

SMART TROLLEY USING IoT

Mr. K Srinivasan, Assistant Professor, Subramoniam V V, Department of E.C.E, Prashanth R, Department of E.C.E, and Sreeram N, Department of E.C.E

Abstract—India is one of the fastest growing economies in the world and aspires to become a 5 trillion dollar economy. E-commerce has surely spread itself and there have been many advancements in this field. The working class and most of our community prefers to go to malls or supermarkets and get their shopping done. Due to increasing populations, shopping is a cumbersome process as one has to wait in long queues to get their processing done. Clearly, it is a waste of time and a tedious affair. The major problem lies with the system of barcodes where every item is being scanned individually which makes the process slow and time consuming. Smart shopping cart is mainly used in supermarkets, grocery stores to reduce the customer’s time and to improve the method of shopping. This cart will be very efficient in current situations like covid-19 pandemic to maintain social distance between the people. The smart cart is user friendly whereas, the scanning is done by OCR, billing and payment methods were done by the smart shopping cart and it is one of the easier ways of shopping. Since the entire process of billing is automated it reduces the possibility of human error substantially. Anti theft mechanism is enabled using load cell and error is indicated by buzzer.

1 INTRODUCTION

Shopping mall is a place where most people from all walks of life will get their daily necessities ranging from food products, apparels, toiletries, gardening tools, electrical appliances, and others. The numbers of little and enormous looking malls keep it up increasing over the years throughout the world because of the demand of the general public. Thus, the amount of advancement of the shopping center system and infrastructure conjointly varies. Compared to some foreign countries’ shopping mall

systems, there are still plenty of spaces for improvement in terms of providing quality shopping experience to the consumers. Consumers often face many problems and inconveniences when shopping. These problems include worrying that the amount of money brought is not enough for paying all the items needed, insufficient information of the items that are for sale and also wasting time at the cashier. These are the issues that include worrying that the amount of money brought is not enough for paying all the items needed, insufficient information of the items that are for sale and also wasting time at the cashier. These are the issues faced by the customer. There are some existing ways to resolve the issues that are declared on top of however the effectiveness still takes into account corrigible. Examples of existing downside finding techniques are subbing the traditional approach of keying item per item by hand to the register with the technology of barcode scanning wherever the cost are stored in the barcode, and also set up a client information counter to help the client if there are any enquiries about the items at shopping mall.

Block Diagram

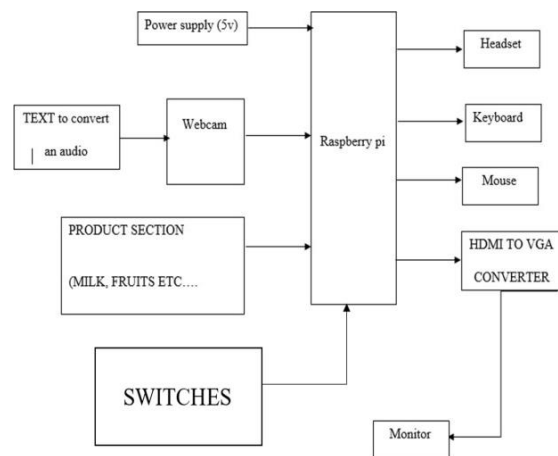


FIG:1 Block Diagram

2 LITERATURE SURVEY

2.1 Automated Billing for Smart Shopping System Using IOT

The implementation of IOT (Internet of Things)[14 15] based automated trolley system was reported in [1]. Framework is utilized to ease lines in shopping centres by utilizing RFID modules. The RFID reader will peruse the RFID Tag set on the item when the item falls in the trolley. In the event that the client needs to expel any item then he should expel that item from the trolley. The LCD will show the subtleties of the expelled item like name, cost and the absolute bill and with the help of Xampp server the bill will be sent to the cashier, flowchart.

2.2 Smart Shopping Trolley Using RFID

Describes the implementation of a Smart ShoppingCart using ZigBee networks. The reliable and cost efficient system design also ensures detection of deception. Thus, the smart system attracts both the buyers and sellers and ZigBee acts like Xampp server but is more reliable.

2.3 Robust Low-Cost Passive UHF RFID Based Smart Shopping Trolley

Designs a shopping cart by taking inspiration from a shopping basket which is under development by Panasonic, in which each item is tagged using UHF RFID [range: 916-924 MHz] Two Circular Polarized (CP) Patch antenna used to read RFID tags in different orientations. They also include a factor for measuring effectiveness of function called as RSSI (Return Signal Strength Indicator) RSSI measurement plays a significant role in this smart trolley application as RSSI measurement indicates the directional gains that are needed for the antenna development. CSL468 RFID reader used 16 ports and scan speed of 300 tags/sec.

2.4 Smart Billing Trolley Using RFID And LIFI

Proposes a cart to provide billing services using a combination of RFID and Li-Fi (Light Fidelity) systems. However, both are not used together. An option is provided at the beginning, when the trolley is put to use by the customer, to choose whether to use RFID or Li-Fi for scanning purposes. This system uses Arduino Uno Atmega328 microcontroller along

with RFID module (tags and reader) and Li-Fi transmitter and receiver. If the RFID option is chosen, the RFID reader is activated and on adding items into the cart, RFID tags are scanned. Otherwise, on choosing the Li-Fi option, the Li-Fi receiver is activated. Work flow in both cases remains the same.

2.5 ShoppingTrolleyUsing RFID Based on IoT

The authors have designed a construct of shopping trolley by using Arduino Uno, infrared sensors, RFID Module, LCD display, Wi-Fi modem and added a DC gear motor to enable trolley automation. It uses Ethernet Shield to connect to the Internet using Ethernet Library. The idea is to connect trolleys to cell phones using Wi-Fi/Bluetooth and an Android app, in which a map of the mall is displayed. If a customer wants to go to the food section, select the food section on the map, and the trolley automatically moves to the food section. Uses RFID module (combination of tags and reader) to scan products.

3 HARDWARE AND SOFTWARE

Hardware

- Raspberry-pi 3 model B+
- Power Supply
- Web Camera
- Bluetooth Module
- Load Cell sensor
- HX711 Load Cell Amplifier Module

Software

- Image Capturing and Processing
- OCR (Optical Character Recognition)
- Python
- VNC Viewer

Working Methodology:

The smart shopping cart is mainly used to avoid standing in queues and it will be efficient in present situations like covid-19 pandemics. The working model of our project will be explained now. First, a product is scanned with the help of a web camera and a buzzer will buzz after scanning the particle for an acknowledgment

and it is placed in the load sensor to obtain the weight of the particle. Now with the help of OCR, the recognized characters were displayed as an output. At the end of shopping, a switch will be pressed to display the bill in the phone with the help of a bluetooth module. Now if a particle is not detected by the camera but detected by a load sensor means, the buzzer will buzz an alarm sound continuously. This is our complete working function of our smart shopping cart.

The following is our proposed methodology and working model of our smart shopping cart:

- A product is selected from the customer and dropped into the cart.
- The web camera scans the product using OCR by Raspberry-pi, and the weight of the product is detected
- The Display module displays both name and price of the product.
- The buzzer buzzes an alarm if the product is not scanned by the camera module, but detected by a weight sensor.
- OUTPUT Fig. 2. The output is the message sent by the Bluetooth module.

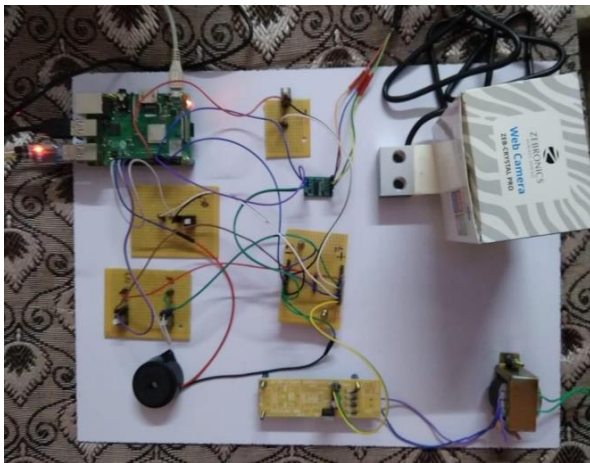


FIG:2 Hardware Setup

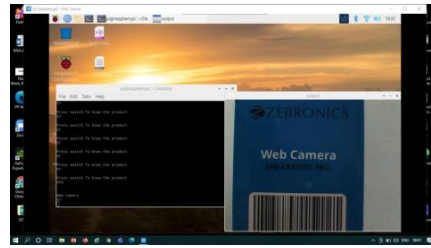


FIG:3 Scan by Web camera and detected by OCR

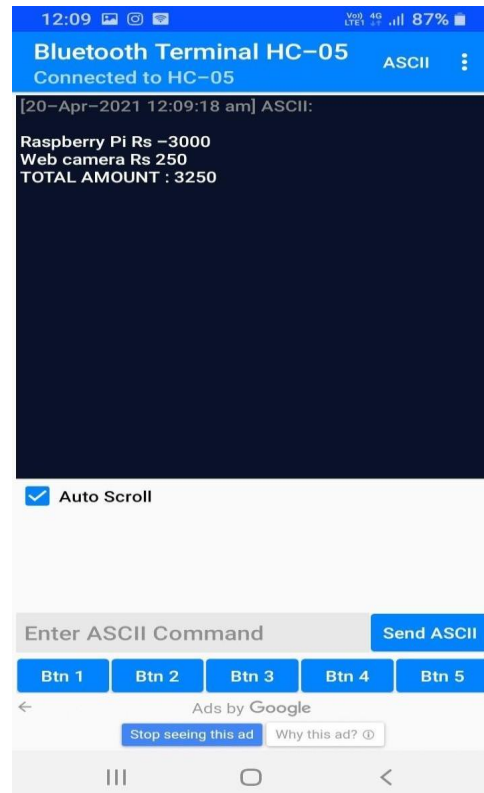


FIG:4 Final Output by Bluetooth module



4 CONCLUSION

In this world, each and every day, we see new innovations for the sake of the comfort of people's life and for reducing time, money etc,. As everything is getting automated, the retail industry is looking for many automated devices in order to increase productivity and efficiency. Automation is proving to be one of the valuable tools in the electronic world. Shopping cart or trolley is one of the common things which is seen in all supermarkets, malls. Though these shopping carts are good, they have some issues. They also have to wait in a long queue for getting their items billed. This causes frustration to the customers and a lot of their time is wasted. To overcome this problem, The Smart Shopping Cart has an enhanced billing system in it which sums up the amount of the items which are purchased. Thus reducing the shopping and billing time.

5 REFERENCE

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