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Smart Trolley

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Abstract: *Often it is a situation that, when we visit a mall or shopping centre, most of us spend timestanding in a queue for billing rather than shopping itself. Having skilled and efficientstaff is another issue. In this scenario a smart solution where you can scan the productsas you put them in the trolley and have the bill automatically displayed would be mostsuitable.*
With this objective in mind, we have created a smart solution and would like to introduceyou to 'The Smart Trolley'. The functionality of this trolley is very simple and user friendly.It uses a barcode scanner to scan the products you shop. Once you scan the productsand put them in the trolley, the product details such as product name and the price willbe displayed on the mobile of the customer. For handling frauds, Smart Trolley is fittedwith a Load Cell which will give the weight of the products that have been entered in thetrolley. The weight of the products in the trolley and the weight of the same productsfrom the database will be compared. If there is a mismatch among the two weights, theerror will be notified to the customer by a buzzer on the trolley itself. The customers willbe able to pay the bills via online payments mode.

I. Introduction

In the modern world, every shopping center and supermarkets employ shopping baskets and shopping trolleys in order to aid customers to select and store the products which they intend to purchase. After selecting the products which the customers intend to buy theyhave to proceed to checkout at the billing counter. The billing process is quite tedious and highly time consuming and has created the need for supermarkets to employ more and more human resource in the billing section, and yet waiting time remains considerably high.

In our project, the difficulties and the problems which occur in the current scenario will be solved. The trolley will be fitted with all the required mechanism such that the bill of all the purchased products by the customers will be directly displayed to the user on their mobile screen. Then the customer will be able to pay their bill through online banking.

Smart trolley is the best option in the shopping centers and malls.
- First the customer has to login to the site with the cart/ trolley id.
- Customer will have to scan the products and put them in the trolley.
- After scanning the products, the bill will be displayed on the mobile screen.

II. Literature Survey

1.1 Smart Shopping Cart

The paper 'Smart Shopping Cart' addresses the challenges of modern shopping where consumers do not like to waste time in queues for billing by creating a smart trolley using ZigBee microcontroller. A device that consists of an LCD screen, a barcode scanner, load cell, microcontroller, ZigBee, and a portable battery will be implemented on the shopping cart.

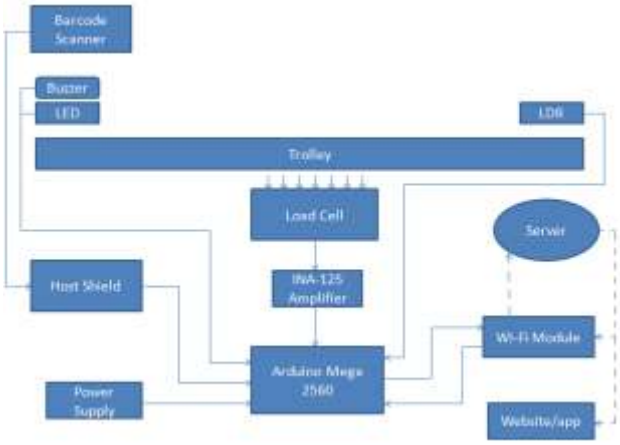
2.2 Automated Billing Cart

Due to this our valuable time is wasted, so by keeping this in mind, we have modified a cart which will contain a barcode scanner by which the customer can scan the product and automatically the product id, product name, quantity and other details are stored in the Xampp database which will be fetched and displayed on the android app. Scanner will keep the track of products added to the cart. Each cart has some unique ID, an android application will use this ID so that the database can be accessed by the user through Wi-Fi module. When the customer arrives at the store, there can be two cases; if a new customer arrives to the store then he will move to the user registration counter. User will be registered first then he/she can take the smart cart and start shopping. If he/she is an old customer then he/she don't need to register again, they can directly start shopping by smart cart and entering its unique cart identity number into the mobile application. When the customer is done shopping, the cashier at the billing counter will enter the unique cart number and all the details will automatically be transferred to the computer and the payment should be done at the counter.

II. Project Description

In this paper we have introduced a smart shopping cart that reduces the time wasted by consumers at the billing counter of a shopping mart. The shopping cart has the ability to create a bill of the productspurchased by the customer. The paper focuses on the available smart technology comprising of embedded system.
The smart trolley proposed in this paper comprisesof a barcode scanner which helps the customer to scan the products at the time of purchase. When customer enters the shopping mart they will have to login to the website using the "unique cart id" provided on every trolley. The products scanned will appear on the webpage in the form of a invoice. Which can be then paid using online banking. The trolley is fitted with the load cell to detect the weight of the purchased products. Any sort of fraud or theft is instantly detected if the data from the database mismatches with the load cell data. For more protection a sensor based detection system in introduced which counts the total number of products purcased.

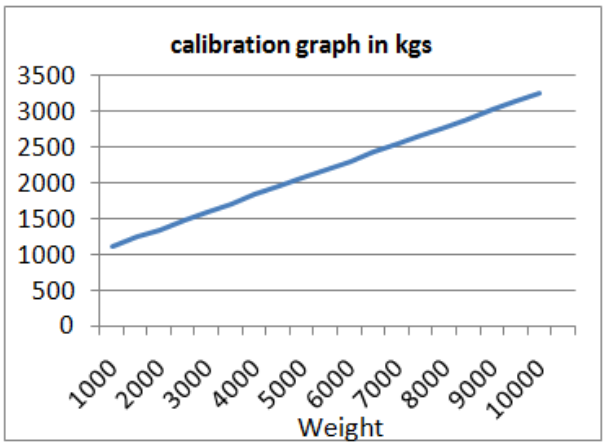
III. Implementation



- The various components of the Smart Trolley have been shown in the above figure.
- The first component is the barcode scanner which is used to scan the products that the customer is willing to buy.
- The barcode scanner will be placed on the handle of the trolley.
- Once the product has been scanned through the barcode scanner, the digital datafrom the barcode scanner will be given to the arduino serially through the hostshield.
- After the product is placed inside the trolley, the load cell will get its weight andthat weight will be given to the arduino board through the INA-125 amplifier.
- INA-125 amplifier is used to amplify the output of the load cell.
- Power supply is used to power the arduino board.
- Now the arduino board through wireless communication by using nodeMCU Wi-Fimodule will pass the information to the server (the barcode scanned).
- The server will get information of the product (from the barcode number) fromdatabase of the products which will be saved on the server.
- The server will pass that information to the arduino board through Wi-Fi moduleas well as to the website/ app where the user will get the information of the productwhich he/she scans.
- Now, the arduino board will compare the two weights, ie; the weight from thedatabase and the weight from the load cell.
- If the two weights are different then buzzer will turn on which will be present onthe trolley indicating that the customer has scanned one product and placed some different product in the trolley.
- If the two weights are same then there will not be any indication from the buzzer.
- LEDs and LDRs are basically used to get the overall count of the products in thetrolley.
- As the products are put in the trolley, the count will keep on increasing.
- As the customer will add the products in the trolley, information on the mobilescreen will be updated.
- Once the customer selects the checkout option on the website, bill will be automatically displayed.
- Now the customer can pay the amount through online banking.
- For the customers not using online banking can avail the cash counter service.

IV. Result

During calibration, graph of weight v/s voltage was plooted and it was found to be a straight line.



The webpage of the Smart Trolley was like:

The products that are scanned and added in the basket will be displayed on the webpage and the list will keep on being updated as the things are added to the trolley.

V. Conclusion

In this proposed paper "A Smart Trolley" using the barcode has been employed. The developed product is easy to use and very economical. However few aspects can be included to make the smarttrolley more robust. To begin with, the load cell used here as a theft protection can be more sensitive to detect the light weight products. Secondly the time required for wireless communication with the server may need to be considered.

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