iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** XII **Month of publication:** December 2018

DOI:

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue XII, Dec 2018- Available at www.ijraset.com

Survey Paper on RFID and Zigbee based Smart Trolley

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Abstract: ***In supermarkets wide variety of product items is available and every price for the products changes constantly. Supermarkets always provide availability of all the products and the main motive is to save the time of the customers. However it happens that the customers get frustrated while waiting in the queue at billing counter. Even sometimes the customers get confused while comparing the total price of all the products with the budget in the pocket before billing. To overcome such problems, here in the paper author has designed a smart trolley using sensors. This system tells that there is no need for customer to wait in the queue for the scanning for the product items for billing purpose. Supermarkets that provide this faculty to only those customers which having membership cards and some rules that every supermarket have . When the customer inserts the membership card in the basket or trolley only then it will work as a smart trolley. Otherwise, it will work as a normal trolley. Supermarkets and hypermarkets use this technique as a strategy to increase the number of customers.***
Keywords: Barcode tag, RFID tag, RFID reader, smart trolley, supermarket

I. INTRODUCTION

Smart Trolley in mall system has given many of the ideas presented by the team based on how the idea would be developed into an interesting technology product which is convenient, easy to use and efficient, including it being an add-on service for the existing self-checkout system. As the concept was based on technology, it was important to know the views of the consumers for which the idea was designed. The purpose for this was to analyze the role of assumptions, perceptions and expectations from the stores and its daily customers towards the proposed Smart Trolley idea for supermarkets has been used in many of the European countries. The work focused on great response from a targeted major retail stores. The Smart Trolley idea is based on the most popular automated self-checkout system in most of UK retail stores. The concept is designed into a smaller version of the automated self-checkout system on a shopping trolley with a user interface screen which allows customers to make payment for items scanned and placed in the trolley before leaving the entrance of the store. This is to release pressure at the tills during peak hours. The Smart Trolley comes with all the traditional services including scanning an item to check for price and details, also there are other additional features that will be included in the design such as locating an item in the store by typing in the item's name in the search field on the user interface screen which will automatically show the item's location in the store. The Smart Trolley is designed with security measures to prevent it being wheeled out from the store's premises and also to protect customer's card details as it is designed to accept only card payment for items bought in the store. The system explains a novel methodology to overcome the problems faced by a customer at a shopping mall. This is achieved by developing a smart trolley system which is capable of not only carrying goods of the consumer but also guiding the consumer to prescribed locations in the mall based on his or her shopping list.

RFID technology is amongst the most revolutionary technologies that will shape tomorrow's pervasive retail sales. This technology offers an important set of opportunities which improve the shopping experience of customers when visiting any self service store. Indeed, this technology is increasingly promising to the extent of a potential replacement the barcode system as new low cost RFID tag manufacturing procedures have emerged.

II. LITERATURE SURVEY

The work done in existing systems have some limitations and disadvantages that are discussed in this section. One of the biggest disadvantages of the existing system is the customer faces is the location of the products which he wishes to buy. A lot of time is wasted in searching for such products and repeated asking of shopping personnel is not such a friendly task. Another disadvantage is that the consumer has to carry the goods selected back to the billing counters either with a help of a hand basket or a trolley. This can be a very arduous task for the consumer especially if he or she is elderly or having any kind of disability.

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In [1] the authors discuss a methodology of creating a Personal Shopping Assistant (PSA) which can be connected to a trolley. The PSA's basic role is to communicate with the user and intimate the user the location of items based on voice recognition. RFID tags line the shopping store at various areas and when a user comes in the vicinity of a product he/she wants to buy, he is intimated immediately by the PSA. Similar methodologies which utilize RFID have been discussed in several papers.

Though utilization of RFID, Wi-Fi or Zigbee is a simple solution to the problem, mapping or placing several of them across the shop is not at all a cost effective solution. In case of active RFID tags, powering the same becomes a problem as well [2]. It must also be noted that, intimation to the customer is given only after he or she reaches the vicinity of the product, which seems quite ineffective since the user can locate the product visually himself.

With regards to solving the problem of assisting shoppers in carrying goods and items back to the billing counters, papers such as [3]-[4] explain in detail the advantages of guidance robots for shopping. Though intricate features such as collision detection and avoidance have been addressed in these prototypes, the robots lack in guiding customers to their selected products and on the other hand follow the consumer around the shop.

In "Design and development of Multi touchable E-restaurant Management System", the multi-touchable interactive dining menu that allows customers to make order conveniently on the developed multi-touchable dining table during the busy hours using their fingers. Orders made by the customers will be updated instantly to a centralized database and subsequently reach the cashier and the kitchen module respectively. Management staff could use the system to manage the restaurant operations digitally, starting from the creation of food items for the multi-touchable interactive dining menu to deleting it or to manage orders from customers all the way to billing it.

III. PROPOSED SYSTEM

The propose system will consist of an android application and web application which will have the details of all the offers and the new launch products. We are going to developed in android platform, a smart trolley using sensors. This system tells that there is no need for customer to wait in the queue for the scanning for the product items for billing purpose.



Fig. 1: Architecture Diagram

The system will have following some of the components. Each component was allocated to different team member to research and submit the required design criteria.

1) Smart Trolley design and user interface this module will consist of the trolley to carry various needed items to be put inside. The trolley will have sensor provided with it which will count and add the price of the products.
2) Connection to the store database the sensor connected to the trolley will have detailed list of product in the mall and price and offers of all the products.
3) Scanning product this component will scan the product in the trolley and add to the cart with adding the price of each product. The scanner will scan the barcode of the products.
4) Generate the bill after the shopping and all the products get added into the cart the user can directly make the payment to the counter. The user need not to stand in the queue again for billing but can make the payment at the counter.

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A. Objectives And Scope

The fundamental focus of this project is to express the following aims and objectives, while also using a clear distinctive approach which will elevate this project from start to finish.

1) Preparation and Planning - Establish how to use tools, methods and processes to generate a technological idea which can be assess for commercial purposes within a time frame.

2) Requirement Analysis - To analyze the project requirements which includes generation and selection of product ideas, definition and value proposition of product, market research and assessment includes, function of product concepts and strategy of commercial viability.

3) Product Design and Architecture - Based on the project requirements, technologically-oriented design will be adopted in designing the system architecture of the product including modules of the system.

4) Implementation of Design - To ensure the product is implemented with the sense of promoting business opportunity by using the TEC algorithm.

5) Results - To develop a commercialization strategy in making this project a potential business by producing a business plan.

IV. FUTURE SCOPE

We have to update the details of the product items in the memory unit of trolley time to time. We take the help of Internet of Things and some software with the help of which all information will be updated regularly. Also, with the help of optical sensor, motors, and motor drivers, we will make trolley in such a way that it will follow the customer which purchasing items and it maintains the safe distance between customer and itself.

V. CONCLUSION

The progress in science & technology is a nonstop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place. This project is used in shopping complex for purchase the products. In this project RFID card is used as security access for product. If the product is put in to the trolley it will shows the amount and also the total amount.

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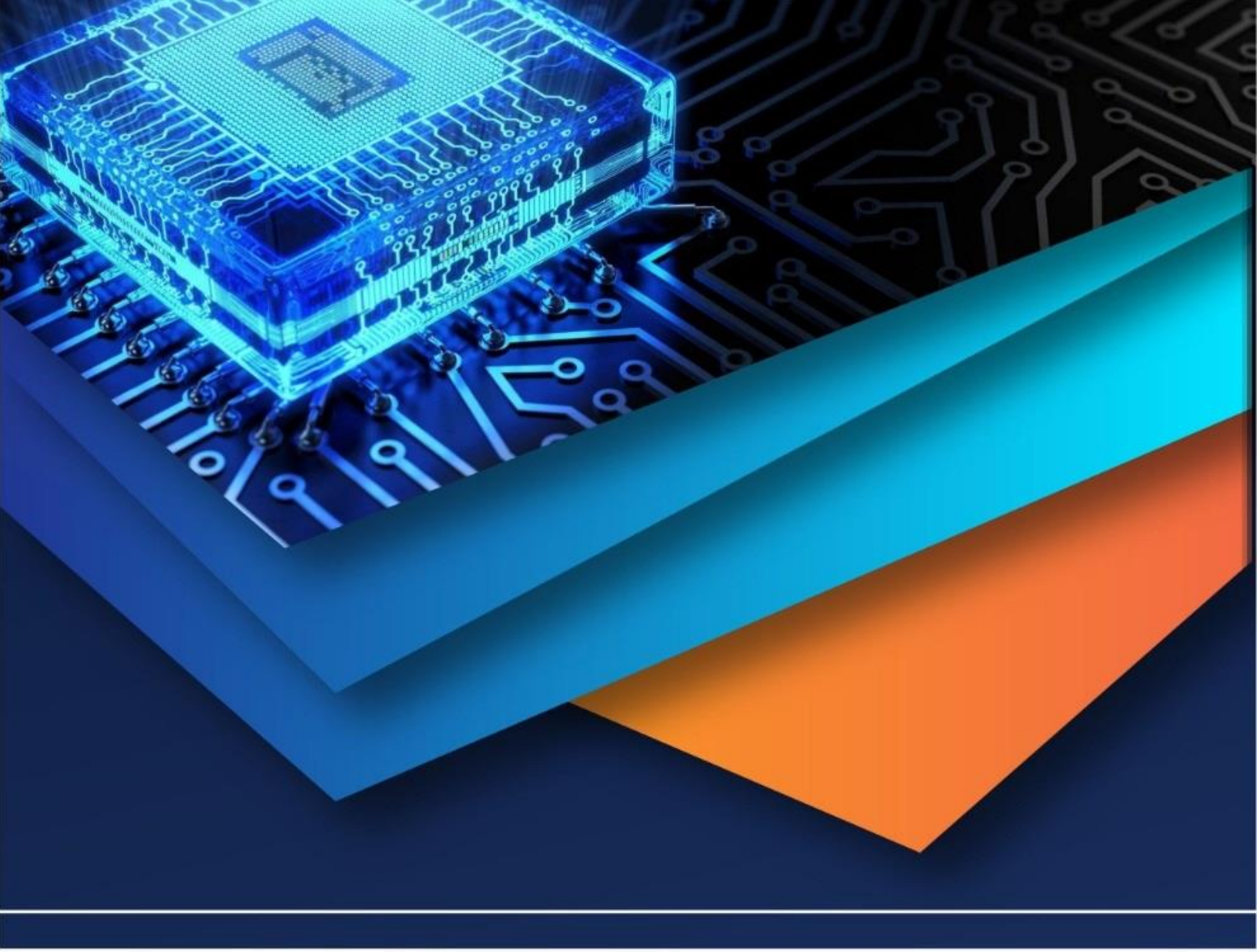
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