ASIC), a server, a server blade

center, a server farm, a mobile device, such as a smart phone, a personal digital assistant, etc.

[0047] The system 600 can include a system bus 602, a processing unit 604, a system memory 606, memory devices 608 and 610, a communication interface 612 (e.g., a network interface), a communication link 614, a display 616 (e.g., a video screen), and an input device 618 (e.g., a keyboard and/or a mouse). The system bus 602 can be in communication with the processing unit 604 and the system memory 606. The additional memory devices 608 and 610, such as a hard disk drive, server, stand alone database, or other non-volatile memory, can also be in communication with the system bus 602. The system bus 602 operably interconnects the processing unit 604, the memory devices 606-610, the communication interface 612, the display 616, and the input device 618. In some examples, the system bus 602 also operably interconnects an additional port (not shown), such as a universal serial bus (USB) port.

[0048] The processing unit 604 can be a computing device and can include an application-specific integrated circuit (ASIC). The processing unit 604 executes a set of instructions to implement the operations of examples disclosed herein. The processing unit can include a processor core.

[0049] The additional memory devices 606, 608 and 610 can store data, programs, instructions, database queries in text or compiled form, and any other information that can be needed to operate a computer. The memories 606, 608 and 610 can be implemented as computer-readable media (integrated or removable) such as a memory card, disk drive, compact disk (CD), or server accessible over a network. In certain examples, the memories 606, 608 and 610 can comprise text, images, video, and/or audio.

[0050] Additionally, the memory devices 608 and 610 can serve as databases or data storage such as the data storage 314 illustrated in FIG. 6. Additionally or alternatively, the system 600 can access an external system (e.g., a web service) through the communication interface 612, which can communicate with the system bus 602 and the communication link 614.

[0051] In operation, the system 600 can be used to implement, for example, a client computer, a print order hub, and at least some components of PSPs that can fulfill a print order. Computer executable logic for implementing the system, such as the memory 8 of the print order system 6 illustrated in FIG. 1 and/or the print order system 300 illustrated in FIG. 6, can reside in the system memory 606, and/or in the memory devices 608 and/or 610 in accordance with certain examples. The processing unit 604 executes one or more machine readable instructions originating from the system memory 606 and the memory devices 608 and 610. In such an example, the system memory 606 and/or the memory devices 608 and/or 610 could be employed, for example, to implement the memory 8 illustrated in FIG. 1 and/or the memory 302 illustrated in FIG. 6. The term "computer readable medium" as used herein refers to a medium that participates in providing instructions to the processing unit 604 for execution.

[0052] Where the disclosure or claims recite "a," "an," "a first," or "another" element, or the equivalent thereof, it should be interpreted to include one or more than one such element, neither requiring nor excluding two or more such elements. Furthermore, what have been described above are examples. It is, of course, not possible to describe every conceivable combination of components or methods, but one of ordinary skill in the art will recognize that many further combinations and permutations are possible. Accordingly, the invention is intended to embrace all such alterations, modifications, and variations that fall within the scope of this application, including the appended claims.

CLAIMS

What is claimed is:

1. A system comprising:

a memory for storing machine readable instructions; and

a processing unit for accessing the memory and executing the machine readable instructions, the machine readable instructions comprising:

a print order hub comprising an arrival time estimator to estimate an arrival timeframe for material provided from a print service provider (PSP) corresponding to a print order based on historical data related to a plurality of prior print orders, a delivery address of the print order and a job type corresponding to the print order.

2. The system of claim 1, wherein the print order hub is to determine a statistical mean time to arrival for a plurality of zones for material of a given job type prepared for a prior print order based on feedback data.

3. The system of claim 2, wherein the print order hub is further to determine a variance for each of the plurality of zones for the given job type.

4. The system of claim 1, wherein the arrival time estimator is further to determine a delivery zone that encompasses the delivery address.

5. The system of claim 4, wherein the arrival time estimator is further to estimate a green value that characterizes estimated carbon emissions needed to deliver the material to the delivery address.

6. The system of claim 1, wherein the delivery address comprises a plurality of delivery addresses and the PSP comprises a plurality of PSPs.

7. The system of claim 1, wherein the arrival time estimator is further to determine a confidence value that characterizes a likelihood that the estimated arrival timeframe is accurate.

8. The system of claim 1, wherein the arrival time estimator is further to determine a shipping method that characterizes a mode of transportation needed to provide the material within the estimated arrival timeframe.

9. A method comprising:

determining a statistical mean time to arrival for material prepared for a plurality of prior print orders from a print service provider (PSP) for a plurality of zones, wherein the statistical mean time to arrival for a given zone of the plurality of zones is based on feedback data corresponding to a subset of the plurality of prior print orders; and

generating data that characterizes an estimated arrival timeframe for a delivery address for material for a print order, wherein the estimated arrival time is based on the statistical mean time to arrival for the given zone.

10. The method of claim 9, wherein the print order comprises a plurality of parameters defining specifications of the print order.

11. The method of claim 9, further comprising generating an estimated confidence value that characterizes likelihood that the estimated arrival time is accurate.

12. The method of claim 11, wherein the estimated time to arrival and the confidence value are based on an environmental factor.

13. The method of claim 9, wherein each of the plurality of zones comprises a geographic area defined by a zip code.

14. A computer readable medium having machine readable instructions comprising:

a print order hub comprising:

a historical data manager to:

receive feedback data from a plurality of client computers, the feedback data characterizing an arrival time and a quality of materials for a plurality of prior print orders provided to a plurality of recipients;

determine a statistical mean time to arrival for a plurality of zones for each material with a common material identification code based on the feedback data; and

determine a statistical mean time to arrival from a plurality of PSPs for the plurality of zones for a plurality of job types based on the statistical mean time to arrival each material with a common identification code; and

an arrival time estimator to:

estimate an arrival timeframe for a delivery address of a print order based on (i) a delivery zone that encompasses the delivery address and (ii) a job type corresponding to the print order; and

estimate a confidence value that characterizes likelihood of accuracy of the arrival timeframe.

15. The computer readable medium of claim 14, wherein the confidence value is based on a statistical variance of the statistical mean time to arrival for the zone corresponding to the delivery zone.

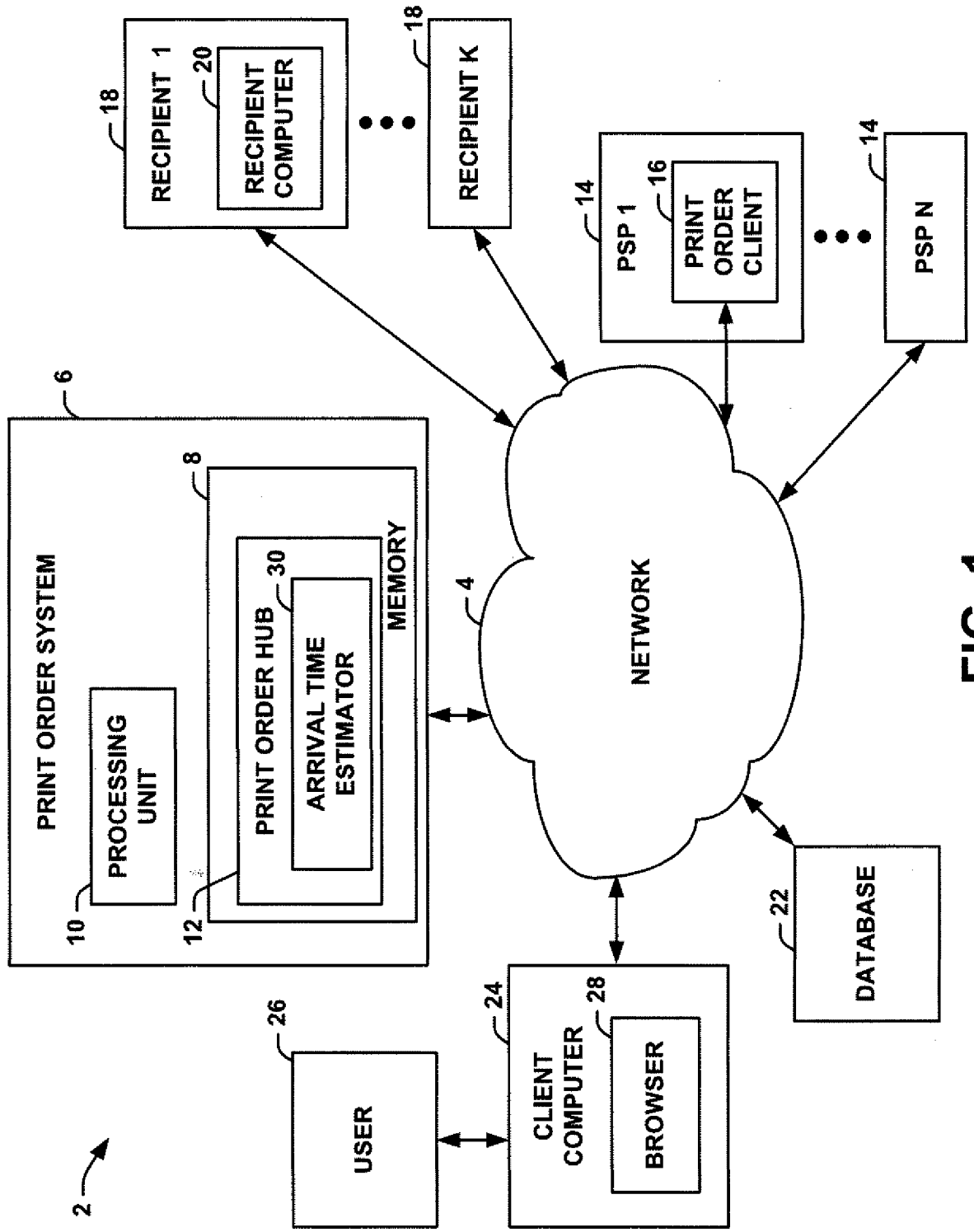
2
PRINT ORDER SYSTEM
6
PROCESSING UNIT
10
MEMORY
8
PRINT ORDER HUB
30
ARRIVAL TIME ESTIMATOR
12
NETWORK
4
RECIPIENT 1
18
RECIPIENT COMPUTER
20
RECIPIENT K
18
PSP 1
14
PRINT ORDER CLIENT
16
PSP N
14
DATABASE
22
USER
26
CLIENT COMPUTER
24
BROWSER
28

FIG. 1

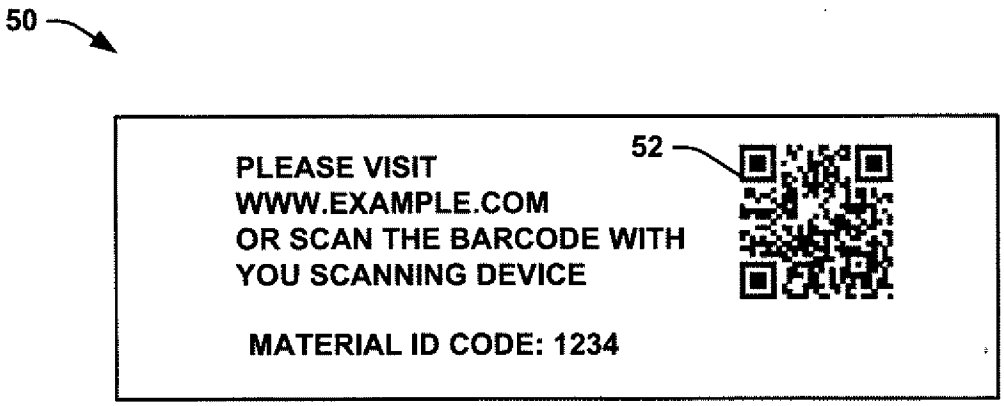
50
52
PLEASE VISIT
WWW.EXAMPLE.COM
OR SCAN THE BARCODE WITH
YOU SCANNING DEVICE
MATERIAL ID CODE: 1234

FIG. 2

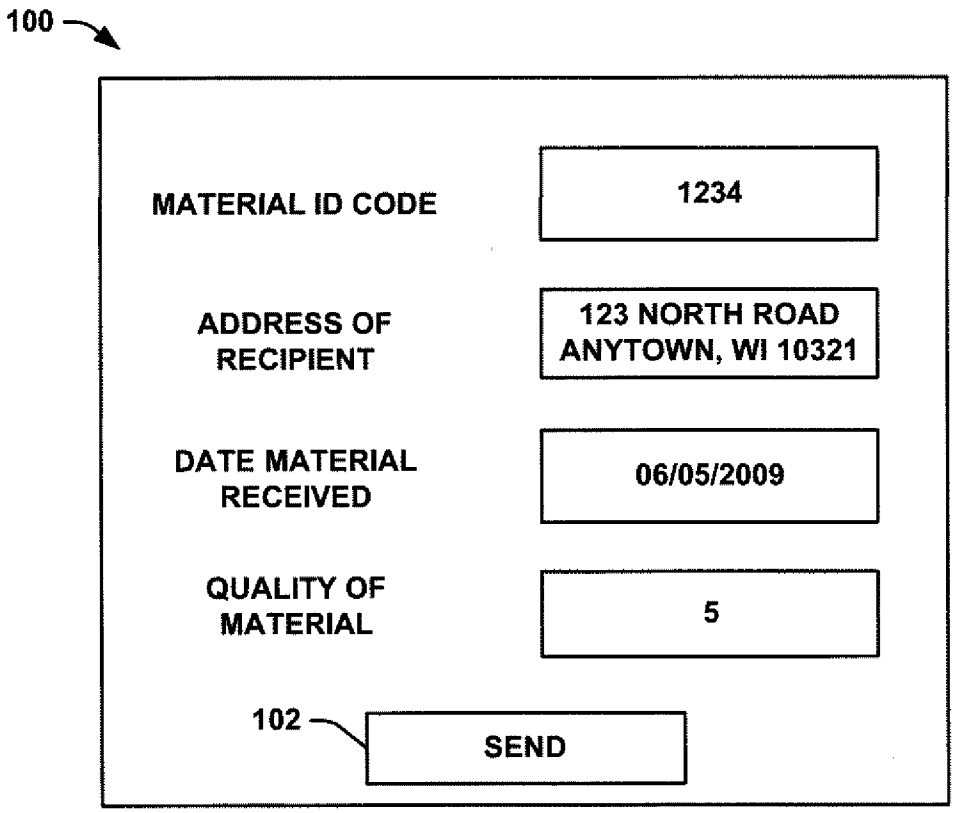
100
MATERIAL ID CODE
1234
ADDRESS OF RECIPIENT
123 NORTH ROAD
ANYTOWN, WI 10321
DATE MATERIAL RECEIVED
06/05/2009
QUALITY OF MATERIAL
5
102
SEND

FIG. 3

150

MATERIAL ID CODE	1234			
PRINT ORDER ID	5678			
PSP ID	PSP 1			
JOB TYPE	A			
AVERAGE QUALITY	7.2			
SHIPPING METHOD 1	ZONE 1	ZONE 2	ZONE 3	ZONE 4
STATSTICAL MEAN TIME TO ARRIVAL	24 HOURS	2 DAYS	24 HOURS	3 DAYS
STATISTICAL VARIANCE	65%	90%	95%	99%

FIG. 4

200

PSP ID: PSP 1			
ADDRESS: 10 SOUTH ROAD, SPRINGFIELD, NT 10507			
	JOB TYPE		
SHIPPING METHOD 1	A	B	C
STASTICAL MEAN TIME TO ARRIVAL FOR ZONE 1	24 HOURS	2 DAYS	1 DAY
STATISTICAL VARIANCE FOR ZONE 1	80%	95%	99%
STASTICAL MEAN TIME TO ARRIVAL FOR ZONE 2	3 DAYS	2 DAYS	3 DAYS
STATISTICAL VARIANCE FOR ZONE 2	55%	75%	90%
STASTICAL MEAN TIME TO ARRIVAL FOR ZONE 3	24 HOURS	24 HOURS	3 DAYS
STATISTICAL VARIANCE FOR ZONE 3	98%	75%	82%
AVERAGE QUALITY	4.2	6.5	8.1

FIG. 5

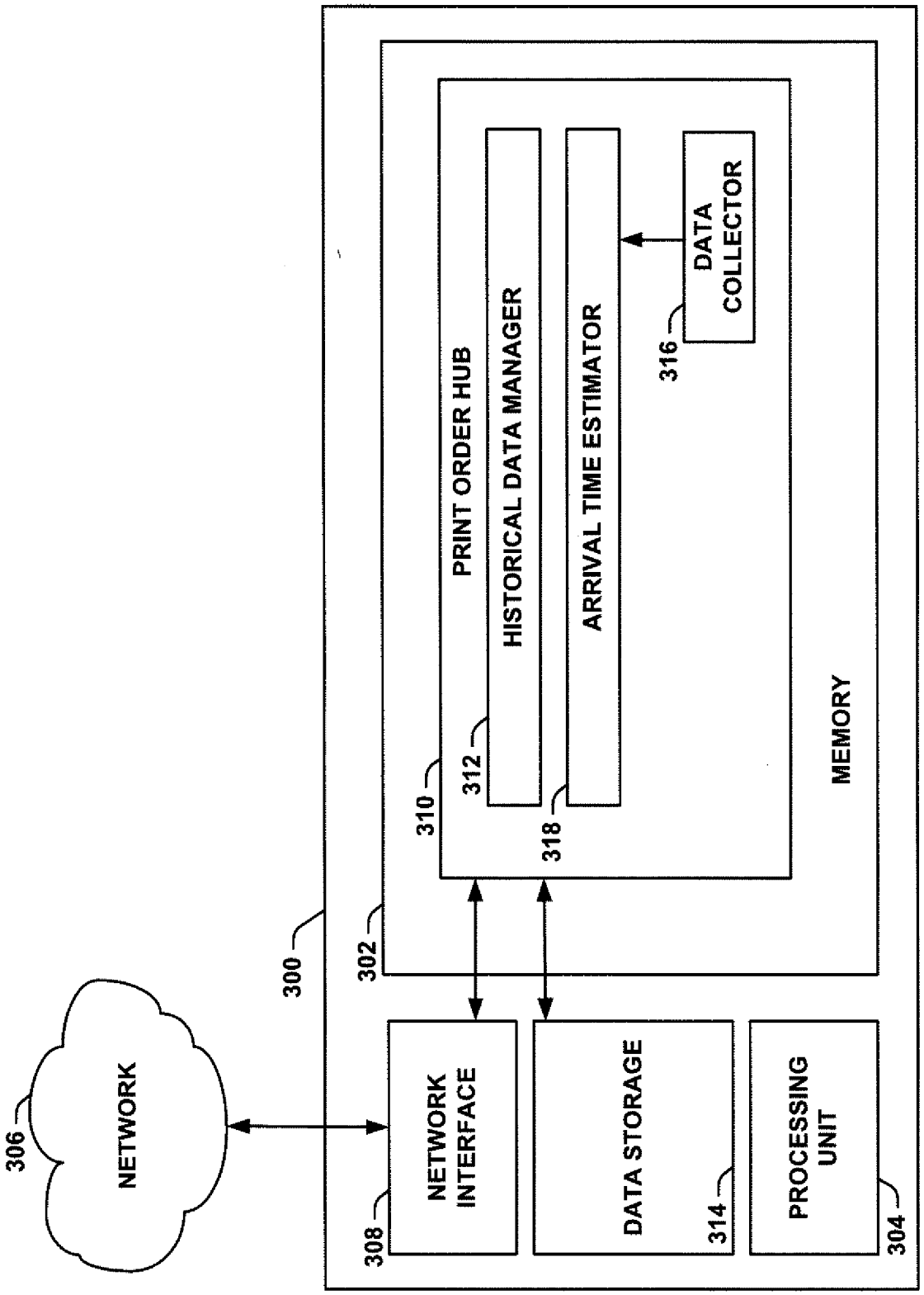
NETWORK
306
300
302
PRINT ORDER HUB
310
HISTORICAL DATA MANAGER
312
ARRIVAL TIME ESTIMATOR
318
DATA COLLECTOR
316
MEMORY
NETWORK INTERFACE
308
DATA STORAGE
314
PROCESSING UNIT
304

FIG. 6

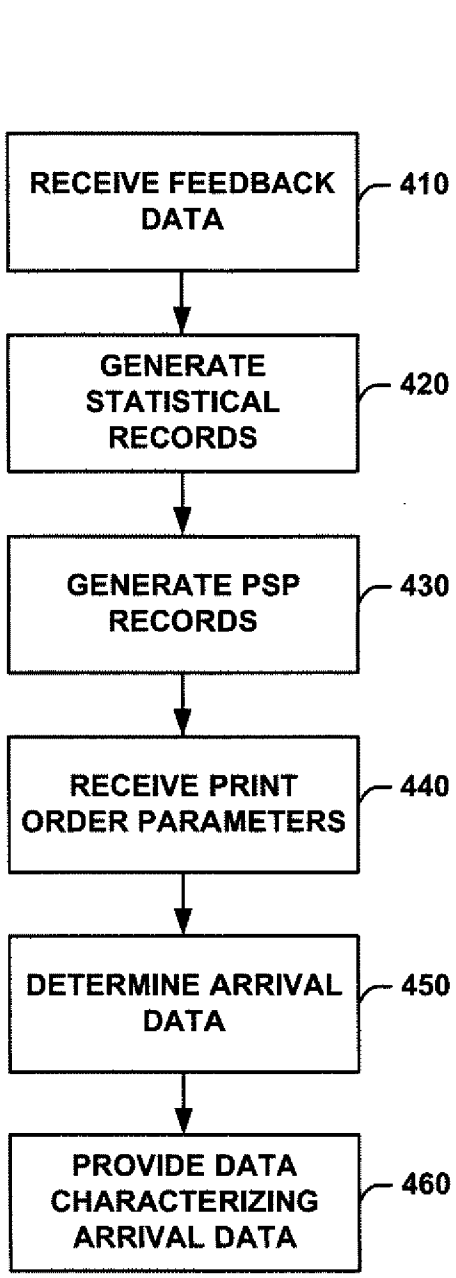
400
RECEIVE FEEDBACK DATA
410
GENERATE STATISTICAL RECORDS
420
GENERATE PSP RECORDS
430
RECEIVE PRINT ORDER PARAMETERS
440
DETERMINE ARRIVAL DATA
450
PROVIDE DATA CHARACTERIZING ARRIVAL DATA
460

FIG. 7

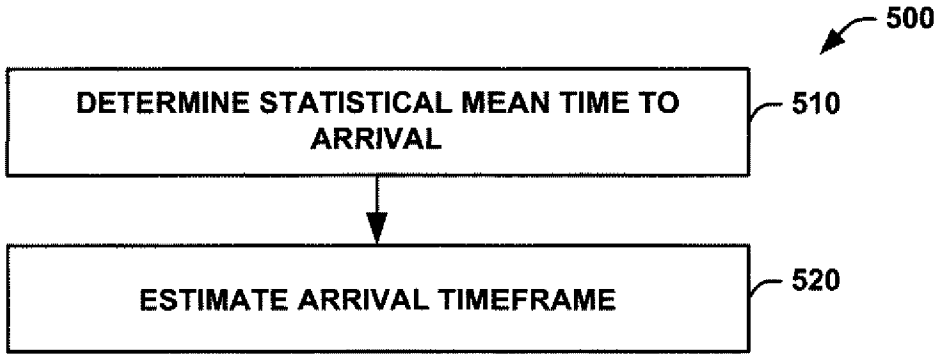
500
DETERMINE STATISTICAL MEAN TIME TO ARRIVAL
510
ESTIMATE ARRIVAL TIMEFRAME
520

FIG. 8

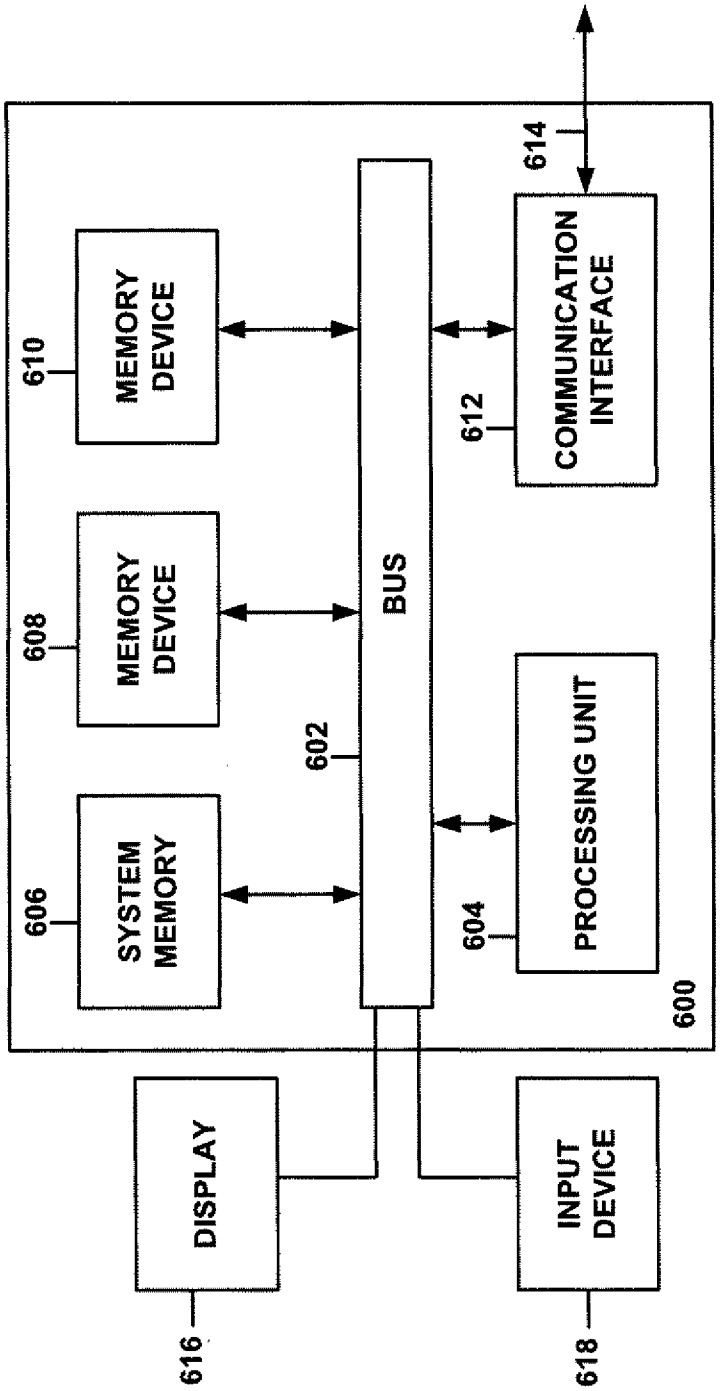
614
COMMUNICATION INTERFACE
612
610
MEMORY DEVICE
608
MEMORY DEVICE
606
SYSTEM MEMORY
602
BUS
604
PROCESSING UNIT
600
DISPLAY
616
INPUT DEVICE
618

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2011/051930

A. CLASSIFICATION OF SUBJECT MATTER

G06F 3/12(2006.01)i, G06F 15/16(2006.01)i, G06F 9/44(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G06F 3/12; G06F 15/00; B41B 1/02; G06F 17/60; B41F 33/00

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: POD, print on demand, print, publish, order, arrival time, estimate, historical data, statistical mean.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2005-208689 A (CANON INC.) 04 August 2005 See the abstract, paragraphs [0010]-[0022],[0065]-[0070], and claim 1.	1-15
A	US 2008-0180729 A1 (LAVIGNE TOBY et al.) 31 July 2008 See the abstract, figures 8,10, paragraphs [0009]-[0028], and claims 1,14,21.	1-15
A	US 2002-0046129 A1 (SHIGEHARU NAKAGAWA) 18 April 2002 See the abstract, paragraphs [0007]-[0020], and claims 1-3.	1-15
A	US 2005-0243365 A1 (AKIHIKO NODA) 03 November 2005 See the abstract and paragraphs [0028]-[0038].	1-15

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

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 MARCH 2012 (28.03.2012)	**09 APRIL 2012 (09.04.2012)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
Government Complex-Daejeon, 189 Cheongsa-ro,
Seo-gu, Daejeon 302-701, Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
Choi, Jae Gwi
Telephone No. 82-42-481-5787

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2011/051930

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2005-208689 A	04.08.2005	None	
US 2008-0180729 A1	31.07.2008	None	
US 2002-0046129 A1	18.04.2002	JP 2002-123575 A	26.04.2002
US 2005-0243365 A1	03.11.2005	JP 2005-339515 A	08.12.2005
		JP 2010-282634 A	16.12.2010
		JP 4592081 B2	01.12.2010
		US 8004702 B2	23.08.2011