

Review Article

Digital India: IoT Based Intelligent Interactive Super Market Framework for Shopping Mall

Arjoo Pathan, Rujuta Kokate, Abhijeet Mutha, Priyanka Pingale, Prashant Gadakh

Department of Computer Engineering, International Institute of Information Technology, Savitribai Phule Pune University, Pune, Maharashtra, India

Email address:

prashantgadakh31@gmail.com (P. Gadakh)

To cite this article:Arjoo Pathan, Rujuta Kokate, Abhijeet Mutha, Priyanka Pingale, Prashant Gadakh. Digital India: IoT Based Intelligent Interactive Super Market Framework for Shopping Mall. *Engineering Science*. Vol. 1, No. 1, 2016, pp. 1-5. doi: 10.11648/j.es.20160101.11**Received:** October 25, 2016; **Accepted:** November 14, 2016; **Published:** December 14, 2016

Abstract: Shopping mall, which as a business retail business, assume an imperative part in India's financial improvement, there are still a few issues in its stock administration, grocery store stores, settlement and different angles, genuinely confining the intensity of ventures. Strip malls and shopping centers are becoming definitely and entrepreneurs are looking to discover the best approach to offer their lodging quicker and less demanding and make tracks in an opposite direction from customary showcasing. With the passage of time, spacious shopping centers and malls are growing drastically and business owners are seeking to find a foremost way to sell their accommodations faster and easier and get away from traditional marketing & sales which compelled them to spend huge amount of money for advertisements with low range of efficiency. On the other hand, costumers are willing to buy their requirements more convenient by allocating less effort in energy and money expenditure and be aware of special offers to keep them in frugality. Consequently, we came up with an idea to invent an Intelligent Interactive Super Market Framework based-on Internet of Things (IoT) which helps these two groups to interact with each other and meet their needs in the best way. By using this system, customers are able to get an application from the server of the shopping center while entering thereto interacts with this system. This application offers welcoming and questioning about customer's favorites to recommend an effective orientation to the exact place to buy stuffs and in addition to aware customer about its availability in that mall, get some services or get aware of special offers even though he/she doesn't have any tendency toward buying. In addition to the system mentioned above, by using the IoT, all stocks in stores can be dispatched to the server for the better performance and real time responding of our system. We will illustrate the details of our suggested system in this paper. In stock, the design acknowledges logistics Interface, logistic Services and logistics stock in view of an application for UI, a savvy wicker container for client accommodation and mechanization operation on RFID innovation separately, advance diminish stock and the issues created by manual mediation.

Keywords: Internet of Things, RFID, Supermarket, Intelligent, Framework

1. Introduction

Internet of things (IoT) is the internetworking of physical gadgets, vehicles, structures and different things—installed with hardware, programming, sensors, actuators, and system availability that empower these articles to gather and trade data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) characterized the IoT as "the foundation of the data society." The IoT permits items to be detected and/or controlled remotely crosswise over existing system infrastructure, creating open doors for more straightforward

incorporation of the physical world into PC based frameworks, and bringing about enhanced proficiency, exactness and financial benefit. When IoT is expanded with sensors and actuators, the innovation turns into an example of the more broad class of digital physical frameworks, which additionally includes advancements, for example, keen networks, savvy homes, canny transportation and brilliant urban communities. Everything is particularly identifiable through its installed registering framework yet can interoperate inside the current

Internet base. Specialists appraise that the IoT will comprise of just about 50 billion articles by 2020. British entrepreneur Kevin Ashton authored the term in 1999 while working at Auto-ID Labs (initially called Auto-ID focuses, alluding to a worldwide system of articles associated with radio-recurrence recognizable proof, or RFID). Regularly, IoT is relied upon to offer propelled availability of gadgets, frameworks, and administrations that goes past machine-to-machine (M2M) interchanges and covers an assortment of conventions, spaces, and applications. The interconnection of these inserted gadgets (counting savvy articles), is required to introduce mechanization in almost all fields, while additionally empowering propelled applications like a shrewd matrix and growing to the regions, for example, keen urban areas. The extension of Internet-associated computerization into a plenty of new application zones, IoT is additionally anticipated that would produce a lot of information from differing areas, with the ensuing need for snappy conglomeration of the information, and an expansion in the need to record, store, and process such information all the more viably. IoT is one of the stages of today's Smart City, and Smart Energy Management Systems.

1.1. Micro-controller

Microcontroller is a chip that contains integrated processor memory, and programmable input output peripherals which are later used to interact with the things connected to the chip. It differs from a microcomputer which only contains CPU. Microcontrollers were first released in 1971 and gained popularity very soon. Microcontrollers are many times are also called as embedded system and embedded controller as microcontroller and its support circuits are often built into or embedded in single chip. Microcontrollers operate at really very low speed compared to microprocessors but in its favor they also consume very less power.

1.2. RFID

Radio-frequency identification (RFID) utilizes electromagnetic fields to naturally recognize and track labels joined to objects. The labels contain electronically put away data. Inactive labels gather vitality from an adjacent RFID peruser's grilling radio waves. Dynamic labels have a neighborhood power source, for example, a battery and may work at many meters from the RFID peruse. Not at all like a standardized identification, need the label not be inside the observable pathway of the peruser, so it might be installed in the followed object. RFID is one technique for Automatic Identification and Data Capture (AIDC). RFID labels are utilized as a part of numerous ventures, for instance, a RFID label appended to a vehicle amid generation can be utilized to keep tabs on its development through the sequential construction system; RFID-labeled pharmaceuticals can be followed through stockrooms; and embedding RFID microchips in domesticated animals and pets permits positive distinguishing proof of creatures. Since RFID labels can be connected to money, apparel, and belonging, or embedded in

creatures and individuals, the likelihood of perusing by and by connected data without assent has raised genuine protection concerns. These worries brought about standard particulars improvement tending to protection and security issues. ISO/IEC 18000 and ISO/IEC 29167 use on-chip cryptography strategies for intractability, tag and peruser confirmation, and over-the-air security. ISO/IEC 20248 determines a computerized signature information structure for RFID and standardized identifications giving information, source and read technique realness.

1.3. Smart Shopping

Shopping is an activity in which customer browses the available goods or services presented by one or more retailers with intent to purchase a suitable selection of them. In some context it may also be considered as a leisure activity as well as an economic one but not always its an leisure activity but also may be an routine activity for some homemakers or the people who consider shopping as a daily chore. Adding a smart context to it means making the work easier by reducing human efforts and adding some technological aspect to it.

2. Methods

2.1. Smart Basket

As of late, tremendous measure of headways in the field of web of things (IoT) innovation has offered approach to new applications and fields. The interfacing with sensors and actuators assumes the joined part of natural detecting, particular figuring, and remotely conveying gadgets. Because of the variables joined by the adequacy for scaling down of equipment, quick detecting types of gear, vitality sparing and searching, and the way that numerous applications can't be wired, IoT innovation makes it appropriate for different application areas, for example, drug and wellbeing care, environment and modern checking. We proposed a shrewd wicker container idea to make a shopping center more intelligent.

2.1.1. LCD Screen

We utilized aggregate 3 LCD screens which are attached to the wicker container as appeared in fig. One for computing aggregate sum of products, one for to show complete weight of item, and another is for ascertaining number of item.

2.1.2. RFID Reader

RFID peruser is go about as optical standardized tags. We utilize RFID peruser for examining every item while putting into the wicker container. RFID peruser can check an item from far separation likewise this is the upside of RFID reader. Another reason of utilizing RFID peruser is it can read gathering of items at once. RFID peruser stores the more data of an item as manufacturing date of a product, Expiring date of a product, Total cost of an item and so forth.

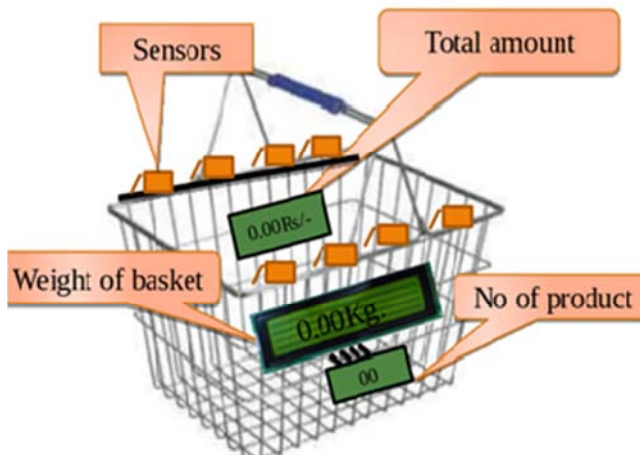


Fig. 1. Smart basket for Interactive mall framework.

2.2. Smart Inventory and Smart Glass

Stock administration is the center issue in the shopping mall circulation focus administration, and how to lessen the expenses of stock is the most critical key of the advanced market. The utilization of RFID innovation in the stock administration, it empowered undertakings to include products convenient, furthermore screen the self existence of perishable product, based on opportune getting a handle on stock data of the ware and comprehension the interest for each ware, at last diminish stock expenses, lessen misfortune, save a great deal of time and exertion for the endeavors.

3. Inventory Working Model

Due to utilizing RFID innovation as a part of store stock administration, suppliers may ace their items deals in a shopping mall and district whenever by the Internet of things and supply products specifically to the shopping mall, in light of the ideal methodology of both sides, and accomplish win-win. Here we assemble stock model to portray it: accepting that one merchant gives a product, in the model considering the circumstance of different stores requesting various item from various sellers.

Basic working model of an inventory is shown as in the figure below.

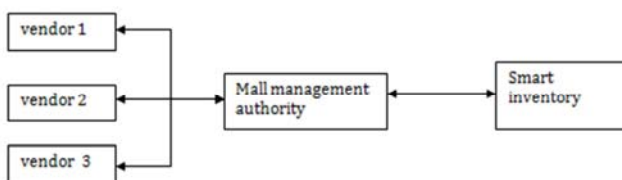


Fig. 2. Inventory Working Model.

3.1. Smart Glass for Inventory

Overseeing every day record of how to orchestrate the items or great in the rack, in what amount is the item present and what amount of the item is left by the day's end is an enormous and dull assignment for laborers in the shopping center. To

keep up an appropriate record of the items present there is need of the "Brilliant glass". Shrewd glass is a gadget which will help the shopping center power with keeping up the number of items, illuminating the power, the director of shopping center and the sellers of the particular item if the amount goes underneath the limit level. Keen glass contains a RFID peruser which will include the quantity of items one take, keep a record and upgrade in database in like manner. Inventory is very helpful to owner as well as vendors also this inventory give indication to the customers products are available or not. With the help of inventory mall management team automatically get the alert if the product is less than the threshold. So if such condition is occurs one message will send to vendors then vendor pass the products to smart mall. This application provides a very high efficiency in supermarket.



Fig. 3. Proposed smart glass.

3.2. Smart App

We proposed a system which is very useful to customer while shopping. We proposed a smart android application concept to make a shopping more interactive. It is linked with Internet of Things (IoT). From this, appropriate guidance will be provided to users, and huge amount of time avoided for searching their needs. Product manufacturers are spending big amount of money for advertising their products which will not have a credible gain and hence it is wasting of money and efforts. Today, the Internet is a public, cooperative and self-sustaining facility accessible to hundreds of millions of people worldwide. From this, IoT trend is introduced.

There are different functionalities in application. First off, customer has to download and install our application from the server. After filling his/her details, customer will get an ID which will be unique for future perspectives. It will store in our database and user will receive offers and discounts in future.

When customer entered in supermarket mall then with having smart app also, we will store this app in Google play store that means any one can easily download this application, all task will be done like as search the product, check the offer, check the product is available payment option all functionalities provide by this app only. User can buy the

product online also we can provide such facilities also.

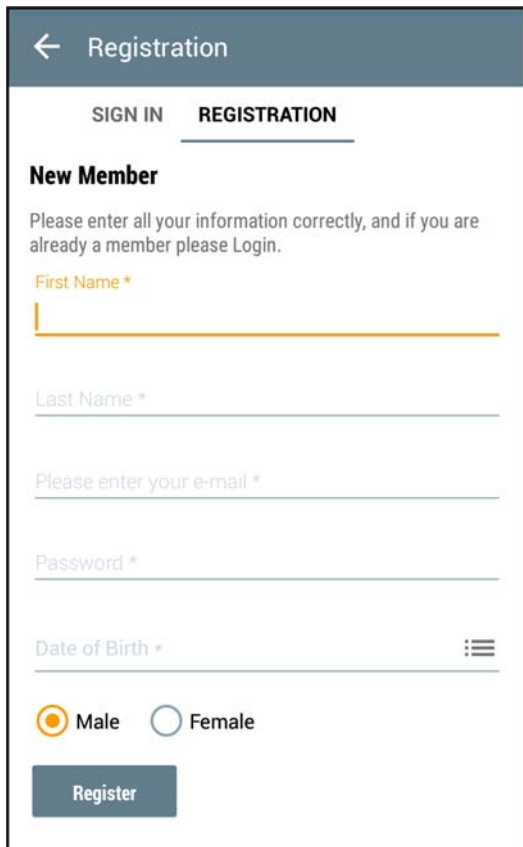


Fig. 4. Registration of User.

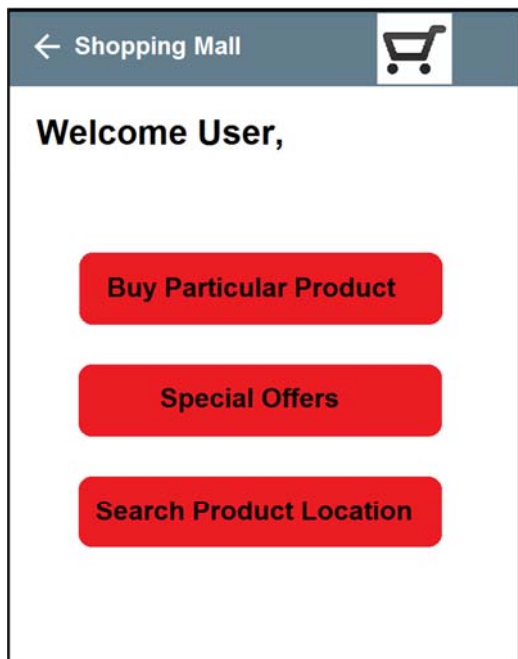


Fig. 5. User Facilities.

After login, user will get various options as shown in (Fig 2). User will get special offers pop-ups, product location where it is located. When user done his/her shopping, he/she has to select payment option like Cash / Card / Net Banking. (Fig. 3)

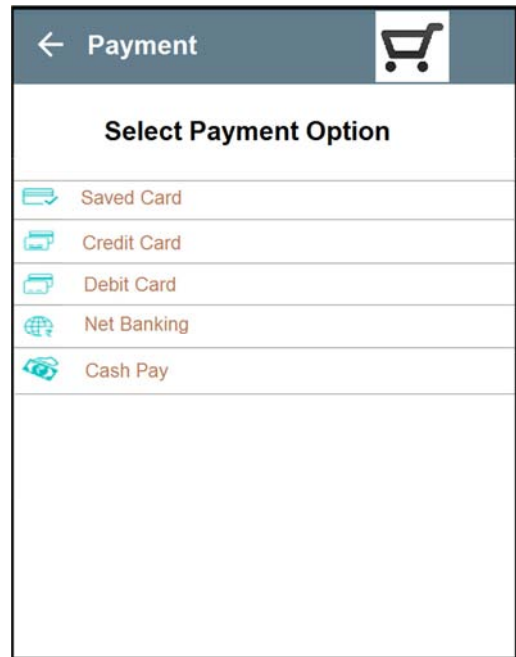


Fig. 6. Payment Option.

4. Conclusion

This paper is expected to present the use of the Internet of Things in the Intelligent Interactive Super Market Framework administration and clients shopping, to illuminate a portion of the downsides in the past the general store. Acknowledging Intelligent Interactive Super Market Framework, while sparing the client and shopping center administration power part of time, and from the source to guarantee quick and advantageous portable installment work, most likely make cutting edge life more helpful. Insightful Interactive Super Market Framework will contain a shrewd application, a keen truck and a brilliant glass for stock which can be connected for general stores and shopping centers.

In light of our estimation, execution of this venture will bring about extraordinary sum measure of income for both clients and entrepreneurs furthermore helps a ton to diminishing parcel of physical work. Moreover, the programmed charging office can keep away from line in the registration procedure so that the better shopping knowledge for clients can be made. In any case, a portion of the issues should be determined further, for example, the Internet of Things industry specialized benchmarks and conventions are not uniform, security issues. For example, system security, specialized issues and so forth.

References

- [1] Development of Smart Shopping Carts with Customer-Oriented Service Hsin-Han Chiang, Wan-Ting You, Shu-Hsuan Lin, Wei-Chih Shih, Yu-Te Liao, Jin-Shyan Lee, and vYen-Lin Chen.2016. International Conference on System Science and Engineering (ICSSE) National Chi Nan University, Taiwan, July 7-9, 2016.

- [2] Smart Shopping Cart with Automatic Billing System through RFID and ZigBee. Mr.P. Chandrasekar Ms.T. Sangeetha Tamilnadu College of Engineering, Kangayam, Tamil Nadu India. ISBN No.978-1-4799-3834-6/14/©2014 IEEE.
- [3] An Intelligent Interactive Marketing System based-on Internet of Things (IoT). Navid Rajabi. Department of Computer Software Engineering, Semnan University Semnan, Iran. Amin Hakim. Management Faculty, University of Tehran Tehran, Iran. 2015 2nd International Conference on Knowledge-Based Engineering and Innovation (KBEI) November 5-6, 2015 (Iran University of Science and Technology) – Tehran, Iran.
- [4] Research on intelligent supermarket architecture based on The Internet of Things technology.2012 8th International Conference on Natural Computation (ICNC 2012).
- [5] Shen Subin; Mao Yanqin et al. The Concept Model and Architecture of the Internet of Things [J]. Journal of Nan Jing University of Posts and Telecommunications: Natural Science 2010, 30.
- [6] Wen Jiabao. Government work report [R]. People's Daily, 2010.03.04.
- [7] Shen Subin; Fan Quli et al. Study on the Architecture and Associated Technologies for Internet of Things [J] Journal of Nanjing University of Posts and Telecommunications, 2009, 29.
- [8] Zhang Chuan; Pan Dehui. Optimal Control Model to Linked-Together Selling with Bi-level Inventory in Regional Distribution System [J]. Journal of Northe Astern University, 2007.
- [9] P. Chandrasekar and T. Sangeetha. Smart shopping cart with automatic billing system through RFID and Zigbee, *Int. Conf. Information Communication and Embedded Systems (ICICES)*, pp. 1-4, India, Feb. 2014.
- [10] R. Kumar, K. Gopalakrishna, and K. Ramesha, Intelligent shopping cart, *Int. J. Engineering Science and Innovative Technology*, vol. 2, no.4, pp. 499-507, 2013.
- [11] Decisions Behind the Design of Queued Message Handler Template, <http://www.ni.com/webcast/3640/en/>, Nov. 2014.
- [12] J. Suryaprasad et al., A novel low-cost intelligent shopping *IEEE Int. Conf. Networked Embedded Systems for Enterprise Applications (NESEA)*, pp.1-4, Dec. 2011.
- [13] Li Mengxun; Liu Hongzhi. Study on Food Safety Surveillance Model Based on Internet of Things [J]. Journal of Beijing Technology and Business University, 2011, 29(2).
- [14] Gonzalez G R Early infrastructure of an internet of things in spaces for learning 2008. Feng Lin. Our country present jot migration payment program analysis.
- [15] Cai Nishui. Study of the New Mobile Payment Scheme Based on RFID Read-Write Module and IC Card [J]. Telecommunications Science, 2006, (10).
- [16] Xiao Chen. Non-contact Payment on NFC Mobile Phone [J]. Radio Frequency Identification Technologies and Applications, 2009, (04). Shu Jun. Security Crisis and Countermeasures of Internet of Things [J]. China Public Security (Academy Edition) 2010, (04).