Multi-Featured Shopping Trolley with Billing System

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Abstract

This paper presents Shopping Trolley with billing system along with Wi-Fi connectivity. The idea is to detect the barcode on the product, display the name of the product on the screen, and providing a Bill receipt. The purpose of the study is to reduce the time of the customer at the billing counter. Another aspect of the project deals to send the details at the billing counter using Wi-Fi and thus manage the quantity of the products in the inventory. Arduino Uno R3 is used to interface the multiport USB hub to interface barcode scanner, printer and display.

Keywords: Arduino Uno R3, Barcode scanner, Barcode tag, Database, Thermal printer and Wi-Fi Router

I. INTRODUCTION

There has been an emerging demand for quick and easy payment of bills in supermarkets. This project describes how to build an automated and time saving system for the world of retail which will make shopping experience customer friendly and secure.
In this paper, shopping trolley is proposed that will be capable of generating a bill from the cart itself. The customer will make the payment in no time at the billing counter as the bill will be already available at the master PC which will also help to maintain database and introduce schemes and offers in stores accordingly.
The designed cart eliminates the effort of self-packaging, makes the best use of cart storage space and involves security mechanism for theft control.

II. BLOCK DIAGRAM

The AVR-microcontroller module is an interface for all the devices and the enclosure lid of the trolley to open. The barcode reader scans upon the barcode provided on the products, successful identification of the barcode on the products will result in activation of the motor driving circuitry. This will open the enclosure lid of the trolley and also display the product name and price on the display screen. The opening and closing of the enclosure lid avoids the theft detection of the products.

A printer is interfaced to the display which prints the bill at the end of the shopping. A battery supply with an inverter circuit is used for giving supply to the printer. The details of the purchase bill are sent to Master PC through a Wi-Fi module for updating the main database.

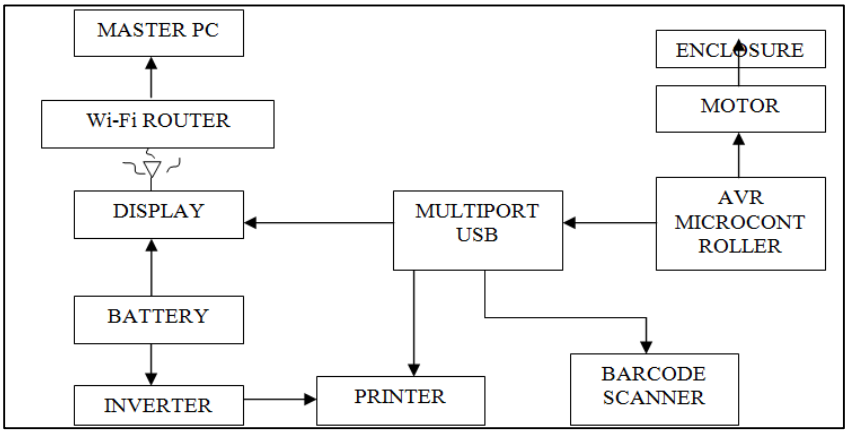

Fig. 1: Block Diagram showing

III. FLOWCHART

A. Customer's Point of View

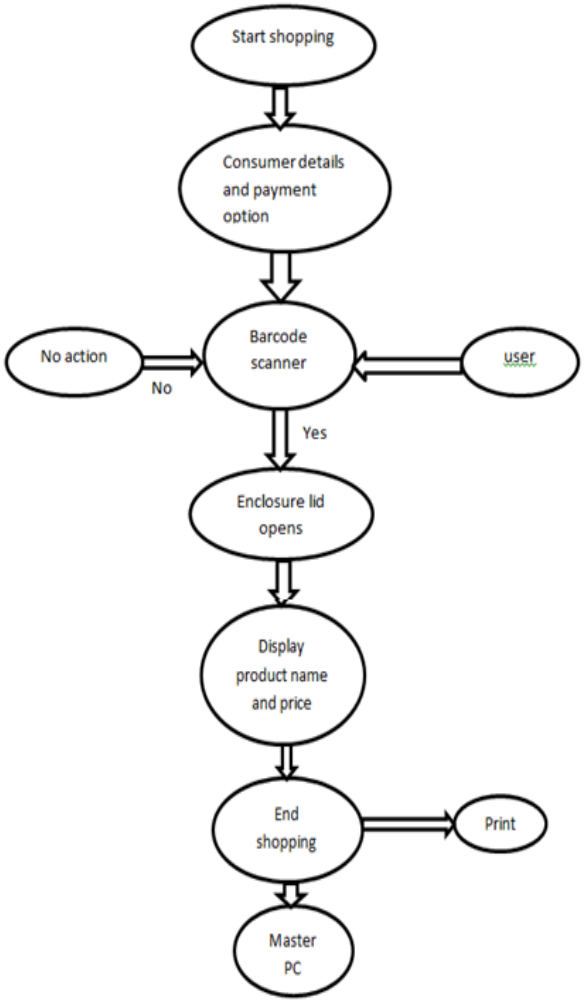

Fig. 2:

1) Algorithm:

1) START Shopping
2) Enter customer details
3) Select Payment Option
4) Turn ON Barcode scanner

5) Scan Barcode on products
6) Open enclosure lid once Barcode is detected
7) Display Product name and Price
8) Print receipt on END
9) Purchase details sent to MASTER PC via Wi-Fi.

B. At the Billing Counters:

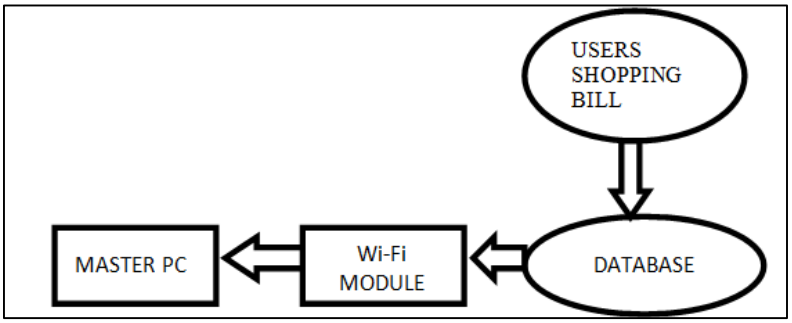

Fig. 3:

2) Algorithm:

1) Receive purchase details via Wi-Fi
2) View Purchase details on MASTER PC
3) Update Inventory database

IV. SCHEMATIC MODEL OF THE TROLLEY

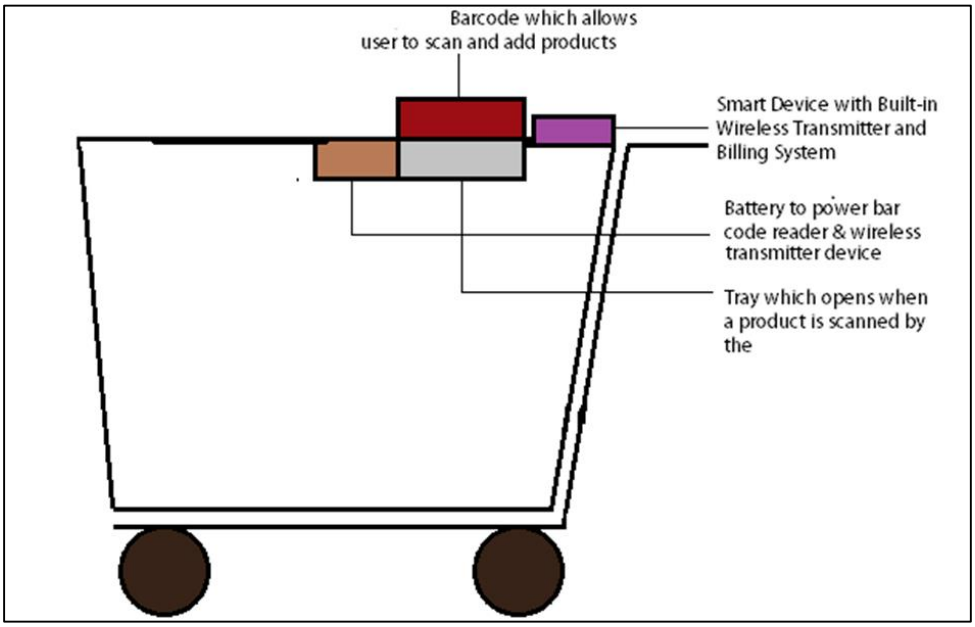

Fig. 4:

V. COMPONENTS

A. Barcode Reader

A barcode reader is an electronic device that can read and output printed barcodes to a computer. It consists of a light source, a lens and a light sensor translating optical impulses into electrical.

1) Working:

- Scanning head shines laser light on to the barcode
- Light reflects barcode into light detecting electronic component called photo electric cell.
- White reflects of barcode reflect more light then black reflects.
- We assume that black line corresponds to one and white to zero

- AS the scanner moves across the barcode the cell generates pattern of on and off pulses.
- An electronic circuit attached to the scanner converts this pulses into binary digits which are sent to computer attached to it

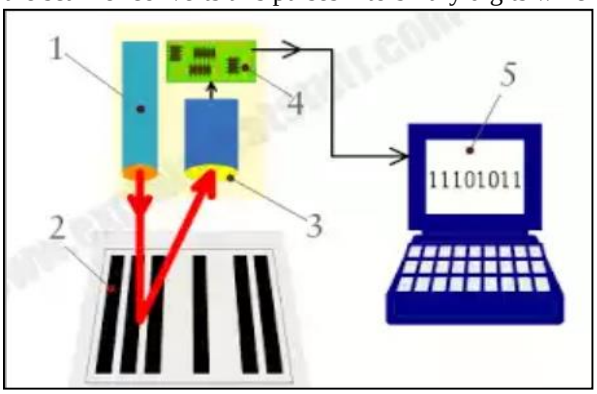

Fig. 5: Schematic Diagram of scanning of barcode

2) Specifications:

- Scanner Type: Laser
- Operational Mode: Automatic
- Supported Interface: USB, Light Pen Wand Emulation
- Character read Limit: 1120

B. Motor

A DC motor is electrical machine that converts direct current electrical power into mechanical Power. It relies on the forces produced by magnetic fields. A dc motor speed can be controlled either by a variable supply voltage or by changing the strength of current in field windings.

Fig. 4:

1) Features:

- Speed: 10 RPM
- Voltage: 12V
- Torque: 3 kg-cm
- Shaft diameter: 6mm
- No- load current: 70mA (max)

C. Thermal Printer:

Thermal printers are faster than impact dot matrix printers they are also smaller, lighter and less power making them ideal for portable and retail applications. Its efficiency can be utilized in retail sectors. Roll based printer can be rapidly refilled.They print more quietly as compared to other printers.

1) Technical Specifications:

- Print Method: Thermal Line Printing
- Print Font Size: 384dot/Line; ANK Character
- Font A: 12*24 dots, 1.5(W)*3.0(H) mm

2) Printer Parameters:

- Support NV LOGO Print
- Print Speed:90mm/sec

- Interface's Port
- Print Width:57.5±0.5mm
- Roll Diameter:50 mm
- Print Thickness:0.06-0.08mm
- Power Adapter: DC 12V/3A
- Reliability Print: 100km
- Temperature:0-45C
- Power Interface: Connect 110V~240V

Fig. 5:

D. Arduino Uno R3

Arduino is an open-source physical computing platform based on a simple I/O board and a development environment that implements the processing language. Arduino can be used to develop stand-alone interactive objects or can be connected to software on your computer (e.g. Flash, Processing, MaxMSP). The open-source IDE can be downloaded for free (currently for Mac OS X, Windows, and Linux).

1) Description:

- The Uno uses an ATmega16U2 instead of the 8U2. This allows for faster transfer rates and more memory.
- The Uno R3 also adds SDA and SCL pins next to the AREF.
- In addition, there are two new pins placed near the RESET pin. One is the IOREF that allow the shields to adapt to the voltage provided from the board. The other is a not connected and is reserved for future purposes.
- The Uno R3 works with all existing shields but can adapt to new shields which use these additional pins.

2) Features:

- ATmega328 microcontroller
- Input voltage - 7-12V
- 14 Digital I/O Pins (6 PWM outputs)
- 6 Analog Inputs
- 32k Flash Memory
- 16Mhz Clock Speed

VI. CONCLUSION

In this paper, the shopping trolley which we have designed is more efficient as it will save customers time at the billing counter as payment can be done without waiting in a long queue. The display and Receipt printing mechanism is advantageous as the customer gets to know the amount of the purchase during shopping and immediately at the end can receive the bill receipt. The trolley enclosure avoids the unauthorized purchase of the products.

REFERENCES

[1] G. Roussos and B. College, ―Enabling Rfid in Retail‖, Computer,IEEE,vol. 39, no. 3, 2006.
[2] ABI Research, ―RFID Item-Level Tagging in Fashion Apparel and Footwear,‖ 4Q, 2009