An Artificial Intelligent based Online Marketing Framework for prediction of product availability in retail environment using IoT

FIELD OF INVENTION

[0001] The present invention relates to the technical field of customer relationship management framework in an organization. The field of the invention is to provide a customer relationship management framework by providing product prediction on the basis of product availability in online marketing.

[0002] More particularly, this present invention relates to the field of automatically providing online marketing prediction using Internet of Things (IoT) sensors-based product availability in retail environment to thecustomers for building strong customer relationships and growing retail business efficiently using technology.

BACKGROUND & PRIOR ART

[0003] The subject matter discussed in the background section should not be assumed to be prior art merely as a result of its mention in the background section. Similarly, a problem mentioned in the background section or

associated with the subject matter of the background section should not be assumed to have been previously recognized in the prior art. The subject matter in the background section merely represents different approaches, which in-and-of-themselves may also be inventions.

[0004] customer relationship management of an organization is one of the most important tasks and requisite to grow a business. Customer relationship management is a technology to manage the organizations relationships and interactions with customers/buyers and potential customers. The motive or objective of the customer relationship management framework is to improve business relationships and improving business performance. A customer relationship management framework aids the organization stay connected with the customers, streamline the business process and improve business profitability. Customer relationship management is the combination of planning, practices and technology that an organization uses to manage and analyze customer interaction and data throughout the customer lifecycle. In the old times, the functions of customer relationship management are performed manually while with the advent of the technology, the customer relationship management has been replaced by customer relationship management framework. The use of customer relationship management framework will benefit organization to grow from small business to large business.

[0005] Now, with the advancement in technology, customer relationship management framework is also evolved while using technology. Customer relationship management framework include managing contacts of the customer and compilation of huge amount of data using technology. One of the most important aspect of having strong or good customer relationship

management in online shopping is recommending the customers regarding products available in the category in which customer is searching product or interested in buying the products. In retail environment, there are various category of product available in a kind of retail business. Further, in each category, availability of the product is also an important aspect. Further, manually counting the product in each category with every brand is not possible as it amounts to a lot of data. Secondly, for counting manually and feeding the data into the framework requires a large number of human resources which indirectly amounts to a major expense in maintaining the human resources. This consequently also give birth to a error prone framework as counting and feeding the large amount of data into framework daily and dynamically will cause error in the framework. Hence it is the requirement or essentiality to provide the product availability in online marketing product prediction automatically.

[0006] In the era of technology, the most advanced technologies for automation involves Internet of Things (IoT) and machine learning. Both the technologies mentioned above are most advanced and efficient technologies which are used for automation now a days. Internet of Things (IoT) is the concept of connecting any device (so long as it has an on/off switch) to the Internet and to other connected devices. The IoT is a giant network of connected things and people – all of which collect and share data about the way they are used and about the environment around them. Devices and objects with built in sensors are connected to an Internet of Things platform, which integrates data from the different devices and applies analytics to share the most valuable information with applications built to address specific needs. These powerful IoT platforms can pinpoint exactly what information is useful and what can safely be ignored. This information can be used to detect

patterns, make predictions, and detect possible problems before they occur.

[0007] Now, if we talk about machine learning, machine leaning is an intelligence demonstrated by machines, unlike the natural intelligence displayed by humans and animals. As the use of machine learning models are increasing in every field for improving the effectiveness and correctness of the work to be done. The machine learning models are based on various models that makes the said framework more competent and capable in the said field. Machines can work and act like a human if they have enough information. So, in machine learning models, knowledge engineering plays a vital role. The relation between objects and properties are established to implement knowledge engineering.

[0008] Hence, the use of machine learning makes any technology related framework automated and more efficient. Automatically counting the product availability in each category with every brand can be performed automatically by Internet of Things (IoT) which can be used by the machine learning models to provide online marketing product prediction to the customers in the category in which the same is interested. Hence, there is a need of such a framework that can automatically provide online marketing product prediction using Internet of Things (IoT) sensor-based product availability in retail environment to increase the efficiency and profitability of the retail business. There is various prior art that aim to resolve the said issue which are discussed below:

[0009] US20040225578 A1 – Linking the consumer to retailer pricing and database information creates a full-feature shopping tool. The Internet is used as a vehicle to enable customer access to portions of this information from any

remotely located computer. Using software resident on the remote computer, the consumer may interact with the database through a Web service to check on product availability, identify item discounts, view promotional specials, access product information, price comparison shop, and plan their shopping visit to the store. The patented Display Edge Technology, Ltd. (DET) Electronic Shelf Label (ESL) Framework facilitates the Web service with access to the store database. In addition, the ESL framework allows for the highlighting of special pricing or tier pricing utilizing display screen annunciators or light emitting devices.

[0010] US5736967 A – A product information display framework has electronic display tags for displaying pricing and product information for products in stores or warehouses. The electronic display tags are electromagnetically coupled to a conductor. A control circuit is used to generate an information signal which contains a tag address and related data. A modulator circuit modulates an a-c. power signal with the information signal and applies it to the conductor for transmission to the display tags. Each of the display tags is equipped with a coil that is electromagnetically coupled to the conductor for picking up the signals carried by the conductor. A demodulator is used to demodulate the signal picked up by the coil to obtain the original information signal. Each of the display tags is provided with a manually operated switch for initializing the tags with initial addresses transmitted by the conductor. A microprocessor in the electronic tag then compares the address contained in subsequent information signals with the address stored in the tag's memory. If the addresses match, the microprocessor further processes the information signal for visual display or verification functions.

[0011] US4500880 A – A computer driven, informational display framework is disclosed which visually displays selected information in real time. The arrangement is particularly adapted for displaying pricing and other associated information in retail establishments which utilize the standard Universal Product Code for the items of merchandise for sale. The particular bar code forms a unique address for respective remote display modules at selected locations throughout the store. A source of computer-based information is applied to all of the remote display units in parallel. When a particular display module detects its unique address, the information to be displayed, which follows the addressed code, is processed and used to control the operation of an LCD display.

[0012] JPH02287591 A – To easily and accurately gather various data of a display rack by providing each display device with a data input means, sending article data to a data processing means, and decreasing input misses. A control part is equipped with plural display devices, which have the input means individually. Here, various data are inputted through the input means, specified on the display devices, and sent to the data processing means. The display devices are arranged corresponding to respective articles and the processing means stores the data in an auxiliary storage device in correspondence relation with the display devices and articles. The input data are properly processed by the individual articles and the processing means sends price data on the articles to the display devices, which display rack tags. Further, sale data are sent from a cash register as an in-selling control means to the processing means and the various data are corrected and stored in the storage device.

[0013] US6269342 B1 – An electronic pricing and display framework using programmable electronic shelf tags. Programmable electronic shelf tags are used in connection with apparatus for programming the electronic shelf tags. Pricing and product information is stored in databases of a computer framework for such purposes as inventory control and updating pricing information. A portable programming device is used to transmit programming data Methods are provided for fast and convenient modification of large numbers of electronic shelf tags located throughout a facility (e.g., a retail store).

[0014] US5216233 A – In a preferred data capture framework, a RF data terminal is capable of use alone or with any of a series of scanner modules incorporating diverse scanner technologies such as CCD bar code scanning, area image data reading, cyclically swept laser beam bar code scanning, and RF identification label scanning. In each case, a frontal operating panel of the RF terminal-- scanner framework is held facing the user during scanning, whether the framework is held with the right or left hand. Scanner data is supplied to the RF unit by mating connectors or the like. From the RF unit, the scanner data may be transmitted on-line to a host computer or other receiving station. The family of scanner modules may provide respective laser scanners with respective different wavelengths of illumination so that an optimum module may be selected for reading respective bar codes of differing colour characteristics.

[0015] US20070174144 A1 - A technique for effecting electronic commerce using a data network is described. The data network includes a plurality of frameworks which, together, form an integrated framework for receiving

customer orders for selected items via a data network, fulfilling the customer orders, and delivering the ordered products to the customers. Moreover, according to a specific embodiment, the integrated nature of the framework architecture of the present invention allows the on-line merchant to provide a guarantee to the customer that the ordered items will be available to be delivered to the customer at the specified delivery date, time, and location.

[0016] US4799156 A – A framework for interactive on-line electronic communications and processing of business transactions between a plurality of different types of independent users including at least a plurality of sellers, and a plurality of buyers, as well as financial institutions, and freight service providers. Each user can communicate with the framework from remote terminals adapted to access communication links and the framework may include remote terminals adapted for storage of a remote data base. The framework includes a data base which contains user information. The data base is accessed via a validation procedure to permit business transactions in an interactive on-line mode between users during interactive business transaction sessions wherein one party to the transaction is specifically selected by the other party. The framework permits concurrent interactive business transaction sessions between different users.

[0017] Hence, there are various prior art a framework in retail marketing in the filed of online shopping but none of the cited prior art aims to develop an automatic framework that can dynamically provide product availability to the customer in the category and recommend product based on the data available in the retail shop. The objective of the proposed invention is to provide an automatic framework that can count the product availability category wise dynamically which can be used to provide online marketing product

prediction. The aim here to present this invention is to develop more advanced framework with the current technology to make more efficient and automatic framework. Further, attracting the customers by providing product available in the category in which the customer is interested with different brand is one of the important aspects of the proposed Invention. Customers will be attracted more when they are provided with the more different brand in the searched product category with available price comparison.

[0018] Besides this, there are various prior arts in the state of the art that claims to resolve the problem of providing online marketing product prediction in retail environment but the approach adopted for solving the same need to be further refined. Hence, there is a need to provide an automatic and dynamic online marketing product prediction while providing product availability using IoT sensors with the use of machine learning model for providing better retail environment experience. The aim of the present invention is to use machine learning model that makes less intervention and involvement of the human resources. The use of machine learning model provides more advanced framework for online marketing product prediction in retail environment.

[0019] Groupings of alternative elements or embodiments of the invention disclosed herein are not to be construed as limitations. Each group member can be referred to and claimed individually or in any combination with other members of the group or other elements found herein. One or more members of a group can be included in, or deleted from, a group for reasons of convenience and/or patentability. When any such inclusion or deletion occurs, the specification is herein deemed to contain the group as modified thus

fulfilling the written description of all Markus groups used in the appended claims.

[0020] As used in the description herein and throughout the claims that follow, the meaning of “a,” “an,” and “the” includes plural reference unless the context clearly dictate otherwise. Also, as used in the description herein, the meaning of “in” includes “in” and “on” unless the context clearly dictates otherwise.

[0021] The recitation of ranges of values herein is merely intended to serve as a shorthand method of referring individually to each separate value falling within the range. Unless otherwise indicated herein, each individual value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context.

[0022] The use of any and all examples, or exemplary language (e.g. “such as”) provided with respect to certain embodiments herein is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention otherwise claimed. No language in the specification should be construed as indicating any non-claimed element essential to the practice of the invention.

[0023] The above information disclosed in this Background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

SUMMARY OF THE INVENTION

[0024] Before the present frameworks and methods, are described, it is to be understood that this application is not limited to the particular frameworks, and methodologies described, as there can be multiple possible embodiments which are not expressly illustrated in the present disclosure. It is also to be understood that the terminology used in the description is for the purpose of describing the particular versions or embodiments only and is not intended to limit the scope of the present application. This summary is provided to introduce concepts related to online marketing prediction using Internet of Things (IoT) sensors-based product availability in retail environment and the concepts are further described below in the detailed description. This summary is not intended to identify essential features of the claimed subject matter nor is it intended for use in determining or limiting the scope of the claimed subject matter.

[0025] The present invention mainly solves the technical problems existing in the prior art. In response to these problems, the present invention discloses an automatic and dynamic product availability in each category with different brands using the Internet of Things sensor-based data compilation. The proposed invention provide prediction to the customers in online marketing on the basis of product searched or crawled by the customers. Further, the proposed invention also capable of providing product prediction with appropriate offers on the basis of customers purchase history. The proposed invention is completely automatic and dynamic in nature. The proposed invention provides the solution to efficiently and

conveniently provide product prediction and availability to the customer with interactive and dynamic user interface. The objective of the proposed invention is to provide an automatic framework that can count the product availability category wise dynamically which can be used to provide online marketing product prediction. The aim here to present this invention is to develop more advanced framework with the current technology to make more efficient and automatic framework. Further, attracting the customers by providing product available in the category in which the customer is interested with different brand is one of the important aspects of the proposed Invention.

[0026] The proposed invention comprises a central server storing the data related to the customers, products, offers, brands and customers purchase history of a retail business organization. The said data is stored in the database storing data related to the products brands and offers in each category, customers details like name, contact number, email-id, date of birth and other customer purchase history. The said database also stores information related to the product availability and count using the proposed invention. The central server involved in the present invention is machine learning enabled server.

[0027] The present invention comprises a central server of the business organization which is based on the machine learning model and backed by the database related to the customers, products, offers, brands and customers purchase history of a retail business organization. The central server which is based on machine learning model is intelligent enough and is automatic machine learned using the data available on the central server. Whole process may be implemented in the form of but not limited to hardware component,

software modules, program modules, computer instructions or the like. The machine learning model is initially trained using the data related to customers, product and brand in each category, customer purchase history and test cases. The proposed invention is performed on the central server and IoT sensors are installed in the retails shop or warehouse premises. The RFID tags are attached with each product that are automatically read by IoT sensors automatically and determines the product availability dynamically. The determined product availability along with the customer purchase history and other data are processed at the central server using machine learning model which automatically determines the category of the products in which individual customer are interested in dynamically and recommend the products based on the product category on the computing device of the customer on which the customer is crawling the products using e-commerce website or application of the retail shop or retail organization.

[0028] An aspect of the present disclosure relates to a computer implemented method for automatic online marketing prediction using Internet ofThings (IoT) sensors based product availability in retail environment, the method comprises: scanning, by the Internet of Things (IoT) sensors, the tags attached to the product in retail shop or warehouse; counting and capturing date related to products in each category periodically at regular intervals; transmitting the collected and captured data via communication network to the central server; analyzing, by the machine learning model, on the central server the data collected along with customer purchase history and crawling data; determining, by the machine learning model, product prediction to individual customers; posting, by the central server, to the online website or

mobile application, the product prediction to individual customers based on product recommended determined.

[0029] Another aspect of the present disclosure relates to a computer implemented framework for automatic online marketing prediction using Internet of Things (IoT) sensors based product availability in retail environment, the method comprises: scanning, by the Internet of Things (IoT) sensors, the tags attached to the product in retail shop or warehouse; counting and capturing date related to products in each category periodically at regular intervals; transmitting the collected and captured data via communication network to the central server; analyzing, by the machine learning model, on the central server the data collected along with customer purchase history and crawling data; determining, by the machine learning model, product prediction to individual customers; posting, by the central server, to theonline website or mobile application, the product prediction to individual customers based on product recommended determined.

[0030] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the detailed description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

OBJECTIVE OF THE INVENTION

[0031] A primary object of the present invention is to provide a method for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment.

[0032] Yet another object of the present invention is to provide a framework for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment. The objective of the proposed invention is to provide an automatic framework that can count the product availability category wise dynamically which can be used to provide online marketing product prediction. The aim here to present this invention is to develop more advanced framework with the current technology to make more efficient and automatic framework.

BRIEF DESCRIPTION OF DRAWINGS

[0033] To clarify various aspects of some example embodiments of the present invention, a more particular description of the invention will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. It is appreciated that these drawings depict only illustrated embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail through the use of the accompanying drawings.

[0034] Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in

the art to which the embodiments belong. Although methods and materials similar or equivalent to those described herein can be used in the practice or testing, suitable methods and materials are described below. In case of conflict, the patent specification, including definitions, will control. In addition, the materials, methods, and examples are illustrative only and not intended to be limiting.

[0035] In order that the advantages of the present invention will be easily understood, a detail description of the invention is discussed below in conjunction with the appended drawings, which, however, should not be considered to limit the scope of the invention to the accompanying drawings, in which:

[0036] Figure 1 shows block-diagram of the online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment incorporating all the embodiment of the framework of the present invention.

[0037] Figure 2 shows a flow-diagram of computer implemented method for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment in accordance with the present invention.

DETAIL DESCRIPTION

[0038] The present invention relates to a computer implemented method for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment.

[0039] Although the present disclosure has been described with the purpose of online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment, it should be appreciated that the same has been done merely to illustrate the invention in an exemplary manner and to highlight any other purpose or function for which explained structures or configurations could be used and is covered within the scope of the present disclosure.

[0040] Some embodiments of this disclosure, illustrating all its features, will now be discussed in detail. The words and other forms thereof are intended to be open ended in that an item or items following any one of these words is not meant to be an exhaustive listing of such item or items, or meant to be limited to only the listed item or items. It must also be noted that as used herein and in the appended claims, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. Although any frameworks and methods similar or equivalent to those described herein can be used in thepractice or testing of embodiments of the present disclosure, the exemplary frameworks and methods are now described. The disclosed embodiments are merely exemplary of the disclosure, which may be embodied in various forms.

[0041] Various modifications to the embodiment will be readily apparent to those skilled in the art and the generic principles herein may be applied to other embodiments. However, one of ordinary skill in the art will readily recognize that the present disclosure is not intended to be limited to the embodiments illustrated, but is to be accorded the widest scope consistent with the principles and features described herein.

[0042] Figure 1 show a block-diagram of the automatic framework for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment as per the embodiments of the present invention. According to the present invention, the said framework comprises a central server (103) having the computation facility wherein the central server is equipped with machine model. The server machine (103) is backed with the database (102) comprising of data related to the customer's profile, user purchase history and product availability in each category. The communication network (101) is responsible for transmitting and receivingvarious data across various embodiments of the present invention. The communication network involved in the present invention may be but not limited to Wide area Network (WAN), local area Network (LAN), WiFi, Bluetooth or the combination thereof. Further, there are n number of customer or consumer associated with the business of an organization. The customer or consumer related to the business of an organization are past customers of the company, potential customer etc. The Internet of Things sensors are installed in the store or warehouse premises which are used to determine the product availability dynamically. The IoT sensors reads the tags available on the product packet automatically at regular intervals. Further, the central server captures data related to the customers crawls from the cookies installed in the browser or product surfed during the active time of mobile

application related to the online marketing application of the retail environment. The central server determines the product prediction in online marketing environment based on the above-mentioned data collected at periodic intervals along with user purchase history. The above-mentioned data is analyzed using the machine learning model on the central server.

[0043] Figure 2 shows the flow-diagram of computer implemented method for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment in accordance with the present invention. The computer implemented method scanning, by the Internet of Things (IoT) sensors, the tags attached to the product in retail shop or warehouse at step 201; automatically counting and capturing date related to products in each category periodically at regular intervals at step 202; transmitting the collected and captured data via communication network to the central server at step 203; analyzing, by the machine learning model, on the central server the data collected along with customer purchase history and crawling data at step 204; determining, by the machine learning model, product prediction to individual customers at step 205; posting, by the central server, to the online website or mobile application, the product prediction to individual customers based on product recommended determined at step 206.

[0044] The figures and the foregoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, order of processes described herein may be changed and are not

limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts need to be necessarily performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples.

[0045] Although implementations for invention have been described in a language specific to structural features and/or methods, it is to be understood that the appended claims are not necessarily limited to the specific features or methods described. Rather, the specific features and methods are disclosed as examples of implementations for the invention.

CLAIMS

We claim:

1. An Artificial Intelligent based Online Marketing Framework for prediction product availability in retail environment using IoT, the computer implemented method comprising steps of: scanning, by the Internet of Things (IoT) sensors, the tags attached to the product in retail shop or warehouse (201);

   automatically counting and capturing date related to products in each category periodically at regular intervals (202);

   transmitting the collected and captured data via communication network to the central server (203);

   analyzing, by the machine learning model, on the central server the data collected along with customer purchase history and crawling data (204);

   determining, by the machine learning model, product predictionto individual customers (205);

   posting, by the central server, to the online website or mobile application, the product prediction to individual customers based on product recommended determined (206).

2. The computer implemented method as claimed in claim 1, wherein the Internet of Things (IoT) sensors reads the tag associated with each product or printed on it at regular intervals.

3. The computer implemented method as claimed in claim 1, wherein the communication network may be based on the WiFi, Bluetooth, Local Area Network, Wide Area Network or the combination thereof.

4. The computer implemented method as claimed in claim 1, wherein database comprises customer profile, user purchase history and product availability data in each category determined dynamically.

5. A framework for online marketing prediction using Internet of Things (IoT) sensors-based products availability in retail environment, the frameworkcomprising:

   a communication network (101) to transmit/receive data from other embodiments of the framework;

   database (102) to store data related to customer profile, user purchase history and product availability in each category with different brands;

   Internet of Things (IoT) sensors (105) for scanning tags attached to each product at regular intervals;

   Central server (103) for performing function based on machine learning model (104) for performing the steps of:

   scanning, by the Internet of Things (IoT) sensors, the tags attached to the product in retail shop or warehouse (201);

   automatically counting and capturing date related to products in each category periodically at regular intervals (202);

   transmitting the collected and captured data via communication network to the central server (203);

   analyzing, by the machine learning model, on the central server the data collected along with customer purchase history and crawling data (204);

   determining, by the machine learning model, product predictionto individual customers (205);

posting, by the central server, to the online website or mobile application, the product prediction to individual customers based on product recommended determined (206).

An Artificial Intelligent based Online Marketing Framework for prediction product availability in retail environment using IoT

The present invention relates to a framework and method for customer relationship management framework by providing online marketing prediction regarding product availability automatically using Internet of Things (IoT) sensors in retail environment. The objective of present invention is to solve the anomalies presented in the prior art techniques and using advanced technique for providing product prediction in online e-commerce space automatically by providing an automatic framework for determining product availability in retail environment. In retail environment, to determine the product availability and managing the retails shops need with limited number of staffs or human resources, there is a need of such framework that can determine the product availability using advanced techniques automatically and provide prediction to the customers automatically to improve customer relationship and improving retail market performance. The disclosure presents an automatic online marketing product prediction on the basis of product availability which will be determined using Internet of Things (IoT) sensors dynamically on the basis of category of products customers often purchase or interested. The proposed invention is performed on the central server and IoT sensors are installed in the retails shop or warehouse premises. The RFID tags are attached with each product that are automatically read by IoT sensors automatically and determines the product availability dynamically. The determined product availability along with the customer purchase history and other data are processed at the central server using machine learning model which automatically determines the category of the products in which individual customer are interested in dynamically and recommend the products based on the product category on the computing device of the customer on which the customer is crawling the products using e-commerce website or application of the retail shop or retail organization. The proposed invention is greatly helping the retail merchants running e-commerce business. Further, the proposed invention requires less

staff and determines the product availability dynamically on regular interval basis automatically. Further, the proposed invention also capable of determining the product category prediction using machine learning model based on customer purchase history and other data. The proposed process and framework automate the process and greatly improves thebusiness in retail environment.

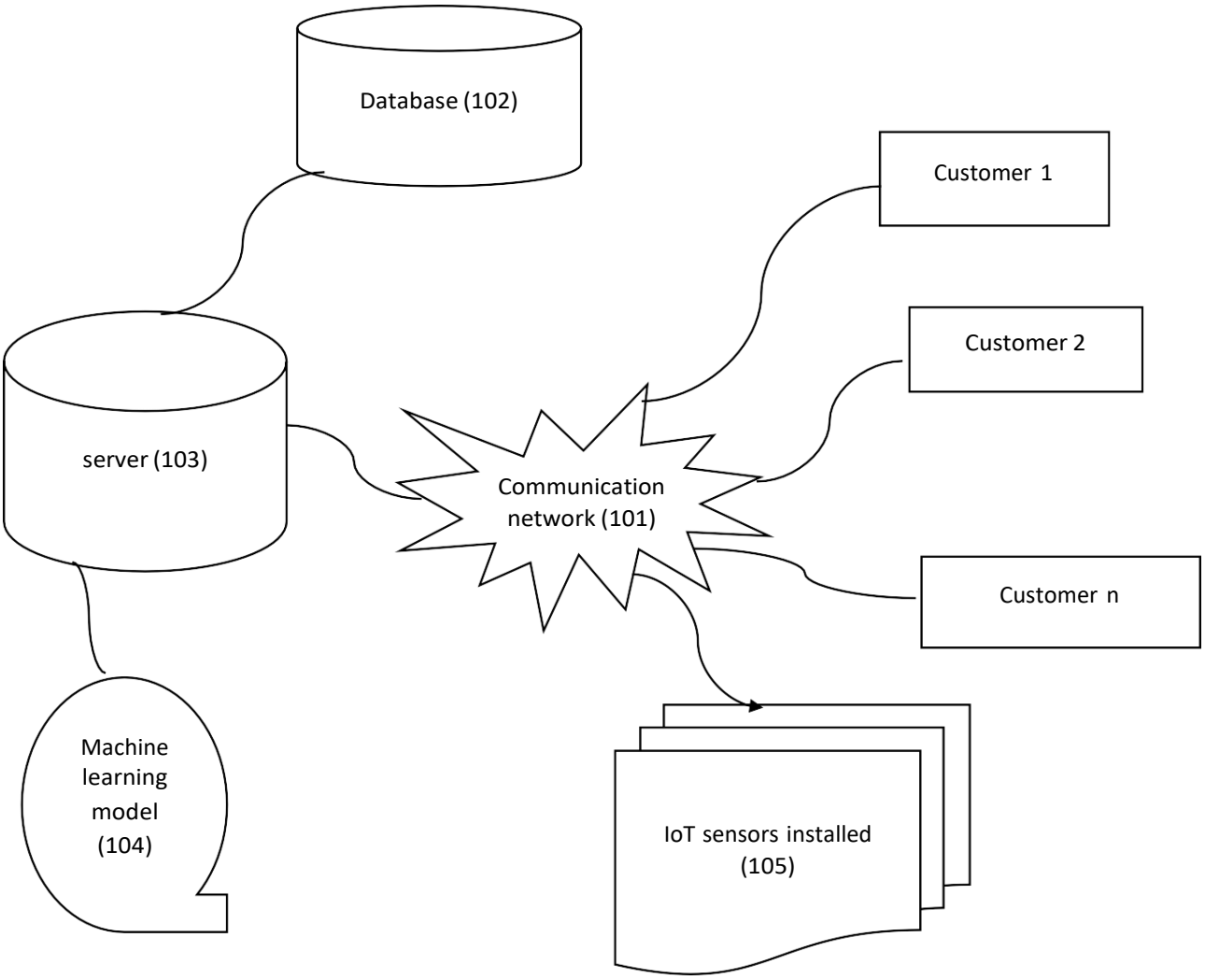

Figure 1: Block diagram of An Artificial Intelligent based Online Marketing Framework for prediction product availability in retail environment using IoT

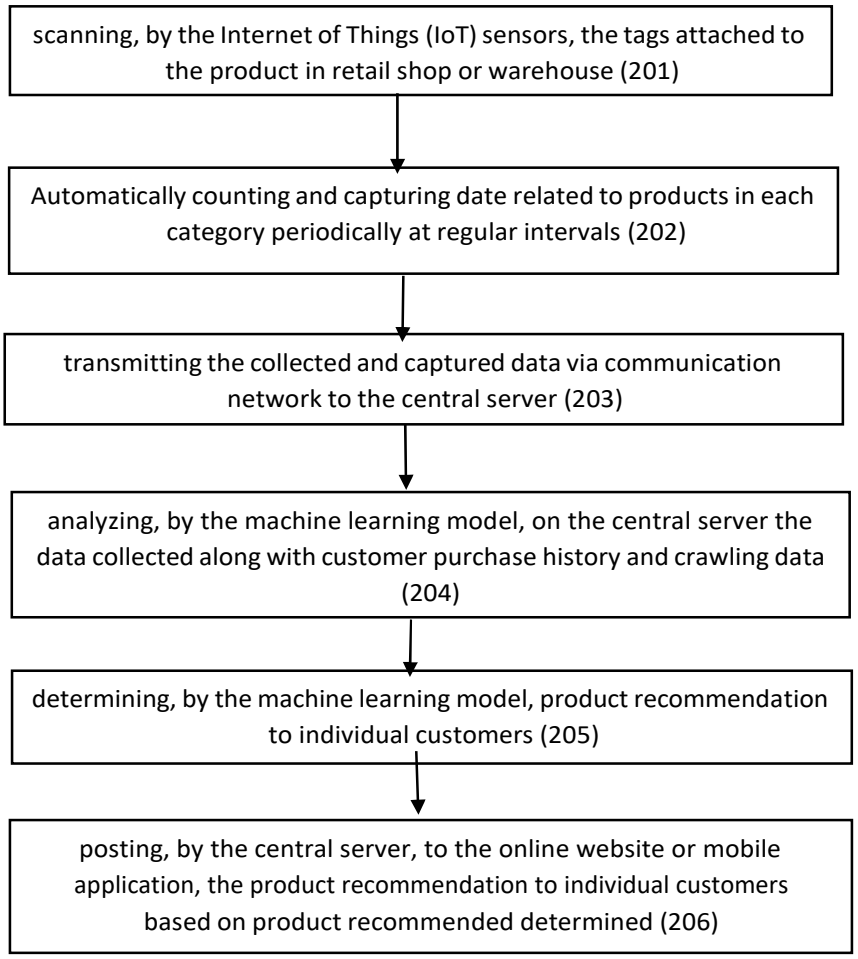

Figure 2 – Flow-diagram of An Artificial Intelligent based Online Marketing Framework for prediction product availability in retail environment using IoT in accordance with the present invention