

Smart Shopping Basket for Super Markets Using LabVIEW

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Abstract: In the nowadays, each supermarkets are using shopping baskets and trolleys, so as to assist customers to pick out and store the product that they intend to purchase. The shoppers need to drop each product that they need to buy into the pushcart, so, proceed to checkout at the billing counter. The billing method is sort of tedious and extremely time intense and has created the requirement for outlets to use a lot of and additional human resource within the billing section and however waiting time remains significantly high. The aim of this study is to propose the “Smart shopping Basket” that aims to scale back and probably eliminate the entire waiting time of consumers, lower the entire manpower demand and expenses for markets and increase potency overall. In a world where technology is replacing the ways that we have a tendency to pursue everyday activity, the long run of the retail trade also lies in a lot of machine-controlled devices. The idea is implemented using LabVIEW Software package and hardware my RIO.

Key words: Supermarkets, billing counter, shopping basket, manpower, LabVIEW, myRIO, devices

INTRODUCTION

Enormous quantity of advancements within the feild of wireless communication has given way to many new technologies and feilds altogether. One such future feild is Wireless Sensor Networks (WSN) (Karl and Willing, 2005) which is maturing at a really quick pace as a result of its suitability during a wide range of application areas. It consists of a large range of tiny, low-power, cost-effective, autonomous devices termed as sensor motes. When interfaced with sensors and actuators, that can be easy or advanced, they play the combined role of environment-sensing, special-computing and wirelessly communicating devices.

These factors amid the effectiveness of technologies for miniaturization of hardware (microcontrollers and radio modems for example) technologies for sensing equipment's technologies for energy saving and scavenging and the proven fact that several applications can't be wired, makes it appropriate for varied application domains. Samples of such applications area unit medication and health care, disaster relief applications, environment and industrial observance, etc. during this new era of consumerism, broad area WSN finds its use in

client application areas like good home, smart grid, etc. The challenges here area unit to not solely create the system intelligent by automation, however, additionally to handle the considerations that area unit raised as a result of the automation method like probability of false alarms, energy consumption, cost-effectiveness, etc. Since, several sensor nodes are needed over a broad area for environment-sensing, the system design has to focus on aspects like the selection and placement of sensors within the area, communication among the various nodes so that, it works reliably with minimum energy demand and be cost-effective at a similar time. During this research we tend to take the actual case of supermarkets wherever our design is employed to deal with the subsequent issues:

- Customer dis-satisfaction as a result of long waiting time for check-out method
- Involvement of lots of man-power that is expensive

So as to achieve this we have come back up with a design that automates the request procedure and saves the customer's time. Automation has its own issues. Absence of human operators can potentially lead to

inconvenience when the underlying technology fails. It also can result in dishonest behavior of the shoppers. Proposed to implement a solution that has redundancy engineered into it in order to scale back the probability of failure and has three main benefits:

- It creates a more robust shopping experience for the shoppers by saving their time
- It minimizes the man-power needed at the shopping center because the checking-out method at the check-out counters is eliminated altogether
- It handles cases of deception if any, thereby creating the system attractive not only to the shoppers, however additionally to the sellers

A number of attempts are made to design a wise shopping cart with various totally different functionalities describe a smart trolley (Awati and Awati, 2012) design that concentrates on the way to get the shoppers eliminate dragging significant trolleys and to automatize request, however, it assumes all the consumers to be honest and thus does not tackle cases of deception, if there are any. Further, proposed a wise shopping (Yew *et al.*, 2012) for future wherever the barcodes (TAI., 2013) are fully replaced by Radio Frequency Identification (RFID) tags and scanners. This concept would possibly take a protracted time to be deployed because it is expensive both in terms of cash and energy. A lot of alternative works describe how products during a store can be tracked by customers rather than spending plenty of your time looking for it.

The purpose of this smart shopping basket is to implement an automatic shopping cart that gives nice convenience and efficiency to customers, that eliminates human labor to push significant loaded carts and facilitate customers easily locate the required products. Our goal includes avoiding collisions with obstacles and detecting accessible routes, collecting user input and optimizing the path needed to accommodate the shopping list and informing customer when the cart is blocked.

Literature review: While doing survey researchers have found that the majority of the people choose to leave the shopping center rather than waiting in long queues to shop for some products. People notice it difficult to find the product they wished to shop for once choosing product they have to face during a long queue for request and payment. To undertake to resolve the issues previously identified, recent years have seen the looks of many technological solutions for supermarket assistance. All such solutions share a similar objectives: save consumer’s time and cash, facilitate the retailers to win loyal shoppers. One system is intended, i.e., web

shopping cart system as a typical customer-server app on the online. Then, they cleared several issues on the implementation of the online shopping cart system that are peculiar to the online.

In order to resolve the problems, planned a novel mechanism that may manage user sessions with high reliability and safety. It’s compared the online shopping cart system implemented using the proposed mechanism with the one developed by the standard ways an additional system is planned, an automatic embedded software generation framework that may produce and evolve ZigBee applications (Ergen, 2004). The framework consists of two major modules, pattern extraction and code generation. Pattern extraction and development are designed to provide ZigBee application with model reuse and modification. SysML serves as a medium in between pattern development and code generation. The smart shopping basket application has been implemented using this pattern based software.

MATERIALS AND METHODS

Design and implementation: In the propped smart shopping basket (Fig. 1) shows the block diagram and it consists of server, PIR sensor, Bluetooth module and power supply as the major blocks. All these blocks are connected as shown in the Fig. 2.

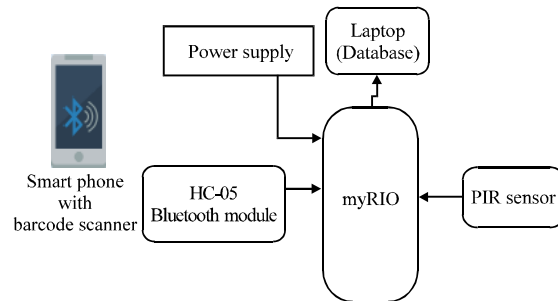


Fig. 1: Block diagram

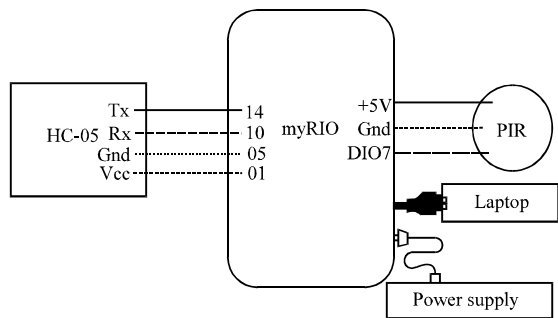


Fig. 2: Circuit diagram

Module working: Power supply powers the my RIO which in turn powers bluetooth module and the PIR sensor. Important part of the block diagram is the Bluetooth sensor (HC-05) which receives the data from the mobile and feeds it to the my RIO for the further processing. In this case the bar code is scanned by the camera of the smart phone and is transferred to the by using application (Cart sense) and bluetooth sensor.

Whenever my RIO receives the bar code data it turns the PIR flag to '1' which means the user can put their hand once inside the basket either to add or remove items. A PIR detects the hand motion turn the flag to '0'. Finally after the completion of the shopping billing is stored in the database (Laptop in this case) through my RIO.

Front panel and block diagram: In the front panel different types of controllers and indicators are used like LED indicators as shown in Fig. 3.

- In the block diagram different Icons and Programming structures are used to develop the code as shown in Fig. 4
- First part of the module is to store trolley ID, so, Bluetooth module is set to read state and when Bluetooth is connected to the application it receives a message "TROLLEY 1"
- With that shopping starts and whenever item is added using app, my RIO receives IDs to store the items added to the cart by comparing IDs
- Best part is security whenever the item is added, myRIO gives a chance to put a hand in it
- So, when the shopping is done for verification, check out phase starts where customer removes all items from basket by using PIR
- Finally at the end of the shopping, billing is automatically done and bill is stored in database

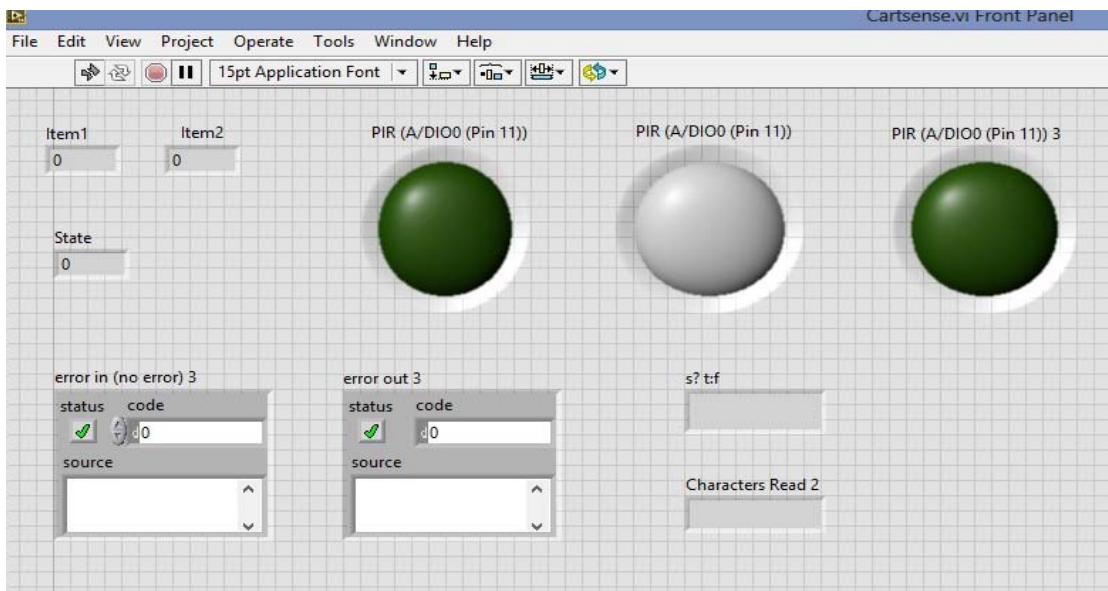


Fig. 3: Front panel in LabVIEW

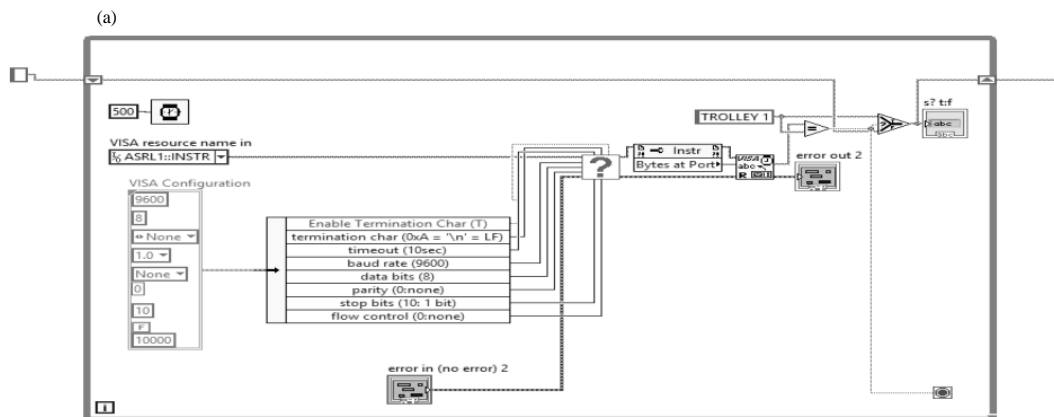


Fig. 4:

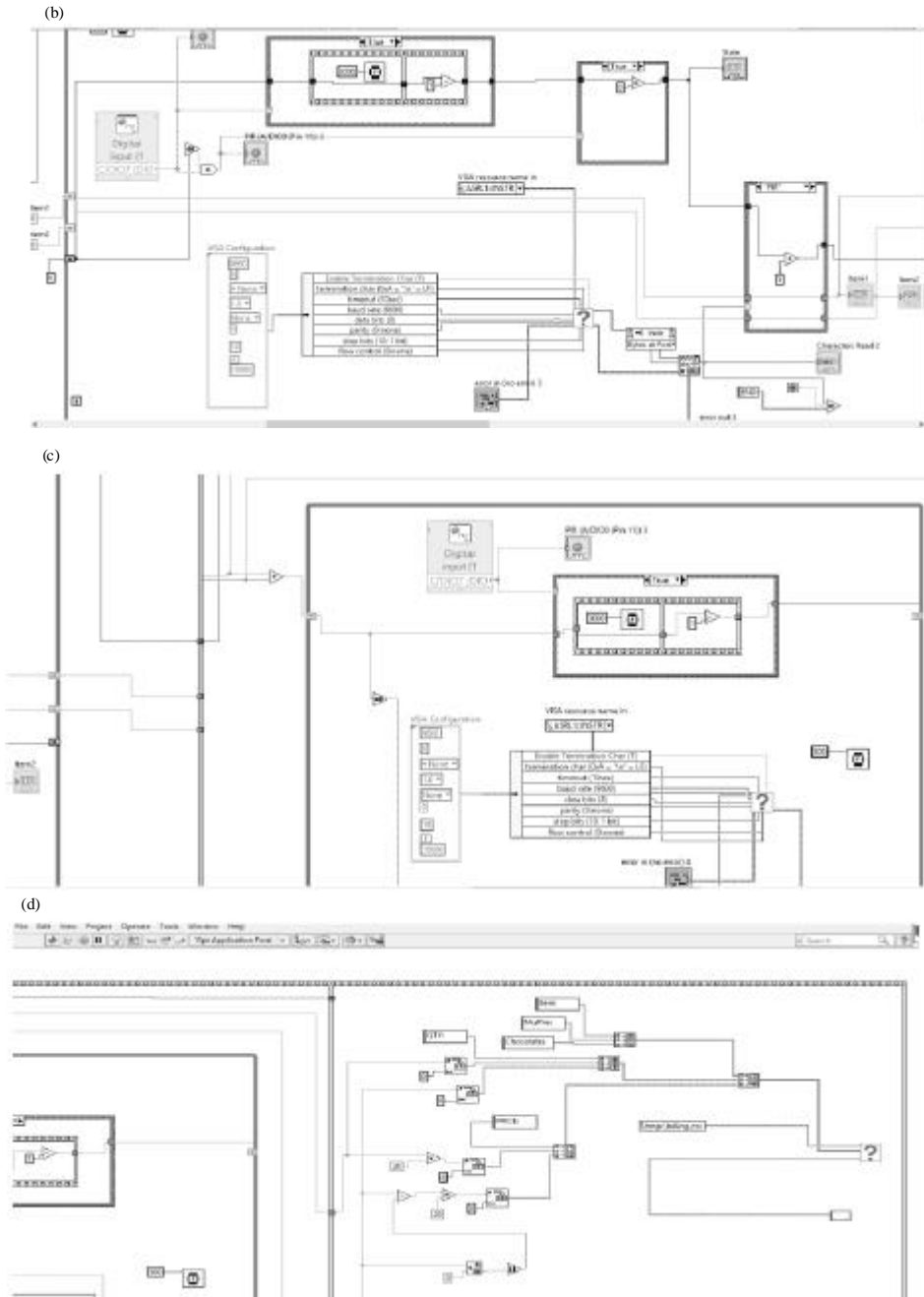


Fig. 4: Block diagram in LabVIEW

RESULTS AND DISCUSSION

Figure 5 shows prototype outside view and it showing the barcode which is unique for each basket. After scanning the barcode the mobile is need to keep for scanning of items which are inserting or removing from the basket. Figure 6 shows the inside view of the basket it consists of my RIO and PIR sensor. PIR sensors alter

you to sense motion, nearly always accustomed discover whether or not a human has moved in or out of the sensors vary. They are little, cheap, low-power, straightforward to use and don't wear out. For that reason, they are commonly found in appliances and gadgets utilized in homes or businesses. And my RIO is that the heart of smart shopping basket.



Fig. 5: Smart shopping basket outside view

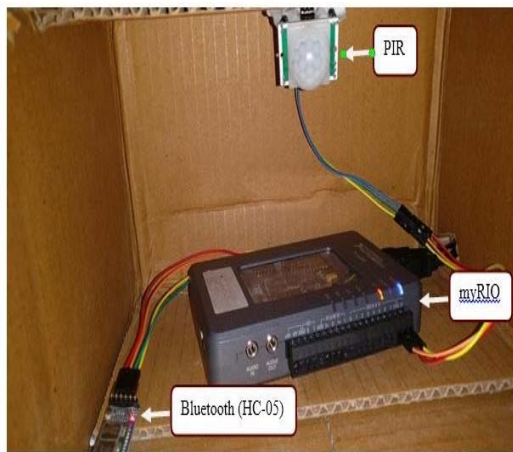


Fig. 6: Smart shopping basket outside view

Figure 7 shows the mobile Application home page which developed for this smart shopping basket after scanning the barcode on the basket the home page looks like as shown in the Fig. 8.

The study successfully demonstrated the possibility of developing a smart shopping system which automates the entire billing procedure. The system which is developed is highly reliable, fair and cost-effective. It is reliable and fair because no complex connections are present.

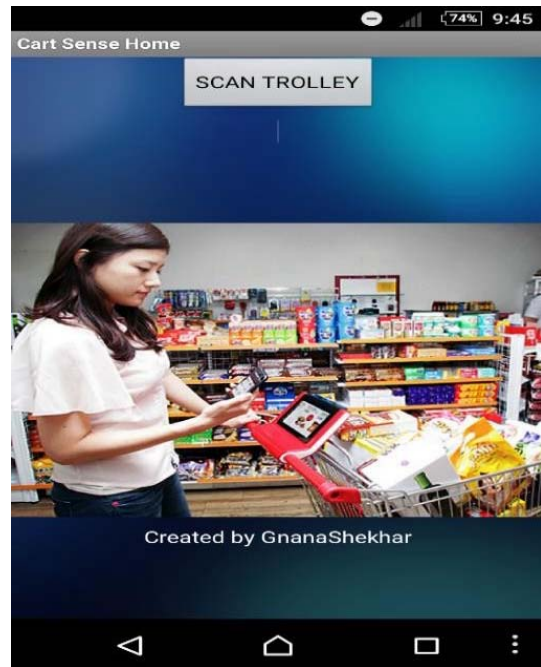


Fig. 7: Mobile application home page

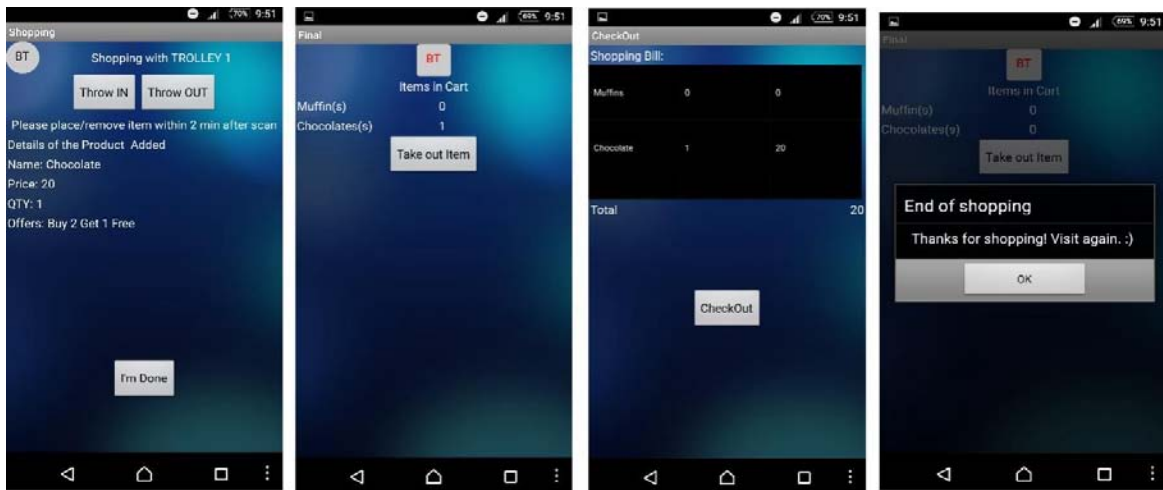


Fig. 8: Screenshots of smart shopping cart flow application (cart sense)

CONCLUSION

Taking into account the changing trend in retail shopping, we come to a conclusion that the intelligent shopping basket is most certainly a definite necessity for the retail marketing industry to step up their portfolios, cope up with the advancement in technology and save time and manpower. The smart shopping trolley application creates an automated central billing system for supermarkets and malls. Using this product customers will not have to wait near cash counters for their bill payment. Since, their purchased product information is transferred to central billing system. The system proposed is highly dependable, authentic, trustworthy and time-effective. There will be reduction in salary amount given to employees, reduction in theft. Also, the system is very time-efficient. The developed product is easy to use, economical and does not require any special training.

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