DESIGN OF AN INTELLIGENT SHOPPING BASKET USING IoT

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DESIGN OF AN INTELLIGENT SHOPPING   BASKET USING IoT

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ABSTRACT

The Intelligent shopping basket is a smart trolley which uses a embedded chip with a bar-code scanner and a battery to allow users to self egress at the supermarkets. The main theme of the paper is to decrease the time consumption in the billing counters at the supermarkets by designing an smart shopping basket which allows users to checkout from the malls and increase the time of Production. The IoT kit which contains the barcode scanner will automatically detects the product dropped into the basket using ultrasonic sensor.

*KEYWORDS***:** *Supermarket, bar-code scanner, sensor, IoT*

I. INTRODUCTION

The term Internet of Things(IoT) was first proposed by Kevin Ashton in 1999. The Internet of Things (IoT)[5] is about innovative functionality and better productivity by seamlessly connecting devices. IoT will boost a tremendous amount of innovation, efficiency and quality [6]. The IoT has become the major disruptive technology changing software.

Every supermarkets employ shopping baskets [3] to help customers to select and store the products. The customers have to drop the products which they wish to purchase and then proceed to checkout. At present in every super market, once the customer is entered in to the mall he has to select the trolley and select the items he wish to purchase and then drop into the trolley. Once all the items has to be selected he need to make a bill of it for that the customer have to wait at the bill counter till he make his turn to make payment. In order to make a payment at times it takes a lot of time so the waiting time of the customer is more which makes the customer to hesitate the visit the mall again This is the common procedure followed in

general marts where the employee of super market of the customer will scan all the products using barcode in the basket which leads to waiting. In general, a bar-code[2] is a machine-readable strip of data printed in parallel lines, used to represent a multitude of information. Traditionally, a bar-code scanner [4] is used by retailers to keep track of inventory and speedup data entry. Bar code scanning applications are product-centric we want to create an application that is consumer-centric.

There are many different bar-code typed that exist for different purposes. We can split them into 1D and 2D bar-codes. 1D bar-code are columns of varying width lines that are imprinted on back of products. 2D bar-codes are the kind of bar-codes which were invented to encode the data not only horizontally but also vertically. Each type of bar-code is called a symbology and there is a corresponding standard that defines a symbol and how to encode and decode the symbol

The drawbacks of the present procedure are each customer has to wait in the queue of the checkout counter. while billing if the customers have to remove some products because of exceeds his budget, again some more items required to check which products has to remove from the basket.

So we need to develop a project for automated shopping trolley with bar-code scanner which aims to reduce the total waiting time of customers, total man power requirement for markets in order to improve efficiency of shopping malls. In a world where technology is replacing the ways we pursue everyday activity, the future of retail industry also lies in more automated devices.

II. SYSTEM DESIGN

The Intelligent Shopping cart system [2] infuses a Shopping cart (trolley) with a bar-code scanner placed at checkpoint. It make possible for the user to self-scan the bar-code of the purchased products which he aspire to purchase. A wireless transmission smart-device [4] makes note of all the scanned items in the particular trolley (with allotment number) and is linked with the Supermarket's backend database which contains features of the products such as Cost Price. The scrutinized products are automatically billed in the wireless smart device for their purchases, thereby significantly reducing total waiting time and transmitted to the Shop's central Billing program.[3].
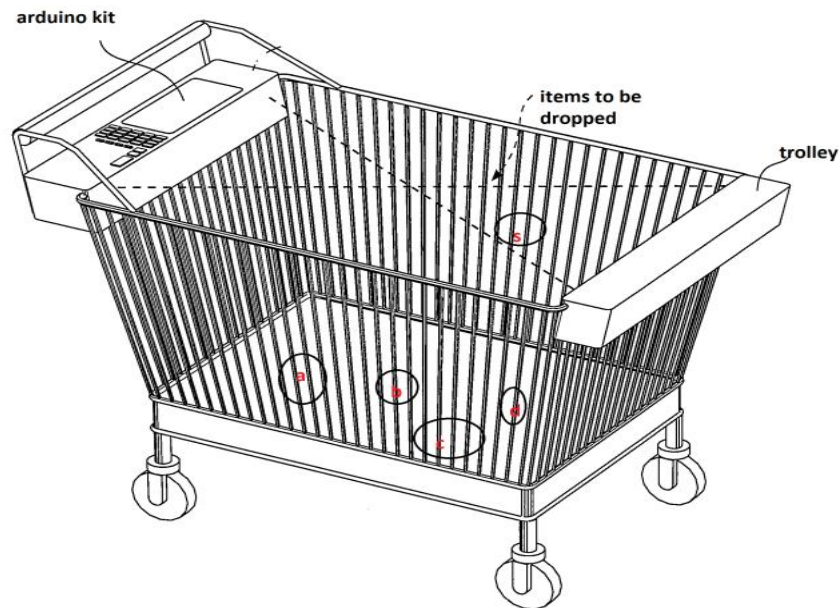
Fig1 : Automated shopping trolley

III. HARDWARE COMPONENTS

- The Embedded ultrasonic chip which controls the entire operation is the trolley.

- A mini 4 inch Touch Screen LCD monitor is integrated with the chip.

- A 1D Bar-code Scanner is connected and installed with the Embedded Chip.

- The 1D bar-code values are preloaded into a central database and the coded Application access these values using a wireless network.

- A battery kit powers the embedded chip and the LCD monitor.

IV. BLOCK DIAGRAM:

The following block diagram shows the circuit having Arduino integrated circuit which uses a barcode scanner and an ultrasonic sensor for automatic scanning of the products. Once the item is selected the customer has to drop it into the trolley. By using the ultrasonic sensor the automatic scanning of the product is done and with the database attached to the Wi-Fi module in

the kit the bill is automatically generated in the bill counter. Finally, the customer can do the payment easily and self checkout from the shopping mall.
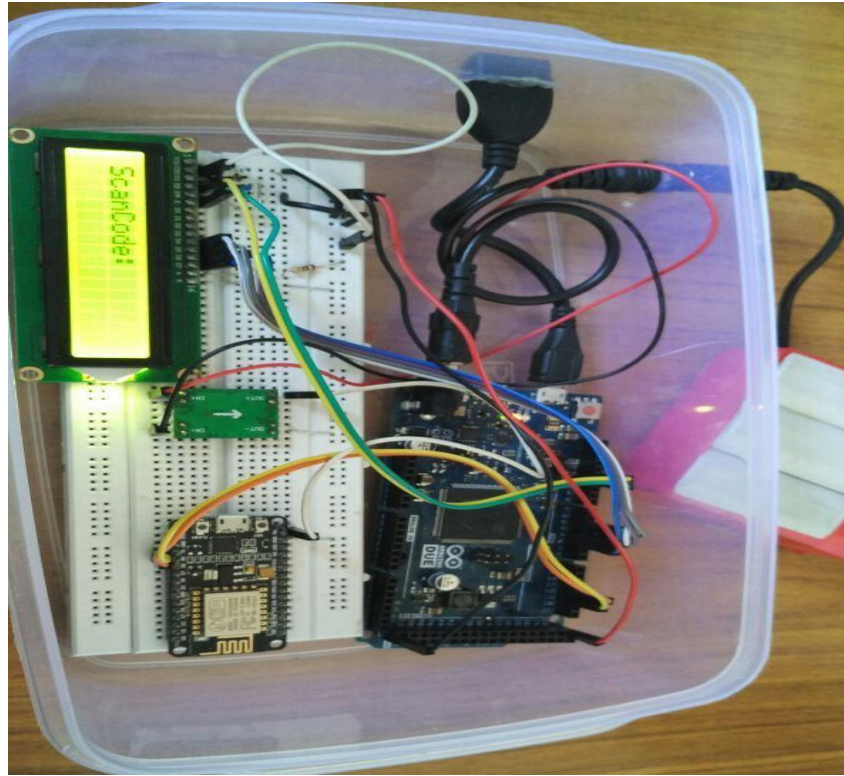

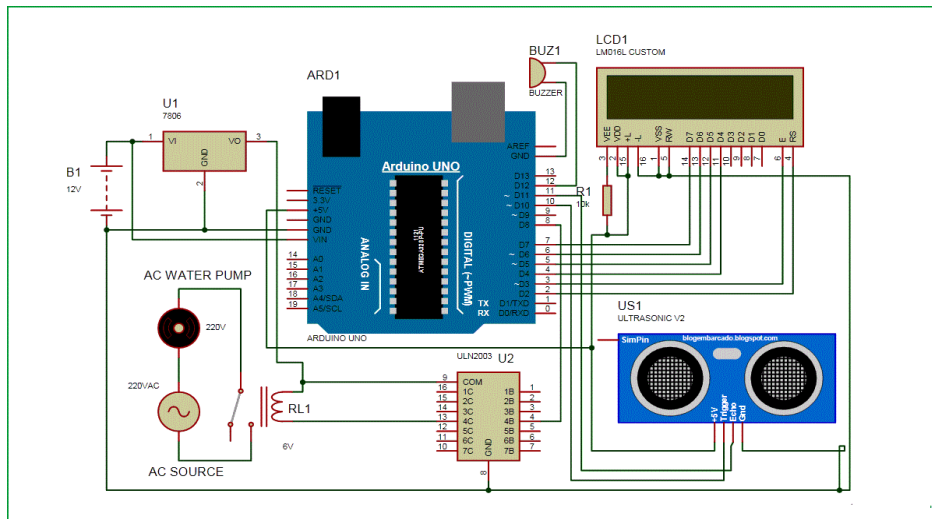Fig 2: IoT kit for shopping basket

Fig 3: Block diagram of the circuit

The Arduino Due is the first Arduino board based on a 32-bit ARM core microcontroller with 54 digital input and output pins, 12 analog input pins, it is the perfect board for powerful larger scale Arduino projects. The board contains everything needed to support the microcontroller.

ADVANTAGES

- Reduces manpower required in billing section. This can reduce the expenses incurred by the management.

- Users can be aware of the total bill amount during the time of purchase.

- Reduces time spent at billing counter and Increases customer satisfaction.

The hardware components used to implement this project are Barcode scanner which is also called a barcode reader is an electronic device that read barcodes. It basically consists of a light source , a lens and a light sensor which translates the optical signals into electrical ones. Most common type of barcode scanner uses laser as a light source. Battery kit is used here in order to supply power to the Lcd screen. A 4 inch Lcd screen is used in order to display the barcodes of the products. A Trolley is used to drop the products by the customer which he wish to purchase. Once the product is dropped the Ultra sonic sensor present in the barcode scanner can automatically detects the product based on the barcode printed on the backside of the product. After the sensor sensed the product then it automatically generates the bill by using the Wi-Fi module. The entire data base is attached to the main module of the system where it generates the products bill. Here the database which we used here is Php . So based on this database the cost price of the product is well known the bill will be generated automatically. Finally the customer will clear his payment easily. So the waiting time of a customer is reduced. The software components used here are arduino due is a microcontroller board based on the Atmel SAM3X8E ARM cortex-M3 CPU . It is the first arduino board based on 32-bit ARM core microcontroller. Node js is the javascript based on framework. It is used to develop I/O intensive web applications. Node js is open source completely free and used by thousands of developers.

V. SYSTEM CORRECTNESS

The Weight sensor is used to detect the weights correctly, there will be the problem if the barcode scanner unable to read the barcode on the product because of either damage of the barcode or dropping of the product fastly. To avoid these kind of errors we are using weight sensor. While checkout, the weight sensor will give the total weight of the products in the basket. Which can compared with the weight of the individual products from the database of the products.

VI. CONCLUSION AND FUTURE ENHANCEMENT

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 for fast billing.

In future this intelligence system will advice the customer which products can be removed from the basket if the budget exceeds. We have to find the mechanism to deselect the removed products from billing.

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