

IOT BASED SMART SHOPPING TROLLEY USING RASPBERRY pi

Vardineni Venkata Srikanth, Mechatronics student, M.tech, MGIT Hyderabad
Dr. K. Sudhakar reddy Vice principal, HOD& Professor Dept of the mechanical, MGIT Hyderabad

Abstract:

In metropolitan cities, we will see an enormous rush at shopping malls on holidays and weekends. This becomes, even more, once there are large offers and discounts. Currently folks purchase a spread of things and place them within the trolley, after buying one ought to approach the counter for billing. By employing a barcode reader, the cashier prepares the bill that may be a time overwhelming method. This ends up in long queues at the billing counters. This project presents a plan to build up a framework in shopping centers to beat the above issue. The main purpose of this work is to build an IOT based electronic smart cart system which will introduce an intellectual approach to billing process using pi camera and raspberry pi with image processing. The total bill of e-trolley can be found on the web page.

Keywords: Adapter power supply, Raspberry pi, pi camera, LCD display, Buzzer and selection switch.

1. Introduction

In this paper we present a raspberry pi and image processing based smart shopping trolley. This project makes a use of raspberry pi processor, hot of the shopping cart. Pi camera is uses to capture the products images which are select by the customer. Using selection switch user can add or remove the product from cart. Buzzer comes when product is added or removed from cart. This cost will monitor the different things like thing cost, thing name, and so on are constantly shown on LCD joined to the trolley.

In this will upload the OpenCV algorithm into the raspberry pi to recognize the product details. Raspberry pi has inbuilt wi-fi which is used to upload the product details and total amount of trolley into the webpage using IOT technology.

It minimizes the time in purchasing and making free to the customer by standing in a long queue by ensuring the customer comfort and minimizing the headache of barcode scanning and eliminating waging of billers, thereby accomplishing both customer and shopkeeper demands.

Automation is the most regularly spelled term in the area of electronics. The hunger for automation delivered many revolutions in the existing technologies. This assignment makes use of an onboard computer, which is commonly termed as Raspberry Pi processor. It acts as heart of the project. This onboard computer can effectively talk with the output and input modules which are being used. It does not consist of a built-in tough disk or solid-state drive, but uses an SD card for booting and long-term storage.

2. LITERATURE SURVEY

Archana Nikose et al. [1] proposed a system where the customer is given a card to scan the barcode which generates a unique id. Later the bill details are displayed on the screen and has to pay through online.

Vishwanadha V et al. [2] proposed a system which is using raspberry pi-based system with a barcode scanner where the customer has to pay the bill through online payment like GooglePay, Paytm etc.

Ashok Sutagundar et al. [3] proposed a system of RFID tags [Radio Frequency Identification] but the shopping information is passed on to the Amazon cloud using the Wi-Fi module and the data is sent to the android application of customers to pay the bill at the counter.

Agarwal Isha Sanjay et al. [4] proposed an IOT based automated trolley where each product is tagged with RFID. The bill is sent to the counter using wireless system.

Raghav Chadha et al. [5] proposed a system that utilizes RFID with the billing side using mobile applications. The billing information is sent to the customer through mobile application using Wi-Fi

module.

Tharindu Athauda et al. [6] has proposed a system which is low-cost, robust, passive UHF RFID based shopping system. It uses UHF antenna mounted on shopping trolley and products are tagged with UHF-RFID.

3. Implementation:

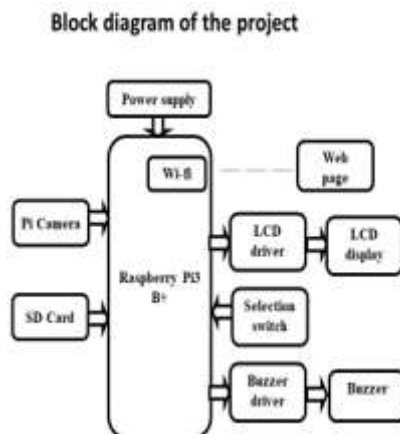


Fig1: Blockdiagram

The device which is able to perform the task is a **Raspberry Pi** processor. Here, pi camera, LCD, buzzer, selection switch is interfaced to Raspberry pi. Selection switch is used either to add or remove the product. When any product is placed in front of the pi camera passes by the system, the image of the object is captured using camera. The image of the object details is fed as input to the **Raspberry Pi** processor. While adding or removing the product the buzzer gives the beep sound. When product is added to trolley name, weight and price of the product are displayed on the LCD. The raspberry pi has inbuilt wi-fi so, processor will send to the total or final bill of all products into the web browser and also displayed on LCD. To perform this task, **Raspberry Pi** processor is programmed using embedded 'Linux'.

4. Related Work:

The short introduction of distinct modules used in this undertaking is mentioned below:

Raspberry Pi (ARM-11) PROCESSOR:



Fig2: Raspberry Pi3

The **Raspberry Pi** can be set up to run like a standard (albeit bare bones) desktop computer, that isn't really the point. Rather, it's intended to be **used as** an educational tool for those who wish to learn to program. It's also intended to be modified and customized for specific tasks. In this version, they've upgraded to a 1.2 GHz 64-bit quad-core ARM processor and added 802.11n Wireless LAN, Bluetooth 4.1 and Bluetooth Low Energy. If you're searching to incorporate the Pi into your next embedded design, the 0.1" spaced 40-pin GPIO header offers you get admission to 27 GPIO, UART, I2C, SPI as nicely as each 3.3V and 5V energy sources.

Raspberry Pi processor is programmed the use of embedded 'Linux'. Linux is the best-known and most-used open source running system. As a running system, Linux is software program that sits under all of the other software on a computer, receiving requests from those applications and relaying these requests to the computer's hardware.

Pi camera:



Fig: pi camera

The Camera Module can be used to take high-definition video, as well as stills photographs. ... It supports 1080p30, 720p60 and VGA90 video modes, as well as still capture. It attaches via a 15cm ribbon cable to the CSI port on the Raspberry Pi.

LCD Display:

One of the most common units attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many microcontrollers are 16x2 displays. This ability sixteen characters per line by 2 traces via 2 lines, respectively.

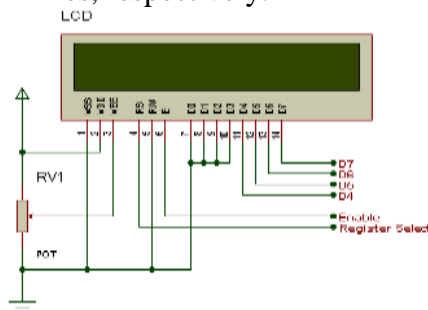


Fig4: 16*2 LCD Display

BUZZER:



Fig5: Buzzer

The vibrating disk in a magnetic buzzer is attracted to the pole by way of the magnetic field. When an oscillating signal is moved through the coil, it produces a fluctuating magnetic subject which vibrates the disk at a frequency equal to that of the force signal.

WEB technology.

Web browser is responsible to request for a website or webpage located on the internet. Web server is responsible for hosting websites, processing web requests, and sending the demanded document to the client in real time.

In this project we develop a web page into the raspberry pi for sending the total product details of smart trolley through wi-fi. By using IP address customer can found the bill into the web browser.

Image processing technology:

OpenCV is a great tool for **image processing and performing computer vision tasks**. It is an open-source library that can be used to perform tasks like face detection, objection tracking, landmark detection, and much more. It supports multiple languages including python, java C++. In this project we implement image processing technology for product recognition. Pi camera will capture the product image sending to the raspberry pi the raspberry pi will identify the product name and weight using image processing.

5 RESULTS:

The **Smart Shopping Trolley using Raspberry pi** system implemented using the RPi. The RPi is powered by a 5V adapter. This smart shopping trolley will send the total product details and bill into the web browser through wi-fi which is accessed on the mobile phone.

6. CONCLUSION:

The present model gives an Integrating characteristic of all the hardware aspects which has been used and developed in it with Arm-11 Raspberry pi processor. The Presence of each and every module has been reasoned out and positioned very carefully. Hence the contributing to the excellent working unit for **Smart Shopping Trolley using Raspberry pi** using Embedded Linux device has been designed perfectly. Secondly, using notably superior IC's like Broadcom BCM2387 chipset, 1.2GHz Quad-Core ARM Cortex-A53 (64Bit) processor, Linux operating device technological know-how with the assist of growing technology. Thus, the assignment has been efficiently designed and tested.

This e-cart able to upload the total product names and total bill mof smart cart into the web browser. This system will able to monitor the product details and total bill amount on LCD module.

5. ACKNOWLEDGEMENT

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