



Intelligent Shopping Cart with Customer Oriented Service

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ABSTRACT: Now a day's interest in shopping malls is widely along with the other communication techniques helps in making increasing among people. People get daily necessities from e-commerce[3] very popular. Modern futuristic product is the shopping malls. There is an emerging demand for easy and one that aids the comfort, convenience and efficiency in quick payment of bills in shopping malls. Shoppers are everyday life. This evolution in the technology will make the frustrated at locating the items on the shopping list when Shopping very much easier than before. In early cases, the shopping in shopping malls and when no assistance is available shopping mall consists of a normal shopping trolley or shopping in shopping. To eliminate these problems, each product in the cart. And the customers have to select and pick the item, and in shopping mall will be provided with a RFID tag, to identify its order to get the bill, the customer has to take that cart to the type. Here we used RFID Tags instead of the barcode scanning billing section, and then the customer has to wait in the check-because, RFID does not require line of sight for scanning the out lines until his or her slot turns over. If that is a rush-day, product. And also it provides more security than the barcode then the customer's valuable time and health will get wasted. scanning system. Here, each shopping carts are implemented So in this project, we implement an innovative concept of with a PID that contains a raspberry pi, a touch screen and an RFID[1] Based Smart Shopping, Billing System and packing RFID reader. RFID reader will read the purchasing product system. The main goal is to provide a technology oriented, low- information on the shopping cart and the information about the cost, easily scalable, and rugged system for aiding shopping for product is displayed on touch screen which is interfaced to the the customer. The smart shopping trolley helps to shorten the Raspberry Pi. After the shopping it will automatically pack the checkout lines[2], thereby helping the customers at retail stores. product. The major advantages of this shopping cart are, In existing system, for manual billing it uses barcode customer can know the amount of total purchase without going of every product for billing by using a barcode reader. So these a billing counter, decrease the number of workers, reduce the systems requires manual operation, so human staffs are required time and reduce the risk. for its functioning. In this proposed system, we are using the RFID reader at the trolley side and every product in the supermarket has its own unique RFID tag with unique ID. Here using this wireless technology over everything. And in the case of shopping sector, the advantages of wireless technology

KEYWORDS: Material choice, RFID, Raspberry pi, Motors, Design of trolley, Overview of the working, Conclusion

I. INTRODUCTION

The technology is getting developed day-by-day. And these developments results in the improvement of our total system. Wireless technology plays a key role in today's communications, and new forms of it will become central to emerging technologies including robots, drones, self- driving vehicles and new medical devices over the next coming years. As we know, the wireless technology is the key feamre in our every sector. Now overall controlling is done by using RFID because of its advantages over the barcode scanning. Barcode scanning requires line of sight for scanning the barcode. But in the case of RFID, it can scan the RFID tag in any manner. It doesn't require line of sight for scanning the RFID Tag. So fast reading is possible. And also, the RFID technology provides security against theft. And here given an alternative shape for the trolley from the present type. This is because, this trolley can balance the overall weight in the trolley. And this trolley is automatically driven by the camera sensor[4] with help of DC motor. So that, the customer doesn't have to push the trolley with their strength.



This technology will help older peoples during shopping. And by doing this, the number human staffs can be reduced and thereby saving money.

II. PROPOSED SYSTEM ARCHITECTURE

Material choice

Here the frame work of the trolley is made up by using ‘STAIN-LESS STEEL’ pipes. The reason for selecting the stain-less steel pipe is because of its strength and its corrosion resistant property. It requires very less maintenance. And stain-less steel is durable and shows high resistant to heat and fire. So that the choice made might be very advantageous. Here given an alternative shape for the trolley from the present type. This is because, this trolley can balance the overall weight in the trolley. Here the back leg of the trolley is bend to an angle of 75° . Because, if the leg is straight, then the weight of the trolley will be distributed to the front side only. So that, it will affect the overall balance of the trolley.

The body over the frame is made with using ‘ACRYLIC BOARDS’. The acrylic is less expensive while remaining 10 times more impact-resistant than glass. Due to its incredible durability, acrylic can be used over a broad temperature range and has superior weather resistance compared to glass and other forms of plastic. And it has many good attractive colour patterns.

RFID

Radio-frequency identification uses electromagnetic fields to automatically identify and track the tags attached to the product. An RFID tag consists of tiny radio transponder; a radio receiver and transmitter. When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the Tag transmits digital data. Usually an identifying inventory number, back to the reader. RFID Card Reader gives a very low-cost solution to read the passive RFID transponder tags that are up to 7 cm away. RFID Card Readers applications include a wide range of hobbyist and commercial applications, including access control, automatic identification, robotics navigation, inventory tracking, payment systems, and car immobilization. The RFID card reader reads the RFID tag in range and outputs unique Identification code of the tag at baud rate of 9600. The data from RFID reader is interfaced and read by the microcontroller or Computer terminal.



Fig. 2.1.1 (a) RFID reader

Fig. 2.1.1 (b) RFID tag and sticker

Raspberry pi

The Raspberry pi is a series of small single board computers. The original model became far more popular than anticipated selling outside its target market for uses such as robotics. It now is widely used even in research projects, such as for weather monitoring because of its low cost and portability. It does not include peripherals or cases. However, some accessories have been included in several official and unofficial bundles.



Fig. 2.1.2 Raspberry pi

Motors

In this project we have use three diferent motors for different operations.they are;

- DC motor
- Wiper motor
- Stepper motor

DC motor

A DC motor is any of class of rotary electrical motor that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motor have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current in part of the motor. This motor with gear reduction produces more low-end torque than standard motor. The DC motor in this project, we can change the direction like clockwise direction or counterclockwise direction by changing the polarity. 24V, 250W, 9 tooth, 1/8” bicycle chain sprocket left or right rotation by reversing wires with gear reduction 300 rpm.

Stepper motor

A stepper motor is also known as step motor or stepping motor, is a brushless DC electric motor that divides a full rotation into a number of equal steps. The motor’s position can then be commanded to move and hold at one of these steps without any position sensor for feedback as long as the motor is carefully sized to the application in respect to and speed. Stepper motor is known by its property of converting a train of input pulses into a precisely defined increment in the shaft position. Each pulse moves the shaft through a fixed angle.

III. DESIGN OF TROLLEY



Here the proposed design of the trolley is entirely different from the currently existing supermarket trolley. There are many advanced features introduced in this proposed design. The main features introduced in this designing are;



- The conventional structure of the trolley is being restructured and provided an ergonomic look for the trolley.
- The space capacity is increased within a smaller dimension.
- The cabin is given with a ‘U’ shaped spherical tip, so that maximum space can be occupied.
- RFID scanning is introduced in the trolley for purchasing items.
- A real time monitor is provided, so that the display shows the purchased items and the bill amount.
- This shopping trolley is completely automated trolley. It follows the authorized customer till the shopping ends.
- And the trolley provides automatic billing and automatic packing.

IV. OVER VIEW OF THE WORKING

The trolley is moved automatically with help of a camera sensor. Then it will be easy to move the trolley without any external force. It will help older customer. The movement can be controlled by a DC motor. And the wiper motors placed helps to control the direction. The trolley can assist to locate the product in the shop. It done with the help of a catalogue in the touch screen and there will be catalogue of the items in the market placed over the cart. And the customer can locate the section easily by selecting the corresponding item. Above show the diagram of the circuit for moving the trolley.

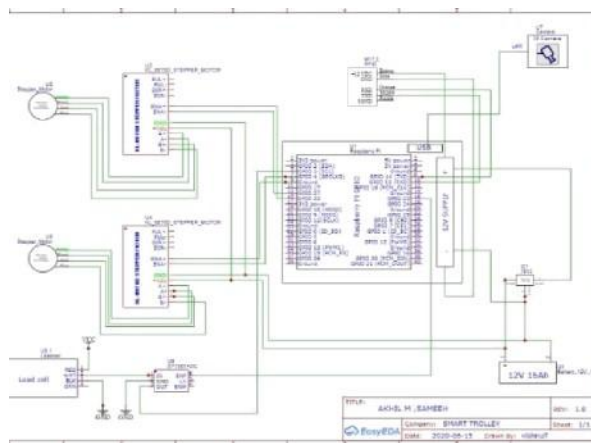


Fig.4.1 Circuit for moving the trolley

Billing and packing section

To start shopping, the customer has to press the start button first and it will ask customer to enter customer’s name and mobile number. And this will be stored in the server of the supermarket. There will be a catalogue of the items displayed on the screen. And customer can locate the sections easily by selecting the items from the screen. So when picking items, fragile items are to be placed in first cabin and non-fragile items are placed in second cabin. When the customer scans the product, the RFID reader will read it automatically and the controller counts the amount of product and displays that amount on the touch screen of the trolley. After shopping, one should press the upload button. Then the bill details will be send to the customer’s mobile number, and can proceed either with Net-banking or pay the bill using ATM card or direct money.

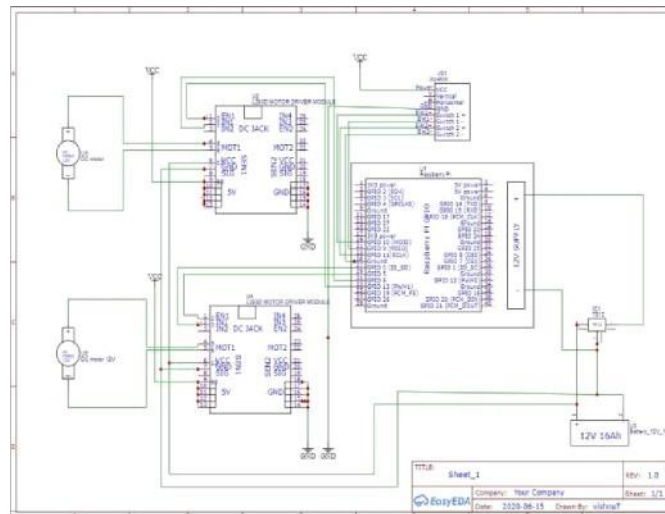


Fig.4.2 Circuit for billing and packing

In the case of packing there are two compartments. The packing covers will be stacked in those compartments. When the cabin is full it will open and the items in it will reach the compartments. The compartment will move downwards as the weight of the load cell increases. When it reaches a particular rate, a buzzer will beep. Then the customer can take the cover and place it in the lower section of trolley.

V. CONCLUSION

This project introduces a smart trolley with enhanced performance features. By using this technology in trolley, we can reduce the shopping time. Because, in the present situation, the interest in shopping malls are widely increasing among people. In the perspective of the owner, the major advantage of this project is, the running cost is very low and it saves money. In conventional supermarket, there will be at least 5 billing counters. And for that, corresponding human staffs are needed for billing and packing in each section. So there is a loss of money in that employer section. But in this project, it deals with an automatic supermarket trolley with enhanced performance features. The main objective of this project is to have a pleasant shopping without waiting in a Queue. Due to automatic billing and packing, the customer no need to wait in a queue for a long time. And in the case of older people, the shopping from shopping mall is very difficult. Because, there is a difficulty in detecting location of items, and after the shopping, the billing section is another issue. And both these issues are solved by this project. The main goal is to provide a technology oriented, low- cost, easily scalable, and rugged system for aiding shopping in person. The smart shopping trolley will help shorten the checkout lines there by helping the customers at retail stores.

APPENDIX

Appendixes, if needed, appear before the acknowledgment.

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