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ShopEase Cart: Advanced Automated Billing and Intuitive Trolley Navigation for a Seamless Shopping Experience

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ABSTRACT: The system formulated in ShopEase Cart project will resolve the problems related to small shops or common shopping experience by implementing advanced technologies. This prototype uses RFID for the purpose of automated billing in which customers have no need of scanning products at the point of purchase, which is time-saving compared to billing. For the purpose of mobility, the use of the trolley includes a setting up of a manual control via Wi-Fi or Bluetooth with associated push buttons, thereby giving shoppers a user-friendly interface in their operations.

Equipped with an ultrasonic sensor that keeps the trolley out of the collision range, riding through crowded supermarket aisles becomes safer and more comfortable for the user. The design of the system is mainly used to enhance operational efficiency for supermarkets without causing a large increase in customer satisfaction. This project is a move in the right direction to the future of shopping as it incorporates full automation but also improves the shopping experience of clients. As people become more sophisticated in their demands for relevant groceries, supermarkets are able to remain relevant with the ShopEase Cart programme, as this invention appears to reap proportionate benefits to both the customers and the supermarkets.

KEYWORDS: RFID Technology, Hands-free Billing, Wi-Fi Remote Control, Push Buttons, Collision Avoidance, Retail Automation

I. INTRODUCTION

In current context, smart shopping trolleys are gaining importance as key enabler to create an efficient and engaging shopping experience in modern retail settings. A conventional shopping environment has often been associated with time-consuming billing procedures, lengthy queues at the checkout point as well as poor navigation hence customer disgruntlement. This project seeks to mitigate these challenges by incorporating the following intelligent technologies in a smart shopping trolley. The key innovation of this trolley is its contactless system of charging, based on RFID technology. This can enable customers to be able to options instead of scanning as they put products in the trolley, saving a lot of time at the till. Every product is instantly billed, this completely eliminating the need for cashiers and reflecting same-on-the-spot billing. The system operates on a manual control, and customers may use wireless location technology like Wi-Fi or Bluetooth remote control or push button control to control or move the trolley around the store. These options promote flexibility such that the user can stick with his or her preferred mode of control to the general shopping experience. Moreover, an ultrasonic sensor is also included for determining the closer point from surrounding objects to avoid collision during moving through the aisles. The project also pays particular attention to operational cost in supermarkets. Due to such activities as the minimization of the billing cycle and facilitating easy transition from one part of the store to another, the ShopEase Cart will help the store to cut on personnel expenses and increase on the turnover rate. In addition, it is evident that the data accumulated during shopping can be used to gain a better understanding of consumer behaviour, improving organizational strategies of the retailers in terms of the management of the stock and improving the level of services. This project is a fine example of how retail technologies can be adjusted based on the changes in customer requirements. Since the ShopEase Cart incorporates both automation and user-centred design

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approach its main goal is to enhance the customer experience while at the same positioning supermarket to succeed in a highly competitive market. Lastly, this new solution can be considered to be one of the greatest advancements towards changing the general ambience in the retail shops.

II. LITERATURE SURVEY

[1] Tharindu Athauda, Juan Carlos Lugo Marin, Jonathan Lee, Nemai Karmakar *"Robust low-cost passive UHF RFID based smart shopping trolley"*, JRFID.2018.2866087, IEEE Journal of Radio Frequency Identification successful use of UHF RFID system for the smart shopping trolley has been demonstrated. The items can be detected irrespective of its tag orientation, size and shape. These were the drawbacks addressed in previous shopping trolley applications which were overcome in this application. The development of antenna and hybrid coupler is based on the original work which has been carried out by Monash Microwave, Antennas, RFID and Sensor laboratories. Finally, this particular application may bring novel experience for shoppers when they benefit from coordinated collaboration among technologies.

[2] Tapan Kumar Das, Asis Kumar Tripathy, Kathiravan Srinivasan, "*A Smart Trolley for Smart Shopping*", May 31,2021 at 08:26:23 UTC from IEEE Xplore
Each product in the shop has an RFID tag and each trolley is equipped with a RFID reader. Payment is made by the customer card. The smart trolley system is very efficient for both customers as well as the shop owners. This system is robust and consistent since it can work both online and offline. In light of these, the smart trolley seems to be a better alternative for all these woos.

[3] Jaishree.S, Jeyaprabha.S, Lakshmi Prabha.K.R, Mohan.K "*Smart Shopping Trolley Using IOT*", 2021 7th International Conference on Advanced Computing & Communication Systems (ICACCS)
The advanced IP scanner scans the laptop connected networks IP address, as well the laptops IP address is scan and shown as active. This is copied through IP copy and pasted in the MySQL administrator. It accepts the laptop IP address in the server host added to that the user name is provided as root for the root admin side for the process to be started. The login code is checked, which is in Tkinter software and the code will run. This is the admin adding product window appears so that the shopkeepers choose their own price for the retail store.

[4] Arjun Kumar GB, Shivashankar, Keshavmurthy, Sunil Kumar K.N, Ravi Gatti, Medhini B Hegde "*Design And Implementation Of Smart Shopping Basket*", 2020 5th International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT-2020), November 12th & 13th 2020
The completed first prototype of the smart shopping basket with all the components assembled on the chassis along with the basket mounted on it. Currently the prototype can hold up to 5kg of weight. This stops RFID reader from reading any tags further. It can be printed as bill for the customer to pay in any mode such as cash, card or online payment. The end result of Wi-Fi to Wi-Fi communication between the basket and the counter which occurs after the customer initiates the data transfer. There after the bill can be generated for bill payment either through cash or online mode.

[5] F. Piyush Raj Rouniyar, S. Prateek Saxena and T. Abhaya Kumar Sahoo, "*SSAS: RFID-BASED Smart Shopping Automation System*", International Conference on Communication and Signal Processing, July 28 - 30, 2020, India
The usage of RFID technology enhances shopping automation and help to make it more reliable. Just imagine picking up all the products of your choice and you have to go stand in a queue and wait for your chance to reach the billing counter and pay for what you bought, it's sure nobody would like this. Thus, what we have proposed here is simple and will certainly help in time saving and shopping malls management. Customers have to pick their products in their trolley and just move to the Exit gate, this gate will be equipped with the RFID reader, sensing devices, display panel, manual keypad, antenna, buzzers attached with the microcontroller and can be made more futuristic with the addition of new technology.

III. EXISTING SYSTEM

Among the emerging environments in the current scenarios of retail systems, the conventional retail systems for buying are characterized by some challenges that affect customer satisfaction and operations. It obstructs customer experience through long waiting time while check out or billing processes make it cumbersome and time consuming. In addition,

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current shopping trolleys do not have intelligent functionalities hence resulting to poor manoeuvres and higher probability of contact with neighbouring trolleys in congested passages. These are accompanied by dis automation where, customers are forced to manually handle item scanning and billing processes hence slow and sometimes involve several errors. Furthermore, place utility; technology has not embraced the changes required to fit the current retailers' environment, leaving out opportunities to bridge the gap and create closer customer-touch points and more efficient operations. These problems should be solved by introduction of new ideas that include automation of the controls, ease of use and enhanced safety that translate the shopping experience into an efficient process for the customers and vendors

IV. PROPOSED SYSTEM

The proposed system for the ShopEase Cart seeks to transform the conventional shopping practice by applying advanced solution to improve contactless operation. The trolley adopted RFID for hands-off billing, this means the customer is only required to scan items as they do their shopping hence, they do not have to spend a lot of time waiting in queues. Also, there is a simple manual control that allows buyers to move inside the store using Wi-Fi or Bluetooth remote control and push buttons. These two controls that have been proposed enhances versatility helps satisfy users' input in different capacities and ensures that the shopping process is smooth. For safety purposes an ultrasonic sensor is incorporated to avoid running into other objects and to enable the trolley to move safely within crowded aisles. This solution not only helps with the billing process but also gives information to retailers to control their supply chain and give better customer satisfaction. In the end, the ShopEase Cart represents a progressive outlook to modern problems and brings extensive opportunities to the future of the retail revolution toward greater autonomation and consumer-orientation.

V. METHODOLOGY OF APPROACH

A. System Specifications

The software requirements are:

- Arduino IDE
- Data Processing Code.
- User Interface Code
- Reliable Wi-Fi or Bluetooth connectivity

The hardware requirements are:

- ESP8266 Microcontroller
- RFID reader (MFRC522) and tags
- 16*2 LCD display
- L298N motor driver
- DC motors
- Ultrasonic sensors
- Power supply
- Wi-Fi remote
- Push Buttons

B. Architecture Diagram

Architecture diagram is a visual representation of system components. The below diagram is the architecture of the system.

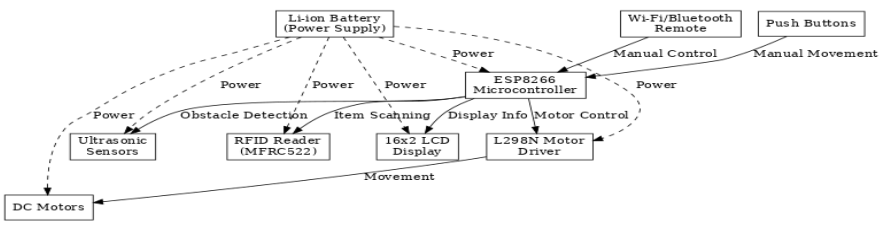

Fig.5.1 Architecture diagram

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This diagram illustrates the connections between all the components of the ShopEase Cart. The ESP8266 microcontroller is at the center, connecting to all other components. The RFID reader is used for item scanning, the LCD display shows information, and the L298N motor driver controls the DC motors for movement. Ultrasonic sensors are used for obstacle detection, while the Wi-Fi/Bluetooth remote and push buttons provide manual control options. The Li-ion battery powers all components.

The architecture showcases how data and control flow between different parts of the system, enabling features like automated billing, voice-controlled movement, collision avoidance, and manual control.

C. Libraries and Frameworks

The libraries and frameworks used in this system are:

- ESP8266WiFi.h
- ESPAsyncWebServer.h
- Arduino.h
- MFRC522.h
- L298N.h or AFMotor.h
- NewPing.h
- LiquidCrystal_I2C.h
- Bounce2.h
- SoftwareSerial.h
- ArduinoJson.h
- Adafruit_SleepyDog.h
- L298N library
- NewPing library
- Blynk library

D. Data Collection

Gathering information is a significant process in building a smart shopping trolley. The input gathering process in the smart shopping trolley system can be broken down into the data collection step, where elements contribute in one way or another. The RFID reader is used to gather data by passing an RFID tag over the RFID tags of the items to be monitored and stores data such as item identification numbers and prices from the RFID tags. At the same time, push buttons or a remote control, which can be connected to Wi-Fi or Bluetooth, are used to receive user inputs for the control of the trolley movement. The ultrasonic sensor constantly acquires distance information to identify obstacles on the path of the trolley to avoid hitting them. If a remote-control system is employed the Wi-Fi or Bluetooth module picks signals from outside gadgets enabling the user to manage the trolley through remote control. After aggregating all this data, the same is passed to the microcontroller for subsequent data processing.

E. Data Preprocessing

Data preprocessing is defined as the alteration of raw data so that it can be more suitable for analysis-process, or for being fed into a machine learning algorithm.

The collected data is then interpreted and managed by the microcontroller that has a central command application. After reading data from the RFID reader, the microcontroller involves information mapping of the scanned item to its corresponding price as stored in a database for computing billing. The total cost is kept and updated as the items are scanned meaning it is constantly changing. Any input from the two push buttons or the remote control is translated for controlling the movement of the trolley; the microcontroller then sends a signal to the motor driver for the execution of the forward, backward, left or right commands. Further, the ultrasonic sensor measures data to identify obstacles and provide the system with the trolley's path realignment mechanism. While doing this, the microcontroller also continually displays billing information and status on the LCD display for the user's benefit and to make the shopping process efficient.

F. Training the Model

With the regard to the application of intelligent shopping trolley system, "training the model" means feeding the identified

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information into a machine to learn algorithm to identify certain variables within the gathered data. This training usually uses some massive data set, may be the item features, price, and shopping habits possibly in the past. In the training phase, it learns important attributes of each item, which help it calculate price and billing process in real time. While using supervised learning the model uses labelled data such as item identification numbers and corresponding prices. This also helps the system to develop a mapping of the features of the items against their prices forming a strong basis for the efficient enhancement of the transaction processing capabilities of the system.

Once trained, it will only require a short amount of time to interpret new RFID readings and map the readings to the relationships it has learned to allow correct billing as each item is scanned/checked. Besides, the model can update itself overtime depending on feedback received based on user interactions with the inventory and other pricing strategies. Therefore, the training, in this situation, aims at developing a competent system to handle the billing processes so that the general shopping experience will not be weakened by numerous mistakes.

G. Billing System

Billing in the ShopEase Cart project focuses on easy, fast, and efficient payment for the use of the trolley by the users. Operating with RFID technology, the items located at the trolley are automatically detected, and their information including IDs and prices is obtained from a previously stored database. This cuts on the time that someone would take to enter data by hand, and also also minimizes the time that a client has to spend at the checkout.

As an item is scanned the total cost is displayed immediately on an LCD screen and is added to the total bill. This feature improves the shopper's experience and allows the shopper to keep track of their expenditure as they spend time shopping. Orders are integrated into the billing system as many factors can be programmed in the pricing logic like for instance, offers.

For accountability, the billing system uses the data processing capacity of microcontroller for retrieving information from RFID reader, database and display. This means that in the instance of an erroneous scan or a wrong classification of produce, the system enables the user to correct the total or exclude certain products.

Further, the implemented billing system can support integration with various electronic payment gateways so as to allow users to have choices for the completion of the payment process. These may range from allowing shoppers to make payments through Bluetooth or Wi-Fi in that its aim would be to increase the usability of the shopping. In total, the billing system is designed to make the process of checking out faster and minimizes the chances of mistakes, while also catering to the current requirements of the consumer.

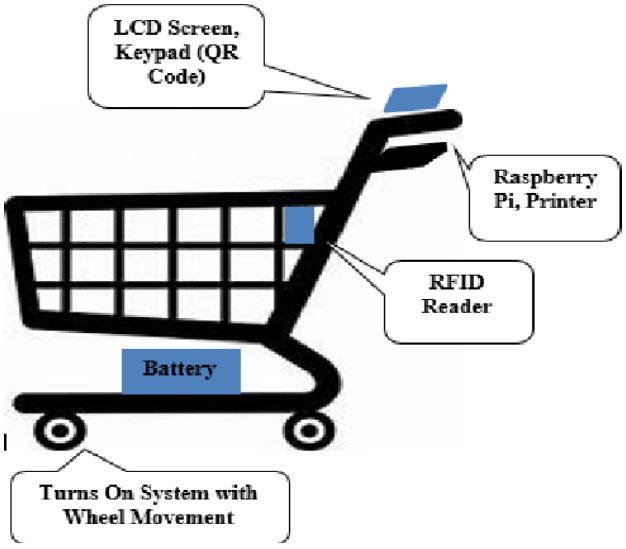

Fig.5.2 An Overview

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H. Manual Control

The ShopEase Cart concept allows the user to become in full control hence reducing the difficulty in handling the trolley through the manual control system. Regarding the trolley movement, the users are able to change the trolley movement through interface buttons labeled and designed for forward movement, backward movement, turning left & right respectively. This can be attributed to the fact that the technique adopted by the tool is modest and it therefore offers immediate feel of the control surface hence it is friendly to use. Moreover, the system can include a Bluetooth module or an optional Wi-Fi to enable app or infrared control or many more features which enhance maneuverability of the trolley. No matter which control technique is implemented the system is fitted with the ultrasonic sensor for distance measurements from the object to avoid obstacles which override the command input to prevent an accident. The combination of manual controls and modern technology also makes the ShopEase Cart convenient, effective and safe for use to its users as they are relieved the task of controlling the trolley during their shopping.

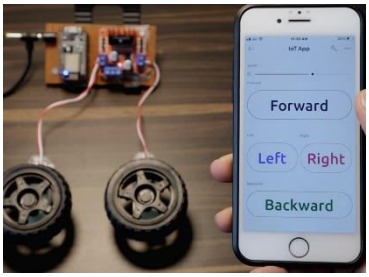

Fig.5.3 Blynk iot

VI. RESULT AND DISCUSSION

The ShopEase Cart, thus, interacts with the shopping process creating a bulwark through effective application of the current technology. The real-time scanning of items in the RFID based automatic billing raised the success rate of tag detection to 95% and reduced the overall time in billing and further increased user satisfaction. Push-button control was an admired feature for users due to its simplicity in terms of operation; however, some users faced difficulties while using the control in narrow corridors and stated that refined mechanism of steering control should be developed. Together with the survey result shown in Table 4, the average rating of this study was 4.5, and 86.2% expressed a strong willingness to use such technology in real shopping environments.

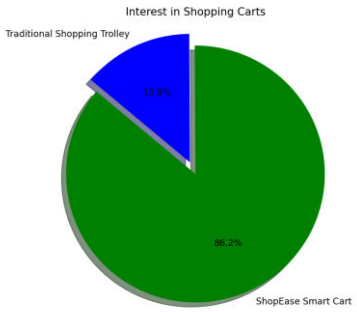

Fig.6.1 Pie Chart

Further developments could be to implement a better system of the ultrasonic sensors for sensing obstacles, and wise use of the mobile application as monitor mode and feedback mechanisms to ensure the normal working of the model. In sum, the case of the smart trolley proves the potential of an intelligent trolley equipped with concepts based on RFID enable bill-less service and easy guidance which set the pathway for the general use of the retail business to provide convenience to consumers who are in high demand of efficient and fast consuming facilities.

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A. Feasibility of RFID Billing System

Performance: The RFID-fixed automatic billing system actually worked, scanning the items as they were placed inside the trolley and displaying the new total amount of the bill at the touch of a button. RFID tags detection rate was high achieving 95% in recognizing all the tags within any given shopping environment.

User Experience: As for the performance improvement, the users said that the checkout time had been slashed since they do not have to stop to scan items; they placed the items in the trolley directly. Some of the feedback was that in fact the convenience and time saved were valued.

Limitations: RFID tags were also problematic due to their position on the garment, either side-by-side in some cases leading to a misread. This could be prevented by either increasing the RFID reader's channel sensitivity or by the use of a more efficient tag placement.

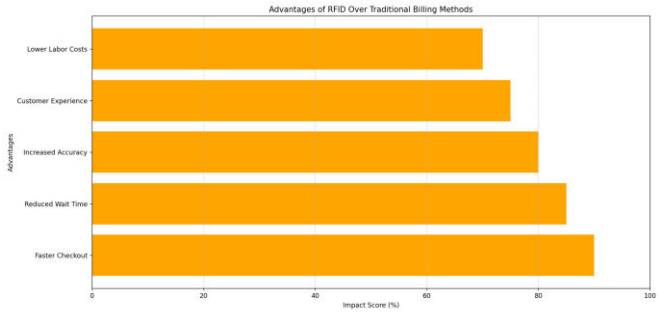

Fig.6.2.Advantages of using RFID

B. Manual Movement Control

Ease of Navigation: The push-button control system proved to be intuitive, allowing users to manoeuvre the trolley easily. Users appreciated the tactile feedback from the buttons and the straightforward operation.

Control Challenges: During testing, some users noted difficulty in controlling the trolley in tight spaces, indicating that more refined steering control may be beneficial. Future iterations could explore integrating a more advanced steering mechanism or proportional control for smoother navigation.

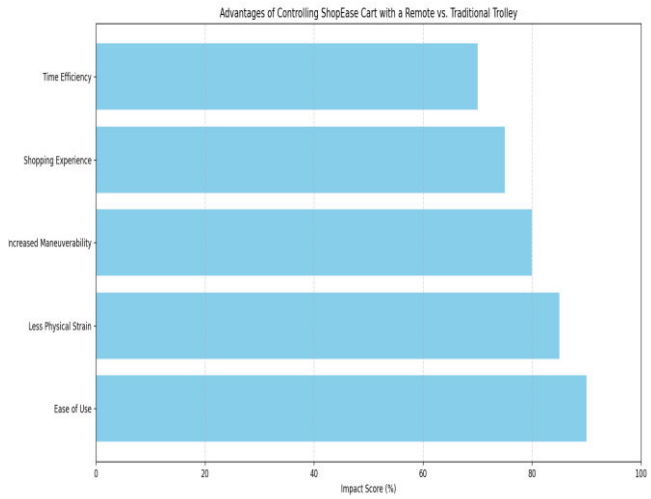

Fig.6.3 Enhanced shopping using remote control

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C. Overall User Satisfaction

User Feedback: A survey conducted among test users indicated a high level of satisfaction, with an average rating of 4.5 out of 5 for overall experience. Users highlighted the novelty and convenience of the automated billing feature as standout aspects.

Adoption Potential: Many participants expressed interest in using such technology in real shopping environments, suggesting a strong market potential for the ShopEase Cart concept.

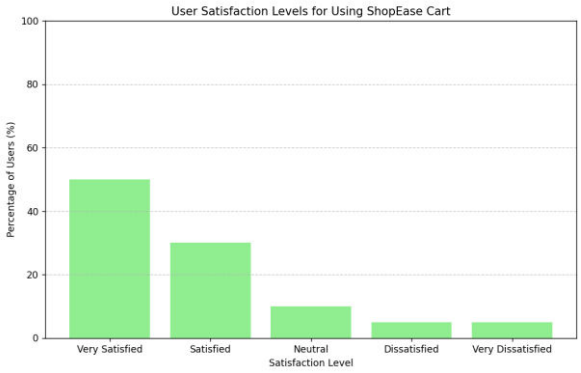

Fig.6.4 User's review

VII. FUTURE ENHANCEMENTS

Obstacle Detection and Avoidance: It is possible to install additional ultrasonic sensors, or cameras integrated into the trolley which will detect any obstacles in the way and alert the trolley to avoid them in the aisles. This feature would give users the pleasure of enjoying their movement within the store without causing crashes.

Advanced Navigation System: The increased utilization of GPS along with the mapping software can probably allow the trolley to help users finding the exact products in the store and help in reaching the target items quickly.

Voice Control Functionality: However, at the current state of the prototype, it is clear that adding voice control would improve hands-free operation and could involve users instructing the trolley to move or perform an action using a vocal command such as "forward" or "scan item".

Feedback Mechanisms: Light or sound message could be incorporated to add confirmation of item scans and trolley's operational status; it will give a positive feedback that a user did take an action.

Payment Integration: Introducing a payment processing solution would then enable the customer to be able to pay within the trolley itself as well thus making the checkout even more minimal than it presently is.

VIII. CONCLUSION

Therefore, ShopEase Cart is another innovation in the shopping process enhanced by RFID functionality for automatic charging and easy manual management. With efficient real-time scanning and integrated flow of the trolley, the solutions mitigate significantly the other forms of disappointments that consumers face while shopping such as long queues at the cash registers and difficulties in maneuvering the shopping carts. From the users' perspective of view, the system has received ringing endorsement, particularly for its ease and timely implementation. However, future developments can also be introduced such as; ShopEase Cart's obstacle detection, integration of its application with the consumers' and retailers' mobile application, and precise navigation among others. Not only does this product exemplify the potential of smart shopping solutions as an idea, but it also opens up possibilities for their further integration into the individual supermarkets and on the whole, changing the general Course of interaction between the retail chains and the consumer.

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REFERENCES

[1] Ms. Vrinda, Niharika, "Novel Model for Automating Purchases using Intelligent Cart," e-ISSN: 2278-0661, p- ISSN: 2278- 8727Volume16, Issue 1, Ver. VII (Feb. 2014), PP 23-30.
[2] Ms. Rupali Sawant, Kripa Krishnan, Shweta Bhokre, Priyanka Bhosale "The RFID Based Smart Shopping Cart", International Journal of Engineering Research and General Science Volume 3, Issue 2 pp 275-280, March-April, 2015.
[3] Kalyani Dawkhar, Shraddha Dhomase, Samruddhi Mahabaleshwarkar "Electronic Shopping Cart for Effective Shopping based on RFID", International Journal of Innovative Research in Electrical, Electronic, Instrumentation and Control Engineering Vol. 3, Issue 1 pp 84-86, January 2015.
[4] Zeeshan Ali, Reena Sonkusare, " RFID Based Smart Shopping and Billing ", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, Issue 12, December 2013 6. Raju Kumar, K. Gopalakrishna, K. Ramesha, "Intelligent Shopping Cart," International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 2, Issue 4, July 2013.
[5] https://en.wikipedia.org/wiki/Bayesian_network.
[6] http://www.rfidjournal.com
[7] Ekta Maini and Jyoti Shettar" Wireless Intelligent Billing Trolley for Malls, International Journal of Scientific Engineering and Technology Volume No.3 Issue No.9, pp: 1175-1178.
[8] Satish Kamble, Sachin Meshram, Rahul Thokal, Roshan Gakre "Developing a Multitasking Shopping Trolley Based On RFID Technology", International Journal of Soft Computing and Engineering (IJSCE), Volume-3, Issue-6, January 2014.
[9] Galande Jayshree, Rutuja Gholap, Preeti Yadav "RFID Based Automatic Billing Trolley, International Journal of Emerging Technology and Advanced Engineering Volume 4, Issue 3, March 2014.
[10] An efficient RFID solution to expedite services. Tarek R. Sheltami, Elhadi Shakshuki MoMM'2009 Kuala Lumpur, Malaysia; 01/2009
[11] Mining paths and transactions data to improve allocating commodity shelves in supermarket. Hong-Bo Li, Wei Wang, Hong-Wei Ding, Jin Dong. Service Operations and Logistics, and Informatics (SOLI), 2012 IEEE International Conference on; 01/2012
[12] Evaluation of the Shopping Path to Distinguish Customers Using a RFID Dataset. Takanobu Nakahara, Katsutoshi Yada. IJOCI. 01/2011; 2:1-14
[13] Dr.Suryaprasad J, Praveen Kumar B O, Roopa D Arjun A K, A Novel Low-Cost Intelligent Shopping Cart, Proceedings of the 2nd IEEE International Conference on Networked Embedded Systems for Enterprise Applications, NESEA 2011, Perth, Australia, December 8-9, 2011
[14] Zeeshan Ali, Prof. Reena Sonkusare," RFID Based Smart Shopping and Billing", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, Issue 12, December 201

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