

# SMART AND EASY SHOPPING SYSTEM USING IOT

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**Abstract:** The Internet Of Things (IoT) refers to the connection of objects together, changing human lives. For an instance, in a supermarket all items can be connected with each other, forming a smart shopping system. In such IoT system, an inexpensive Radio Frequency Identification (RFID) card is attached to each item. Generally, customers collect the items to be purchased and wait for long hours at billing section. To avoid such situation a smart shopping cart is proposed, which is equipped with RFID reader along with raspberry pi automatically reads the price and details. As a result, the billing can be conducted from the shopping cart itself. In addition to this, smart shelving can also be added into this system to monitor stock and update a central server. Another advantage of this system is that inventory management becomes much easier, as all the items are read automatically instead of scanning manually by workers. In this project we represent the requirements of a smart shopping system.

**Keywords:** RFID tag, reader, Raspberry pi.

## I. INTRODUCTION:

In the era of the Internet of Things (IoT), interactions among physical items have turned into a reality. Regular items would now be able to be furnished with processing force and correspondence functionalities, permitting objects wherever to be associated. This has gotten another unrest mechanical, financial, and ecological frameworks, and activated incredible difficulties in information the executives, remote correspondences, and constant basic leadership [1]. Also, numerous security and protection issues have developed and lightweight cryptographic techniques are in intense interest to fit in with IoT applications.

There has been a lot of IoT look into on variant applications, for example, smart homes, e-health frameworks, wearable gadgets, and so on [2]– [4]. In this paper, we centre around a smart shopping framework dependent on Radio Frequency Identification (RFID) innovation [5], which has not been very much concentrated previously. In such a framework, all things available to be purchased are appended with a RFID tag, so they can be followed by any gadget furnished with a RFID reader in the store. Naturally this brings the accompanying benefits:

1. Things put into a keen shopping basket can be consequently read and the billing data can likewise be created on the cart. Therefore, clients don't have to hold up in long lines at checkout.
2. It turns out to be simple for the store to do stock administration as all things can be naturally read and effectively logged.

We propose the utilization of ultra-high frequency (UHF) RFID innovation [6] in the keen shopping framework, as UHF passive tags have a more drawn out range, from 1 to 12 meters. Past research on the plan of smart shopping frameworks primarily centred around utilizing low/high recurrence RFID, which have deficient ranges, and leave clients to physically examine things with a RFID scanner. In our proposed system, each smart cart is furnished with an UHF RFID reader, a microcontroller, a LCD. The smart cart can consequently read the things put into a cart by means of the RFID reader. A microcontroller is introduced on the cart for information handling and a LCD is prepared as the user interface. At the point when a client finishes shopping, they pay at the checkout point utilizing the created billing data on the smart cart.

This paper is a pioneer work in the structure of secure smart shopping framework. We list our commitments as pursues.

1. We propose a total plan of the smart shopping framework, and we give a depiction of the structures and relating functions in detail.
2. we proposed utilizing UHF RFID innovation to help associations in a smart shopping framework. The system can read automatically in a proper range.
3. We have assembled a model of the keen shopping framework and real functions.

## II. Related Work:

Concentrate on IoT applications is a prevalent point as of late, yet smart shopping frameworks have not been very much examined. There are some examination works being distributed as of late in regards to improving clients shopping background. In 2011, Klabjan et al. [7] proposed following a client in the store and finding clients' interests so as to offer customized coupons. Smart shelves and smart carts were likewise talked about in their work. Smart carts can be followed utilizing RFID innovation.

There are more structures around there over the most recent three years, yet none of them included original thoughts. In all the past structures, a client needed to examine the things one-by one physically, which isn't advantageous. Moreover, security issues have never been investigated in any past work. RFID innovation has been broadly examined as of late and it is a noteworthy innovation connected in IoT applications. Amendola et al. surveyed the RFID innovation and its utilization for applications on body-driven frameworks. Welbourne et al. built up a RFID biological system with a suite of online, client level instruments and applications. For basic supply advertising, most stores are utilizing standardized identifications these days, however we have

motivation to trust that RFID over scanner tag is a general pattern as RFID can accomplish remove reading, which mentally brings the property of IoT and interface every one of the articles in a store together.

### III. Smart Shopping System:

#### A. Structure Goals:

Our proposed keen shopping framework ought to accomplish the accompanying significant objectives: The smart cart ought to have the capacity to precisely read things put into or expelled from the cart. A thing put into one cart ought not have the capacity to be read by another truck close-by.

#### B. Segments:

Our proposed brilliant shopping framework comprises of the accompanying parts:

1. **Smart Cart:** The accompanying parts are prepared on the smart cart.
2. **Microcontroller:** Raspberry pi controller coordinates with the RFID reader and LCD touchscreen to perform registering functions.
3. **RFID reader:** We utilize a ultra-high recurrence (UHF) RFID reader which permits a reading range up to 10 meters. By tuning the transmission intensity of the reader, we can control its reading range.
4. **User Interface (LCD show):** Displays item data, total cost, connection status.

#### C. Building a Functional Smart Cart:

We constructed a model to test our plan and usefulness. The block diagram demonstrates the parts of our structured smart cart.

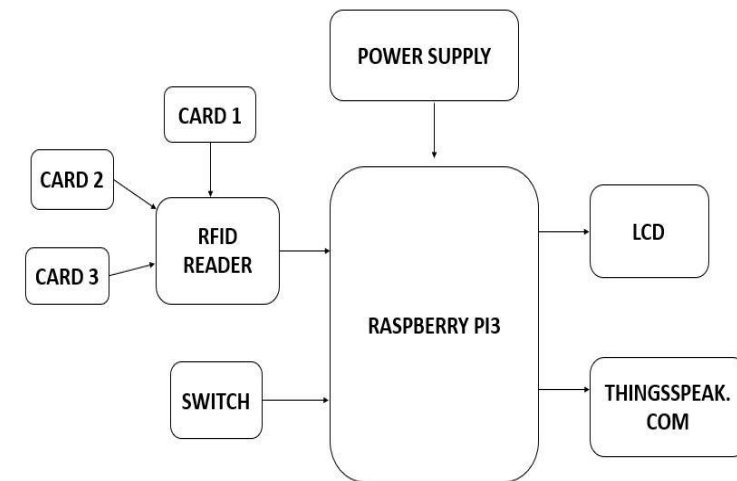


Figure: Block diagram of proposed method

As per our tests, when putting a thing into the smart cart or expelling a thing from the cart, the smart cart can precisely read it. When unmistakably shows a thing put into a smart cart won't be read by a close-by cart accidentally. We are likewise ready to test how to set a RFID reader at the checkout point with the goal that the things in the cart can be precisely read.

### IV. Smart Label Technology:

**RFID:** There are distinctive advances that might be utilized by a smart mark to ease item identification. The most prominent current identification innovation is RFID. RFID utilizes radio recurrence transponders that transmit one of a kind identifiers (for the most part in various Industrial-Scientific-Medical (ISM) groups) and, at times, certain put away information. There exist different global standards that have been used in numerous applications in the most recent years. An itemized depiction on the principles of RFID is out of the scope of this article, but the intriguing reader has great reviews on the innovation and the sorts of RFID frameworks.

## V. Results:

These are the results we got:

[1] After connecting to the network the LCD displays as 'Smart Trolley' as in fig:1.



Figure:1

[2] RFID cards are read one by one (figure2) which resembles the items in shopping mall.

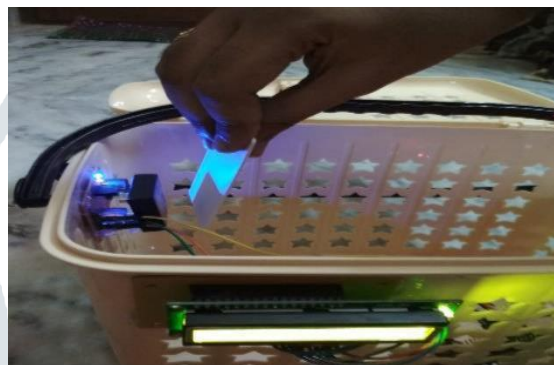


Figure:2

[3] After reading it displays the item name and total cost (figure 3).



Figure:3

[4] Finally switch is pressed (figure 4.1) which uploads the data to server (figure 4.2)

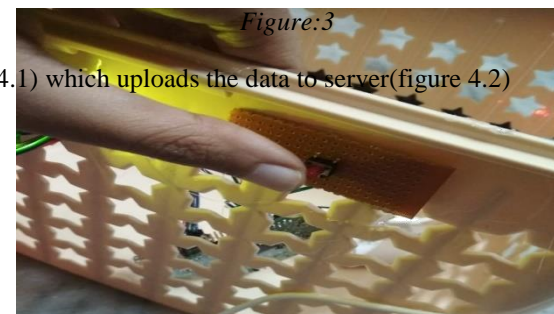


Figure:4.1

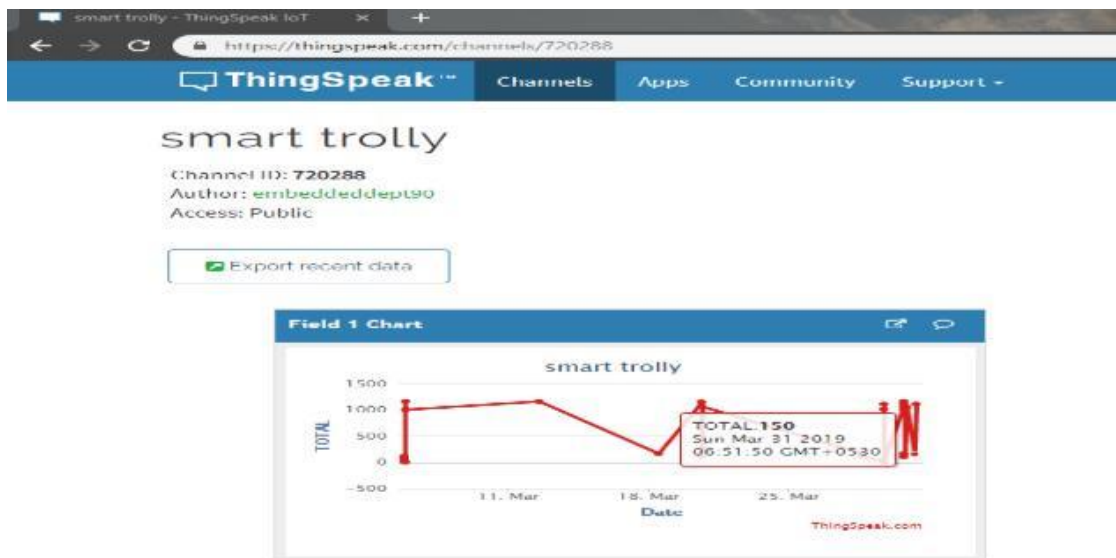


Figure:4.2

## VII. Conclusion and Future Scope:

In this paper, we propose a protected smart shopping framework using RFID innovation. We detail the structure of a total framework and construct a model to test its functions. We trust that future stores will be secured with RFID innovation and our exploration is a spearheading one in the improvement of a smart shopping framework. Our future research will concentrate on improving the momentum framework, for instance, by adding the smart shelves to enhance easy inventory management, make receivable information to mobile phone.

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