

WSN BASED SMART SHOPPING

^{#1}Swapnil Ankushe, ^{#2}Krishna Dhakne, ^{#3}Pawan Awasthi, ^{#4}Supriya Sankapal
^{#5}Prof. Ankita Tidaky

¹ankushe1996@gmail.com
²krishnadhakne9158@gmail.com



^{#1234}Department of Information Technology
^{#5}Prof., Department of Information Technology

Bhivarabai Sawant Institute of Technology
Research Technology, Wagholi,
Pune-412207

ABSTRACT

Now day's customer is purchasing various items in malls or supermarkets require a trolley for carrying product, so we implement the system using WSN (Wireless Sensor Network) based smart shopping. Product procurement represents a complex process. On each occasion customer has to pull the trolley from rack to rack for collecting items and simultaneously customer has to perform estimated expense computation. At the end, customer has to wait in queue for billing and payment. To overcome that, we have developed a smart way for shopping. Each and every product will have RFID tag instead of barcode scanner. The intelligent trolley will consists of a RFID reader and zig-bee and two LED lights. User will have android mobile application which will help user for making payment cashless using payment Wallet. Whenever customer take item and put into intelligent trolley then the cost of product automatically reduce from the wallet once the amounts of wallet get finished intelligent trolley glow RED light otherwise glow YELLOW; so there is no need to wait in the queue.

Keyword: Cart, RFID tag, RFID Reader, Zig-Bee, Customer, Mall

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I. INTRODUCTION

Shopping mall is a place where people get their daily necessities ranging from food products, clothing, electrical Appliances etc. Sometimes customers have problems regarding the incomplete information about the product on sale and waste of unnecessary time at the billing counters because customer has to wait into the queue. Continuous improvement is required in the traditional billing system to improve the quality of shopping experience to the customers. Now-a-days numbers of large as well as small shopping malls has increased throughout the globe due to increasing public demand of choice-based shopping. At the time of festivals, special discounts, holidays, etc. there is a huge rush in shopping malls. The use barcode reading technique in such situations always results in waste time since customer has to wait till all items get scanned. The intention of proposed system is to avoid billing overhead and make payment automatically. This can be achieved by using WSN (Wireless sensor network) based intelligent trolley proposed in this paper. This system uses RFID technique instead of barcode. Proposed system uses separate RFID reader for each trolley and RFID Tag for each product. When

customer buys any product RFID reader reads the tag which is present on the product and Zig-bee module attached per trolley will transmit the information to the access point and bill is calculated and automatically deducted from mobile wallet.

Radio frequency identification (RFID) is a rapidly growing technology that has the potential to make great economic impacts on many industries. While RFID is a relatively old technology, more recent advancements in chip manufacturing technology are making RFID practical for new applications and settings, particularly consumer item level tagging. These advancements have the potential to revolutionize supply-chain management, inventory control, and logistics. At its most basic, RFID systems consist of small transponders, or tags, attached to physical objects. RFID tags may soon become the most pervasive microchip in history. When wirelessly interrogated by RFID transceivers, or readers, tags respond with some identifying information that may be associated with arbitrary data records. Thus, RFID systems are one type of automatic identification system, similar to optical bar codes.

Zig-Bee is built on top of the IEEE 802.15.4 standard. ZigBee provides routing and multi-hop functions to the

packet based radio protocol. ZigBee technology is a low data rate, low power consumption, low cost; wireless networking protocol targeted towards automation and remote control applications.

II. LITERATURE SURVEY

Mr.P. Chandrasekar, Ms.T. Sangeetha “Smart Shopping Cart with Automatic Billing System through RFID and ZigBee”. [1], Contemporary embedded systems are habitually based on microcontroller’s i.e. CPUs in the company of integrated memory as well as peripheral interfaces but ordinary microprocessors by means of external chips for memory and peripheral interface circuits are also still common, especially in more complex systems. Radio frequency identification (RFID) technology may not only be useful for streamlining inventory and supply chains: it could also make shoppers swarm. ZigBee is based on an IEEE 802.15 standard. ZigBee devices often transmit data over longer distances by passing data through intermediate devices to reach more distant ones, creating a mesh network; i.e., a network with no centralized control or high-power transmitter/receiver able to reach all of the networked devices. This paper provides centralized and automated billing system using RFID and ZigBee communication. Each product of shopping mall, super markets will be provided with a RFID tag, to identify its type. Each shopping cart is designed or implemented with a Product Identification Device (PID) that contains microcontroller, LCD, an RFID reader, EEPROM, and ZigBee module. Purchasing product information will be read through a RFID reader on shopping cart, mean while product information will be stored into EEPROM attached to it and EEPROM data will be send to Central Billing System through ZigBee module. The central billing system gets the cart information and EEPROM data, it access the product database and calculates the total amount of purchasing for that particular cart. Main aim of this paper was to provide an automatic billing to avoid queue in malls and super markets.

Feng Zhu, Bin Xiao, Senior Member, IEEE, JiaLiu , Member, IEEE, Bin Wang, Qingfeng Pan, Li-jun Chen. “Exploring Tag Distribution in Multi-reader RFID Systems”. [2] Radio Frequency Identification (RFID) brings a revolutionary change in a range of applications by automatically monitoring and tracking products. With the proliferation of RFID-enabled applications, multiple readers are needed for ensuring the full coverage of numerous RFID tags. In this paper, we focus on the tag distribution problem in multi-reader RFID systems. The problem is to fast identify the tag set beneath each reader, which is a fundamental premise of efficient product inventory and management. Only with such tag set information can we localize specific tags in a reader and expedite the tag query information collection. As an RFID system usually contains a large number of tags and multiple readers, the traditional solution to identify tags by individual readers is highly time inefficient. We propose an Inference-Based protocol (IB) that identifies the tag distribution based on information inference rules and the aggregated physical signals to improve operational efficiency. In our protocol, three kinds of inference rules based on internal information reported by

a single reader, external information shared by multiple readers, and history information retained by the system are fully exploited to infer tag distribution. With these rules all readers can cooperatively work together and quickly obtain the tag distribution in the system. We also build a prototype RFID system using the USRP-based reader and WISP programmable tags, and then implement the IB protocol. The experimental results and extended simulations show that IB outperforms the state-of-the-art protocols.

Min Chen, Wen Luo, Zhen Mo, Shigang Chen, Senior Member, IEEE, and Yuguang Fang, Fellow, IEEE, Member, ACM. “An Efficient Tag Search Protocol in Large-Scale RFID Systems With Noisy Channel”. [3] Radio frequency identification (RFID) technology has many applications in inventory management, supply chain, product tracking, transportation, and logistics. One research issue of practical importance is to search for a particular group of tags in a large-scale RFID system. Time efficiency is a crucial factor that must be considered when designing a tag search protocol to ensure its execution will not interfere with other normal inventory operations. In this paper, we design a new technique called filtering vector, which can significantly reduce transmission overhead during search process, thereby shortening search time. Based on this technique, we propose an iterative tag search protocol. In each round, we filter out some tags and eventually terminate the search process when the search result meets the accuracy requirement. Furthermore, we extend our protocol to work under noisy channel. The simulation results demonstrate that our protocol performs much better than the best existing work.

III. PROPOSED SYSTEM

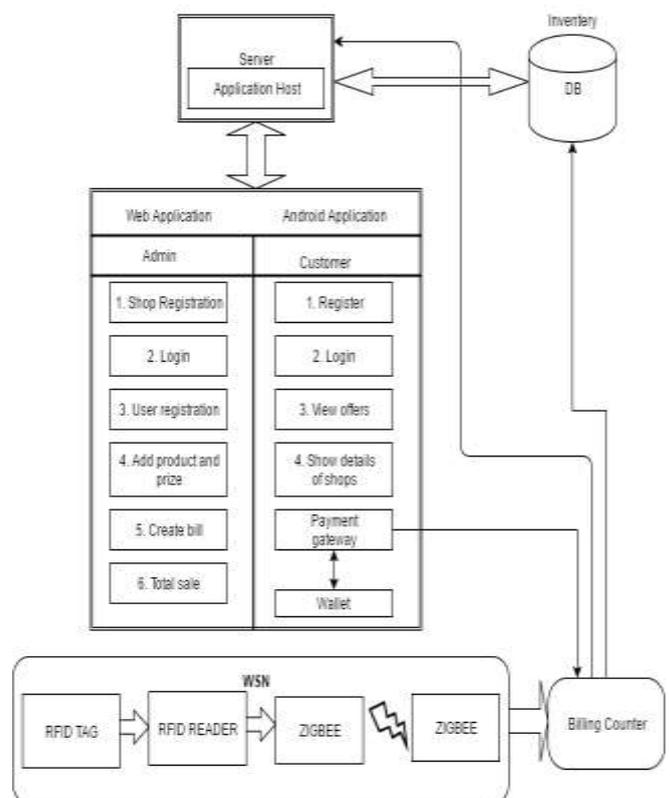


Fig 1. System Architecture

Module:

Mobile Application:

The mobile Application provide the information related shopping like offers of All shop and shop number and compare two or more shop of a same categories to each other.

There are three modules in mobile application User module, Shopkeeper module and admin Module.

User Module:

In user module very first step is to register process that user create unique user id and password for security purpose when registration is done user can login App.

After login, User views the offers with the shop detail that exist in the mall. In this mobile application another very important feature is payment wallet in which Customer add the amount and when customer buy the product then amount will be reduced from the payment wallet. After completing shopping customer gets conformation message and then logs out. In this way customer do not need to standing in queue for billing.

Shopkeeper Module:

In shopkeeper module the shopkeeper register the shop name and shop number by creating the user id and password for particular shop. In this module Shopkeeper add /remove /update Product detail that will be exist in his/her shop, add/remove/update the offer's related with his/her shop.

Admin Module:

In this module Admin Add/Remove/update the Shopkeeper and Shops Detail. Admin also responsible for the add/remove/update the product detail from the Database

Intelligent Cart:

The cart consist RFID reader, ZigBee module and two indication LEDs (Red and Green).

RFID Technology:

When customer comes in mall, all product have RFID tag, RFID stand for Radio Frequency Identification: The RFID tag will have information of product like cost, price, expiry date etc. RFID systems consist of small transponders it transfer the information to the RFID reader.



Fig 2. RFID tag.

RFID reader read the information of product and send through Zig-Bee.

Zig-Bee MODULE:

It is built on top of the IEEE 802.15.4 standard. Zig-Bee provides routing and multi-hop functions to the packet based radio protocol. Zig-Bee technology is a low data rate, low power consumption, low cost, wireless networking protocol targeted towards automation and remote control applications.



Fig 3. Zig-Bee Module

The Zig-Bee module receive the information from the RFID reader and transfer to the central access point.

Indication LEDs:

There are two LEDs Green and Red .The LEDs give indication to the customer about available balance in the wallet with the help of LEDs. During shopping when customer get the product and put it into trolley then amount will be reduce from the wallet. If shopping is within the wallet amount then glow the green LED, and if shopping is more than wallet amount then glow the Red LED.

IV. CONCLUSION AND FUTURE WORK

The intended objectives were successfully achieved in the prototype model developed. The developed product is easy to use, economical and does not require any special training. Though the project showcases the proof of concept, there are a few aspects that can be included to make the smart shopping more robust. To begin with, in this project the latency time of the wireless communication with the server may need to be considered. Secondly, the communication is not very secure. Another Zig-Bee module operating at the same frequency can easily intercept the transmitted data. This issue will have to be resolved specifically with respect to billing to promote consumer confidence. Further, a more sophisticated micro-controller and larger display system can be used to provide better consumer experience.

The customer just needs to type the name of the product he wants to search on the Android device, and the cart will automatically guide him/her to the products

locations. The proposed Smart Shopping System intends to assist shopping in-person which will minimize the considerable amount of time spent in shopping as well as to time required in locating the desired product with ease.

V. ACKNOWLEDGEMENT

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