Retraction

Retraction: A Multifunctional RFID enabled Shopping Tramcar (J. Phys.: Conf. Ser. 1916 012071)

Published 23 February 2022

This article (and all articles in the proceedings volume relating to the same conference) has been retracted by IOP Publishing following an extensive investigation in line with the COPE guidelines. This investigation has uncovered evidence of systematic manipulation of the publication process and considerable citation manipulation.

IOP Publishing respectfully requests that readers consider all work within this volume potentially unreliable, as the volume has not been through a credible peer review process.

IOP Publishing regrets that our usual quality checks did not identify these issues before publication, and have since put additional measures in place to try to prevent these issues from reoccurring. IOP Publishing wishes to credit anonymous whistleblowers and the Problematic Paper Screener [1] for bringing some of the above issues to our attention, prompting us to investigate further.

[1] Cabanac G, Labbé C and Magazinov A 2021 arXiv:2107.06751v1

Retraction published: 23 February 2022
A Multifunctional RFID enabled Shopping Tramcar

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Abstract. In the diligent world with full of time restraints, people run behind time. In order to save time and labor graft, we have proposed a multifunctional shopping tramcar to avoid queues in the super-market and shopping malls. The core intent of this project is to develop a robust tool with high efficiency, minimal cost and an accustomed structure for the ease of customers and retailers. The system works with the integration of 7 modules. Firstly, develop a login credentials for each customer to connect the cart with the main server through a website based login and set the budget, if it crosses the limit it notifies the customer. The products are scanned via RFID scanner. Besides, this system is embedded with a technique which intimates the product spot when searched. It also has the anti-theft mechanism feature, enabling automatic bill display and automatic payment. The sales rate could also be predicted to drop down the work of a retailer.

Keywords: RFID scanner, website based, login credentials, anti-theft mechanism, product intimation, automatic bill, automatic payment.

1. Introduction

Due to increase in population every individual is facing tough situations at times. So, they expect everything to be done quicker, easier as well as in an efficient manner too. In our daily life routine shopping is a basic need. Every day in shopping market and shopping mall people are forged to halt in the stream for prolonged period in which people may easily get infected during this pandemic period it is dangerous to get through a crowded belt. It may lead to some health issues not only covid-19. So the design of shopping tramcar is very much efficient and it is useful to many people for purchasing the things. The function of this shopping tramcar is very much efficient in all the purposes it is helpful for both the customers and retailers. In this module the tramcar has anti-theft mechanism, automatic billing, predicting the sales rate, finding location of the products, budget setting and creating the login credentials for the customer benefits. This tram car is nothing but a trolley all the features are included in that trolley. Each and every function has a different task automatic billing provides billing operation that has been done as automatically using a tag called Radio frequency identification by using this tag the customers scan the tag with the reader and bill is generated. The anti-theft mechanism helps for the retailers the main function of this module is to find the theft products (i.e.) non scanned products. Predicting the sales rate module is very much useful for the customers for their future shopping purposes. Then Finding location of the product in this module the customers can search the products and they can find the location of the product and it shows clearly the product is placed in sections and rows and...
customer can analyze the availability of the products in the shopping market or shopping mall. The budget setting module is useful for the customers to set the budget while shopping if the budget is increased with actual budget an notification is send to them and then they can change the budget or else they can remove the product from the tramcar. And final module is creating the login credentials for the customers through this login credentials they can able to scan or purchase the products. All these modules are integrated in a single tramcar. In today's technological world it is very much useful and people continuously do their shopping without any obstacles. Mainly this tram car is designed to save the customers time and to reduce the crowd. This shopping tramcar has the aptitude to make the customer errands feel more congenial and resourceful. This helps in easy stockpile organization. This merchandise is targeted for achieving a high cost effectual manner. Therefore, it becomes more viable to instigate it in real-time.

2. Literature review

An IoT based module interfaced with RFID sensors enables a wireless communication for generating a bill automatically. Speech to textual content application is grounded on the Usual Language Processing. It is also used to analyze the customer view and comments on physical purchase rather than online purchasing. RFID Arduino mobile application has been used. Product promotion, discounts and offers are introduced in the promotion module. [1]

This system enables the billing process through a built in Android Studio Software. This application is developed by using the Android Studio Software program which serves as an authentic Google IDE for Android development. Java is the main programming code that has been used to run the application. [2]

It enables cart-cart communication to consume time along with anti-theft mechanism to enhance the security. Weight/Load sensors have been employed to characterize the proximity of new products in the purchasing cart. Payment processing is done via an application. Automatic data formatting is possible in case of any item being added or removed. Organization of the shopping is made in a systematic way. [3]

Taking to contemplation, the paper promises to detect the product, recommend the product and provides a centralized and automated bill using RFID and RF system. Li-Fi technology is used for automatic billing and product detection. The Fast Map Algorithm which is based on IoT helps to find the location of particular product. [4]

3. Proposed Methodology

The key intent of this venture is to design a tramcar with multifunctional capabilities for easy assistance of customers and retailers. It makes the shopping easier, efficient, quicker and reduces the stress of the customer and retailer. Whenever the customer visits the shopping mall or supermarket they require a tramcar for purchasing their essentials. Primarily, the customer can interface the cart to the main server through their provided web-based login credentials. A login ID and a password is given to each customer. By logging in the customer gets to know the offers available in the shop.[5] To avail the offer if any, the customer can scan the QR code which is displayed in the website. All this can be done under a single micro-controller which we have used in this project, the Raspberry Pi 3. All the products are edged with a unique RFID tag. When purchaser picks the product and reside them in a trolley, the RFID reader mounted on the tramcar will automatically read the tag on the product and recognize the item for billing. The term and price of the item will be displayed on the LCD which is fitted on the cart. The cart and the centralized server communicate via ZigBee connection. The searched product location can be intimated to the customer through a Go-frugal software. Once the purchasing is over the customer needs to face the queue at the billing counter and spend more time in return.[6] Time consumption is a tedious process involved in manual method. The overall database of the stock will the fed to the central server
for the purpose of sales rate prediction. Finally, a reset button will be provided for the subsequent convention Figure 1.

![Block diagram](image)

**Figure 1. Block diagram**

4. Materials and Methodology
   
a) Materials
   
The requisite to implement this project are listed below with the following two categories of requirements

4.1 Hardware requirements
   
- Raspberry pi
- RFID tag
- RFID scanner
- Load sensors
- IR sensors
- Buttons

4.2 Software requirements
   
- Python idle
- Language
- Embedded C

b) Methodology
   
The methodology proposed in our project consists of, 7 modules which are briefly discussed in the following.

i) Login credentials:
   
   Every time, when a customer tries to use the cart, a user ID and a password will be assigned to the customer by the retailer. Through those provided credentials he/she could login successfully and connect the cart to the main server. This is mainly developed under a website based login. Therefore, we could expect an efficient operating rate.[7]
ii) Set budget:
Once the customer crosses the login credentials page he/she will be directed to the budget setting page. It also displays the available offers and discounts for the customer. This feature enables the customer to set the budget and also provides a minimal knowledge about the ongoing offers in the shopping errand. When the chosen products exceed the predefined budget it notifies the customer via a buzzer.[8]

iii) Intimate the searched product:
The products chosen by the customers are placed inside the tramcar by undergoing a process called scanning through a RFID scanner. The products placed in the shop are mounted with a RFID tag/RFID sticker according to the product convenience. By scanning through the RFID scanner we can add the products and by reverse scanning it we can remove the products to be eliminated.[9] If a customer finds difficult to locate a product, our website designed with Go Frugal application aids the customer by intimating the exact location of the product. The products could be searched through the search bar available in the developed website.

iv) Automatic bill display:
If the customer finishes his/her shopping, the total cost of the bill will be displayed in order to allude them. Each RFID tag holds its individual information which was already fed to it. It holds the information like, the product name, product cost and its proportion. When a product gets scanned newly, it cumulates with the previously scanned product cost and it endows the total cost. The contents of the bill will be sent as a mail to the customer’s mail ID for future reference. A copy of it will be sent to the retailer’s mail ID for the collection of database.

v) Automatic bill payment:
The payment method is made possible in 3 methods
❖ Manual bill- The displayed bill in the customer’s cart will also be monitored in the main server of the retailer system. This approach helps the customer to pay the bill in a ready cash method.
❖ Auto bill payment- This method is only possible when the customer syncs his/her bank account with our developed website. By this method when the customer chooses to pay, the amount will be automatically transacted to the main server account.
❖ Online payment- in the digitized world maximum of people tend to make online payment through some trusted payment applications like google pay, Phone Pe, Paytm, etc., through the QR code available in the cart or in the front side of the market, the customer could scan and pay the required amount.[10]

vi) Anti-theft mechanism:
This mechanism works with the help of load sensors and IR sensors embedded in the cart. Whenever a product gets placed inside a cart without any proper scanning, the load sensor and IR sensor incorporated within the cart, senses very quickly as an extra weight gets added to the cart without scanning.

vii) Predict the sales rate:
Since all these subsidies are given for the ease of customer, this module is designed to benefit the retailer by predicting the sales rate and to intimate the existing stock.

5. Conclusions and Future Scope
A multifunctional shopping tramcar is thus designed to revolutionize the shopping markets, where maximum of the things function manually. Time consumption and bill payments are made easier and efficient. This method eliminates labor work and forges for the prosperity of the retailer and the
customer. Since Raspberry Pi 3 is used over here, it overcomes the problems faced by any other microcontroller like, Arduino UNO & Nano and PIC microcontroller. The operating speed of Raspberry Pi 3 is tremendous when compared to the later mentioned microcontrollers. A new program code could be added to the Raspberry pi without erasing the previous program. RFID tag eliminates the compulsion of line of site as compared to barcode scanner. READ/WRITE option is available in RFID tag. Therefore, many a times a RFID tag could be overwrite and used.

Every customer owns their unique login credentials, the offer for a regular customer and the pass by customer will vary. The more a customer purchases could avail more of the offers. This system provides a relaxation to the retailer by offering an Anti-theft mechanism, as it could sense if any theft implies. Product location finder also helps the customer in saving their time. Overall, this multifunctional tramcar provides leisurely shopping experience.

To the maximum all the features have been developed in our project. But the prediction of sales rate could be improved further by predicting the future sales rate through machine learning. Sign convention based system could also be developed.

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