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Automated Billing Smart Trolley And Stock Monitoring

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ABSTRACT
In this modern world, all people like to use products which is of high technology. People do not want to waste time and energy by using conventional systems. Rather they prefer advanced devices which is automated, smart, to finish their work soon. Smart trolley is one such advanced devices which is more flexible and a easy process to complete shopping without any delay. Customers in the store do not want to wait for long time to pay their bill. In the smart trolley the bill can be paid simultaneously without waiting in the counter. Once the shopping is over payment is done through online or offline based on the customer. This flexibility is not provided by the existing trolley. To overcome this, Smart trolley is preferred. The newly designed smart trolley consists of Arduino UNO, RFID reader and tag, Wi-Fi module. Apart from this payment feature, smart trolley allows the admin to view the stock details also. Each product's stock can be monitored and planned accordingly without any extra manual work.
KEYWORDS: Arduino Uno, Website development, Bill generation, PHP, HTML, MYSQL, Stock monitoring**.**

INTRODUCTION

Only 8% of customers use existing smart trolley. Many customers don't use the available smart trolley because of its complexity in accessing, payment modes, membership cards. The complexity is because of the difficult options in the trolley. Many available smart trolleys allow only online payment or payment through master cards which is not afforded by all customers. Smart trolleys is not installed in many stores because of its cost. The cost is high because of the design that includes servo motor which also requires high maintenance. Whereas in the new design it is overcome by using a IR sensor which reduces the maintenance, power consumption and the cost of the trolley also. The accessing options are also so simple that every customer can use it. It doesn't include any login option, or membership card. This trolley is proposed, so that difficulty in using existing smart trolley is reduced, additional options are included, many components are replaced from the existing one to decrease the cost of the smart trolley. The working is also simple that the customer can add products into the trolley by using the switch and it can be removed similarly. After the shopping is over bill can be generated by using the bill switch. Once the bill switch is pressed, the data is transferred, so that the customer can have a look at the entire bill and the total price based on the discount in the store. When the shopping is completed by the customer, the stock details get updated and displays the current balance stock to the admin. So, the manual work to keep on monitor the stocks is not needed when the newly designed smart trolley is used in the store.

LITERATURE SURVEY

This paper discussed a product "Smart shopping trolley for supermarkets using rechargeable smart card" being developed to help customer in terms of reduced time spent while shopping. The main objective of proposed system is to provide a technology oriented, easily handled, and efficient system for helping the customers in shopping. The main facility that the proposed model provides is the customer only needs to carry a smart card, which is needed to be swiped in the trolley to initiate shopping when a customer places a product in the smart trolley, the RFID Reader will read the Product ID and the information related to it will be stored in Arduino UNO. When shopping is over the customer have to press the end button which will automatically deduce the bill amount from the

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balance available in the smart card. The payment is made right there and thus avoiding the need of waiting in queue at counter and saving large amount of time. The smart card is rechargeable.
This system presented an alternative method of doing shopping easily as well as providing security money wise for customer satisfaction. This is implemented using android which supports NFC. In traditional way customer needs to physically purchase his product, carry cash or card along with them and wait in long queue for making payment. The application would read the product id of the product assigned in the NFC and add it to the cart in the application. The quantity of product can also be changed so the list can be edited. E-wallet facility will be given for making payment. It will also provide OTP to the customer for secure money transactions.
The objective is to make our shopping easier by using the RFID tags which are attached to each product in the shopping market.

PROPOSED SYSTEM

The advanced version of trolley which is very much flexible with improved features for the customers in all aspects is smart trolley system. The proposed system is flexible to the customers as it allows them to pay via online as well as offline. All products in the shop is fixed with RFID tag. Our device consists of a RFID reader. When the products are added, the reader reads the particular product's tag and displays in the screen. If any product is to be removed it can be done using the remove switch. Once the bill is generated if any product is added or deleted will be alerted using a led. If the payment is done, it will be indicated so manual checking is not needed. Stock availability can be monitored by the admins if the shopping is done using trolley. Based on the offers at festival time, device will scan the product and calculate the price after discount, display.

A. HARDWARE COMPONENTS

Fig 1. Arduino UNO Board

Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. It features the Atmega8U2 programmed as a USB - to -serial converter.
The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm centre-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and VIN pin headers of the POWER connector.

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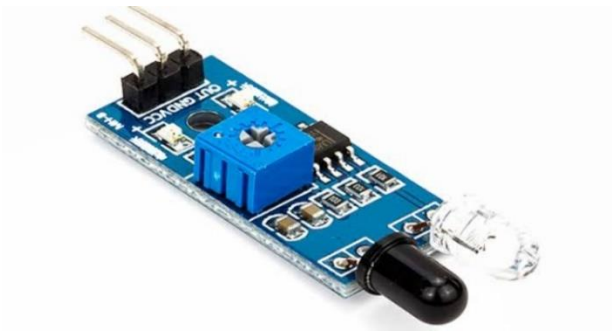

Fig 2. IR Sensor

IR sensor identifies the presence of an object by producing a beam of infrared light. It can detect little obstacles however with less exactness or accuracy. It can recognize obstructions in a range inside 50 cm at an edge of ±45 degrees precisely. The onboard variable potentiometer assists with fine-tuning the range of operation (to calibrate the distance). The IR proximity sensor incorporates a transmitter and a receiver. The estimation is accomplished by interfacing the IR proximity sensor with the Arduino UNO board. The IR transmitter is an IR Light Emitting Diode (LED) and the receiver is an IR photodiode which is delicate to IR light of a similar frequency as that radiated by the IR LED. At the point when IR light falls on an obstacle, it reflects and falls on the photodiode and correspondingly its output voltage change with respect to the extent of the IR reflected light and obstacle LED gleams. This is the standard of working of infrared sensors.

Fig 3. Node MCU

Node MCU is an open-source firmware and development kit that helps to build IoT product. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The firmware uses the Lua scripting language. ESP8266 is a low-cost, Wi-Fi Module chip that can be configured to connect to the Internet for Internet of Things (IoT). Node-MCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module. The term "Node-MCU" by default refers to the firmware rather than the dev kits. It is based on the Esperessif ESP8266-12E Wi-Fi System-On-Chip, load with an opensource, Lua-based firmware. It's perfect for IoT applications and other situations where wireless connectivity is required. This chip has a great deal in common with the Arduino – they're both microcontroller-equipped prototyping boards which can be programmed using the Arduino IDE.

B.SOFTWARE COMPONENTS

1)Arduino IDE: Arduino IDE where IDE represents Integrated Development Environment official programming presented by Arduino.cc, which is predominantly utilized for composing, gathering, and transferring the code in the Arduino device. Practically all Arduino modules are viable with this product that is open-source and is promptly accessible to install and begin compiling the code just as transferring machine code to the microcontroller.

2)Thing Speak: To learn how to send sensor readings with the ESP8266 Node MCU board to

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Thing Speak. For demonstration purposes, we'll use a BME280 sensor , but you can easily modify the examples to use any other sensor. The ESP8266 board will be programmed using the Arduino core.

There are many ways to send sensor readings to Thing Speak.

In this tutorial, we'll use one of the easiest ways-using the thing speak-Arduino library. This library provides methods to easily publish sensor readings to single fields or multiple fields.

C . Block Diagram of the Proposed System

The block diagram of the proposed system along with all components used is shown in Fig. 4. It contains an Arduino module, IR sensor, power source.

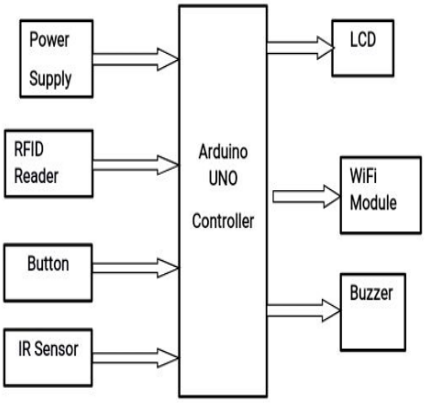

Fig 4.Block Diagram of Proposed System

D. Working of the Prototype

While the customer keeps the product in the smart trolley, the Radio frequency ID reader automatically senses the product by scanning the tag. And its corresponding electronic product code number is generated automatically. To store the item price and total billing data, microcontroller memory is used LCD display.

RESULTS AND DISCUSSIONS

The proposed model is easy accessible and convenient to use. It does not require special training. The manpower is decreased and will save time that the user spends in billing queue. Many users can be attended in same time which is useful for retailers and customers. Time efficiency and cost efficiency are guaranteed by this smart billing system.

Fig 5.When no items added

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Fig 6.When item added

Fig 7.Total Bill after adding

Fig 8.After removing a product

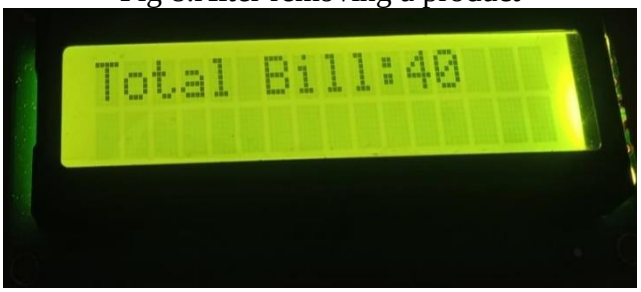

Fig 9.Total Bill after removing

FINAL PROTOTYPE

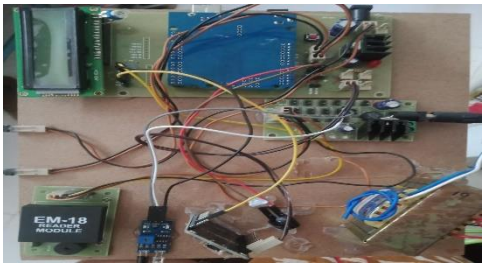

Fig 10.Final Prototype

CONCLUSION

The smart shopping trolley with new technology allows the customers to shop efficiently. This is designed in such a way that the data of the customer is sent to the counter through wi-fi module,

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which reduces standing in long queue in the bill counter, On the other hand admin can monitor the stocks and plan in advance.

FUTURE SCOPE

In the future, there can be a keyboard so that money limit can be set by the customer and shop accordingly. Through technology packing can be done so that home delivery can be made possible.

REFERENCES

[1] P.T. Sivagurunathan, P. Seema, M. Shalini, R. Sindhu Smart Shopping Trolley Using RFID International Journal of Pure and Applied Mathematics Volume 118 No. 20 2018, 3783-3786.
[2] Tharindu Athauda, Juan Carlos Lugo Marin, Jonathan Lee, Nemai Karmakar Department of Electrical and Computer Systems Engineering Robust Low-Cost PRFID Based Smart Shopping Trolley IEEE Journal of Radio Frequency Identification DOI 10.1109/JRFID.2018.2866087.
[3] K.Gogila Devi,T.A.Kaarthik, K.Nandhini, S.Priya Smart Shopping Trolley Using RFID Based on IoT International Journal of Innovative Research in Computer and Communication Engineering Vol. 5, Issue 3, March 2017.
[4] Sarika S. Pandey, Soumya R. Gupta, Meenaz M. Shaikh, Komal M. Rawat, Prof. Pravin Jangid, Prof. Ragini Mishra Smart Cart Using Arduino and RFID Volume: 05 Issue: 03 | Mar-2018.
[5] Vaishali Rane, Krutik Shah, Kaushal Vyas, Sahil Shah, Nishant Upadhyay Smart Trolley Using RFID Volume: 06 Issue: 01 | Jan 2019.
[6] Akshay Kumar, Abhinav Gupta, S Balamurugan, S Balaji and Marimuthu R Smart Shopping Cart School of Electrical Engineering, VIT University, Vellore.
[7] Manikandan T, Mohammed Aejaz M. A, Nithin Krishna N. M, Mohan Kumar A. P, Manigandan R RFID based Advanced Shopping Trolley for Super Market Journal of Chemical and Pharmaceutical Sciences ISSN: 0974-2115.
[8] Mr.P. Chandrasekar, Ms.T. Sangeetha Smart Shopping Cart With Automatic Billing System Through RFID And ZigBee CICES2014 - S. A. Engineering College, Chennai, Tamil Nadu, India.
[9] Gaikwad Prerna, Kalekar Shital, Shete Renuka, Thorat Komal, Nita R. Mhaske Smart Billing Trolley Using RFID And LIF International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 6, Issue 9, September 2017.
[10] Bindhu, V. "Design and Development of Automatic Micro Controller based Weather Forecasting Device."
[11] Bhalaji, N. "EL DAPP–An Electricity Meter Tracking Decentralized Application." Journal of Electronics 2, no. 01 (2020): 49-71