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Follow Me Smart Shopping Trolley

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Abstract: *These days, supermarkets have practically reached the point of development in terms of technology. People buy various items from supermarkets and place them on a trolley because that is the simplest way to transport goods in supermarkets. However, customers must manually push the cart throughout the entire shopping experience, and when it comes to paying their bills; they must stand in line for a very long time. The busy schedules of people make this a time-consuming process. The research team has developed an efficient and highly advanced technique to avoid these issues. There isn't a true multifunctional automated trolley to make shopping easier, despite the fact that several Smart Trolleys already exist that include some of the aforementioned features. The "Follow Me" research team created a multipurpose cart that makes customers' shopping experiences more simple and easy. Follow-Me is a collection of technologies, including autonomous, human-guided navigation using an Arduino Microcontroller. A precise, user-friendly smart shopping cart has been made available by the research team to make it easier and more convenient for customers to shop.*

Keywords: Follow Me, supermarket, Smart Trolleys, Raspberry pi.

I. INTRODUCTION

Today's daytime grocery shopping activities are primarily apparent, including shopping carts. Customers are manoeuvring carts around them as they carry their purchases. The typical technique of moving the trolley is carried out manually by a person making an effort. It is therefore extremely difficult for a consumer to push the cart while shopping with a baby in tow, and it is nearly impossible for a disabled person to do so with just one hand. On weekends and holidays, there is a noticeable rush at the supermarkets; this rush is heightened by any special discounts or offers. The main objective of the research project was to develop a multi-functional automated trolley in order to solve the aforementioned issues. An automated trolley called Follow Me can carry items while automatically following the consumer without any assistance from a person. The use of this method will influence how easily modern shoppers may complete their buying tasks.

II. LITRATURE REVIEW AND OBJECTIVES

L.S.Y. Dehigaspege et al. proposed Follow Me Multifunctional Automated Trolley, which tracked customers' steps using Sharp IR sensors. It also contains an Android-powered automatic invoicing system and a tablet that is mounted in front of the trolley to track the items that consumers have purchased. Additionally, the upcoming trolley will include several multifunctional features like automatic parking into the slot and automatic charging while the trolley is parked[1].

S. M. Kalyani Dawkharet al. proposed Using Radio Frequency Identification (RFID) technology, an electronic shopping cart. This cart has a feature to keep track of the contents, like. Viewing the product name, expiration date, and price, they have employed a Liquid Crystal Display (LCD) screen to display the products. The trolley only performs the aforementioned tasks, which is a downside of the system. Since the trolley is electronic, the automatic travelling facility is not covered. [2].

Suraj S.et al. ARM7 and RFID technology were used to implement an RFID-based wireless intelligent cart [3]. The RFID tag will be scanned by the reader when the consumer places the required products in the trolley, and the product name and prices will appear on the LCD screen.

Satish Kambleet al. created a multipurpose shopping cart using RFID technology [4]. There are three primary parts to it. The Server Communication Component (SCC) kept the cart and server connected. Customers can review the status of the products in the trolley using a user-friendly interface provided by the user interface and display component (UIDC).

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The billing is handled via the Automatic Billing Component (ABC), which is connected to SCC components. In order to complete a related task, all of these elements must cooperate.

S.Sainath et al. created an automated shopping trolley for super market billing system [5]. The system combines a Raspberry Pi, an embedded chip, two barcode scanners, and a battery pack to enable self-checkout at the market. The trolley has a GUI-based Android application attached to it so that it can communicate with the server.

Prateek Aryan et al. suggested intelligent shopping cart with automated billing through Bluetooth and RFID [6]. Using RFID technology, products were automatically identified within predetermined ranges and sent to the billing system. Cart and mobile devices can communicate via Bluetooth. This system has a unique feature where data is encrypted and saved on the cloud utilising attribute encryption algorithm.

Zubin Thomas et al. Li-Fi module-based proposed automatic billing system is an efficient method of reducing human work.[7] Lifi device is used for billing.

P. Chandrasekar et al. suggested automated invoicing system that makes use of ZigBee and RFID[8]. A Product Identification Device (PID) with an LCD, an RFID reader, an EEPROM, and a ZigBee module is included into each shopping cart. Product information will be read using an RFID reader on the shopping cart while also being saved in an attached EEPROM and sent to the central billing system via a ZigBee module.

Udita Gangwal,et al. proposed smart shopping cart using wireless sensor networks (WSN) for automatic billing purposes[9]. The entire billing process is automated by WSN.

Galande Jayshreeet al proposed automatic billing trolley using RFID [10]. This system comprises of an RFID reader and items with RFID tags in malls. When a customer places any item in the cart, the RFID reader will read the item's code and store the item's price in memory. Wireless RF modules at the billing counter will communicate the whole bill data to the computer.

Jadhav Rahul et al. suggested automated billing trolley using RFID [11]. Each RFID tag in this technology has a magnetic stripe with a unique code, and the RFID Reader module reads the tag to communicate. An appropriate replacement for the manual billing approach used in shopping malls is the automated billing system based on passive RFID.

Mr.Yathisha Let al. presented using RFID and Zigbee modules a model for automated shopping carts to shorten line-ups in malls [12]. When a consumer places a product onto a trolley, it is scanned by an RFID reader and the product price is displayed on the LCD. This system uses RFID tags rather than bar codes. Data is transferred via a Zigbee transmitter to the primary PC.

Harpreet Singh Bedi et al. Smart phone and Arduino-based smart trolley is proposed [13]. The customer's membership card, which the supermarket gives to its frequent customers, has RFID attached to it under this system. A shopping cart or basket with an RFID reader attached senses the presence of a regular client and transforms into a smart trolley as a result. A mobile application must be downloaded by the normal client before the smartphone may scan barcodes. The barcode is created with a barcode scanner and sent to Arduino through Bluetooth Module.

Thangakumar et al. Automated shopping cart for the proposed supermarket billing system [14]. The automated shopping cart system combines a trolley with two sets of barcode scanners that are situated at the entry and departure locations of the store, respectively. It makes it easier for the user to independently scan the barcode of the things he wants to buy.

2.1 Objectives

1. The main objective of proposed system is to make offline shopping more interesting and futuristic.
2. Provide a technology oriented solution at low cost.
3. Improve the speed of purchase.
4. To make another strong option for Online Shopping in future also

III. MATERIALS AND METHOD

3.1 Block Diagram

3.1.1 Arduino Uno

The Arduino Uno is an open-source microcontroller board created by Arduino.cc that is based on the Microchip ATmega328P microprocessor. A variety of expansion boards (shields) and other circuits can be interfaced with the board's sets of digital and analogue input/output (I/O) pins.

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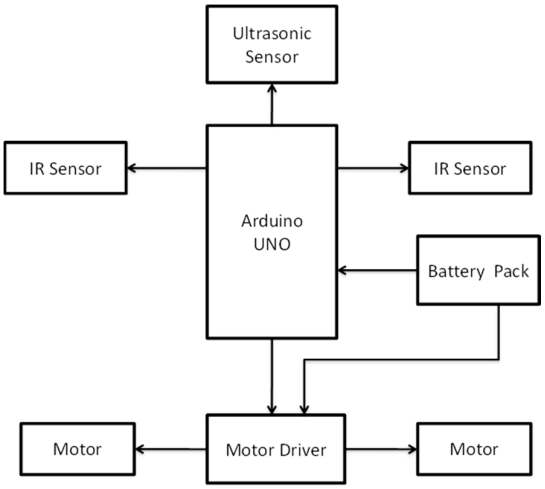

3.1.2 Ultrasonic Sensor

It is a digital sensor, and we can use it to determine the water level and relay the results to a Raspberry Pi. An ultrasonic sensor is a piece of technology that uses ultrasonic sound waves to measure a target object's distance and then turns the sound that is reflected back into an electrical signal. The speed of audible sound is greater than the speed of ultrasonic waves (i.e. the sound that humans can hear).

3.1.3 IR Sensor

A detector that responds to infrared (IR) radiation is known as an infrared detector. Thermal and photonic detectors are the two primary types (photodetectors).

Numerous temperature-dependent events allow us to follow the thermal impact of the incident IR radiation. Changes in resistance are the basis of bolometers and micro-bolometers. The thermoelectric effect is used by thermocouples and thermopiles. Thermal expansion is followed by Golay cells. The most common type of detector used in IR spectrometers is the pyroelectric one.

3.1.4 12v-Power Supply

It takes a 170-230 volt AC input and outputs 12 V DC at 400 mA of current. The Arduino Uno and Motor Driver are powered by it. For operation, all electronic circuits require a DC power supply with a sufficient voltage.

3.1.5 L298n Motor Driver

An integrated monolithic circuit, the L298n is housed in a 15-lead Multiwatt and PowerSO20 packaging. It is a high voltage, high current twin full-bridge driver intended to drive inductive loads such relays, solenoids, DC motors, and stepping motors and take normal TTL logic levels.

3.1.6 DC Motors

Appliances, toys, and tools all employ small DC motors. The universal motor, a light-weight brushed motor used for portable power tools and appliances, is capable of running on direct current. Currently, larger DC motors are used for steel drives, elevator and hoist propulsion, and electric vehicle propulsion.

3.2 Working of System

When a customer approaches a smart trolley and turns it on, the trolley will start to follow the user no matter which direction they are walking in and will also detect any obstacles in its path. The Arduino Uno, ultrasonic sensor, and infrared sensor used in this system. The model uses an ultrasonic sensor to detect people. With a range in the prototype of between 30 cm and 100 cm. The model uses two IR sensors to direct (turn) the trolley: a left-side IR sensor and a right-side IR sensor.

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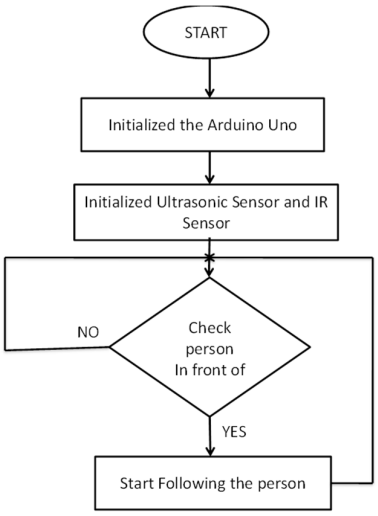
When the trolley turns on, an ultrasonic sensor detects a person in front of it. When that person moves, the sensor begins to follow that person while maintaining a 30 cm space between the user and the trolley in the prototype. Additionally, the trolley rotates to the left when a human turns to the left, thanks to an IR sensor on the left side. In a similar manner, when a person turns to the right, an IR sensor on the right side activates, turning the trolley to the right. The trolley automatically stops if the person stops moving. The prototype trolley's range is from 30 cm to 100 cm, so when the person in front of it moves past that distance, the trolley likewise stops automatically.

3.3 Algorithm

Step 1: Start
Step 2: Initialize the Arduino UNO.
Step 3: Initialize the Ultrasonic Sensor and IR Sensor.
Step 4: Check the person in front of trolley, If 8YES then start following. if not then keep checking.
Step 5: Repeat the step4 continuously.

3.4 Flowchart



IV. CONCLUSION

The trolley follows the user continuously, Once Trolley is powered on and it captures the user image and it will start to follow him/her in any direction with proper distance between them and help user by reducing physical efforts.

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