Smart Trolley

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Abstract
Today, supermarkets almost fully developed thanks to numerous technological advances. Individuals buy unique things from the stores and put them into a streetcar since it is the simplest strategy utilized in general stores to convey merchandise. Nonetheless, all through the entire course of shopping, client should move the streetcar physically by their own work what's more, with regards to the charging system clients should stand by in long lines to cover their bills. Due to people's busy schedules, this is a waste of time. In addition, while the trolley is parked in its slot, Follow Me features automatic charging and parking to its slot. A streetcar naturally dodges an impediment, and to collaborate and speak with the individual streetcar ought to follow that specific individual. To accomplish this focus on the objective of our work is to plan what's more, create a robot that tracks the objective as well as additionally move towards by keeping away from hindrances while following. A special tag is attached to the member who should be accompanied by the streetcar to make things easier. The images of the unique tag are continuously captured by a small pi camera and compared to the initial image. If they match, the trolley moves further and uses ultrasonic sensors to avoid obstacles as it moves forward. Because uniqueness is important, tag plays a crucial role and simplifies the process. Electrical components are also utilized in the mechanical design of the trolley. Raspberry pi is used to follow the human.

Keywords: Supermarkets, Bills, Trolley, Multifunctional, Streetcar, Follow me, User Interface (UI) techniques, Bar code reader, Automatic charging and parking, raspberry pi , Unique tag, Ultrasonic sensor

I.INTRODUCTION

Nowadays, most supermarket shopping activities can be seen with shopping carts. Clients are pushing streetcars around them to convey the things they bought. The regular course of venturing to every part of the streetcar is done physically by the person with work of them. In this manner, if a customer conveys a child while doing shopping it is a genuine weight to the client to push the streetcar or to an incapacitated individual with one hand is extremely difficult to push the streetcar. Individuals can see enormous rush in stores on vacations and ends of the week the rush is considerably more when there are unique offers and limits.

A tablet with an Android platform is attached to the Follow Me automated trolley so that it can perform the above-mentioned task and carry products while automatically accompanying the customer without the need for person's intervention. A robot application has been developed to provide suggestions for products to purchase. Besides, the streetcar is stopping back to its opening consequently after the client completes them buys, the streetcar will be charged consequently while the streetcar is in the stopping opening.

There are GPIO pins on the Raspberry Pi. GPIO pins are used to control the robot with the L293D motor driver board. A raspberry pi is connected here to a pi camera. The robotic wheels are moved in a right-to-left, forward-or-backward direction by DC motors. The Linux-based system and ARM11 architecture of the Raspberry Pi Additionally, it has eight GPIO, one UART, one I2C, and one SPI to essentially satisfy the control requirement. DC motors that are dependent on the driving motor control the trolley's wheels.

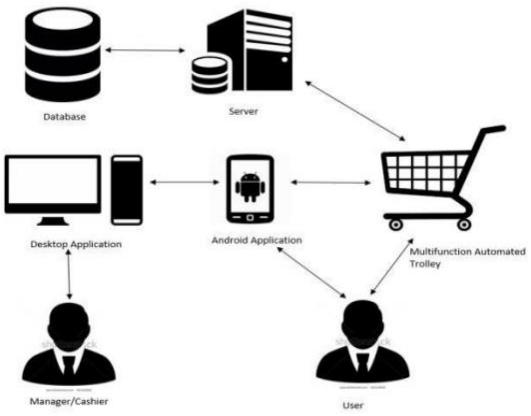

Figure 01: Architecture Diagram

Figure 01 indicates that primarily by users personal ling with the system. While using the trolley, the customer will interact with the Android system to receive product information, prices, and recommendations for the items they have purchased. The data are being retrieved from the database in which they are stored. Director and money collector is connecting with the work area implantation as a partner to the client to finish the bill. All of the aforementioned data come from a server and a hosted database

II.LITERATURE REVIEW

An Android-based smart billing system and a tab that is mounted in front of the streetcar to keep track of the goods purchased by buyer make up the developed research. In addition, the to-be-developed trolley will include a number of multifunctional functions, including self charging while the streetcar is parked and parking in the slot [1].The android app can be used to control the robot in .It instructs the robot to move left, right, upward, and backward[2].The application is built on the Android platform; raspberry pi receives the signal for further processing.[3] .This procedure, the deferral and server issues are diminished as the Wireless Fidelity is utilized. Because it makes use of an integrated circuit and Zigbee, the robot can be implemented wirelessly. Without the use of wires, the Robot could be steered in complete freedom and autonomy.[4] A AI cart is used to follow and track the target in a unplanned setting. In this case, an ultrasonic sensor and a microcontroller are used to locate and track a specific individual. A special tag is kept on the members who should be accompany by a robot, and the robot automatically follows that person. A trolley is used to transport goods and also houses the bar code reader to speed up the billing process. Intelligent Space was developed to achieve the human-centered robotic system. Multiple DINDs spread out over a large area are used to measure the positions of the objects that are being targeted the iSpace.[5].When a customer placed a item in the streetcar, an Radio Frequency Identification reader scanned it, and the price and cost of the product were displayed on an Liquid crystal display. The ZIGBEE transmitter and receiver connected the trolley to the main computer server[6].

A QR code-based system that developed a streetcar to track the products and perform automatic billing with the assistance of an smart display. RFID technology, which consists of readers and tags attached to the products, is used to track the products[7].Vidyavardhaka College of Engineering in India developed RFID-based shopping and automatic billing. In order to provide on-the-spot billing in supermarkets, they have developed an architecture that incorporates wireless technology and radio frequency identification (RFID)[8].This study was made for customers with disabilities. A light beam and a light range sensor are utilize precisely pursue the customer and measure their position. Only the customer can be followed by this trolley [9].Shopping trolley that can be controlled with a remote. This trolley's structure is made up of a robotic structure and a keypad that can be used to move it in a particular direction. In addition, when the trolley is parked in the slot, it is equipped with automatic charging and parking [10].

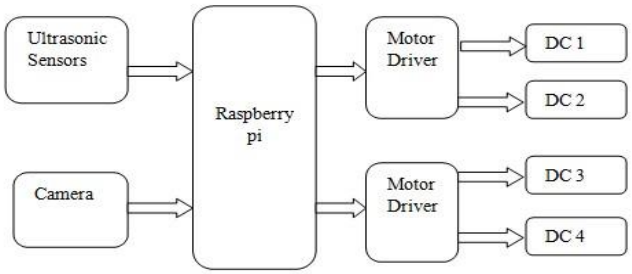

Figure 02: Block diagram of the system

III. WORKING METHODS SECTION

Streetcar consists of a automatic vehicle with various sensors and modules, including an ultrasonic sensor and a camera, mounted on two wheels and one freewheel. The camera is in an upward direction changed and is at first mounted at the level of 4feet from the beginning upgrade the visible capacity and adequacy. The client controls the streetcar as it follows specific individual by a novel ID tag.

The image is continuously captured and compared to the original by the Pi camera. It follows that individual if it matches. Additionally, it uses an ultrasonic sensor to search for and avoid obstacles. The project includes a number of elements, including the circuit design, tag identification, obstacle avoidance, and human detection system.
To find the unique tag, images are continuously captured. To create this programme, we used an OpenCV Python platform.

Figure 03: Pi camera

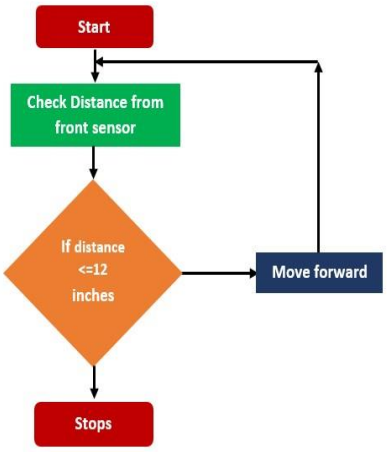

Figure 04: Flow Chart of Ultrasonic Sensor

The frequency at which ultrasonic sensors transmit sound waves is too peak for persons to hear. After that, they listen for the noise to reflect back, after which they use the time needed to calculate the distance.

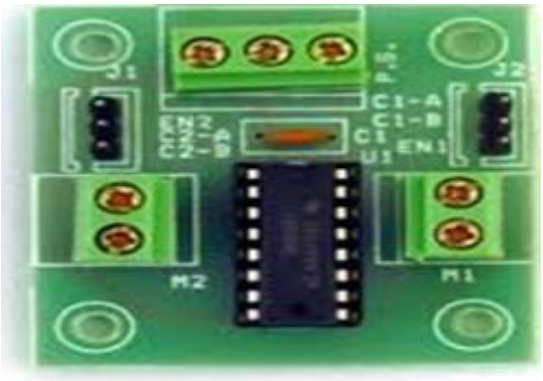

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Figure 05: Motor Driver IC

We have utilized the L293D motor to drive the DC motors in both directions. The 16-pin IC known as L239D is capable of controlling two sets of DC motors simultaneously."Follow Me" robotized streetcar was produced for grocery stores what's more, this shrewd streetcar interfaces with software application through web administrations.

Figure 06: Mobile App Purchase Goods

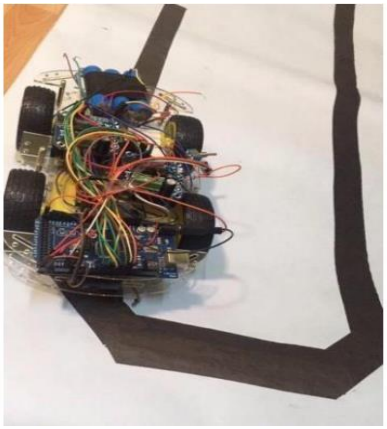

Figure 07: Robot Line Following

The Follow Me tram robot, shown in Figure 7, follows the dark line. This process is designed to autonomously place the tram in its designated alloted space.

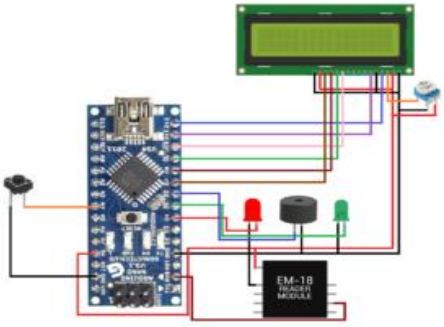

Figure 08:Smart Billing Circuit Diagram

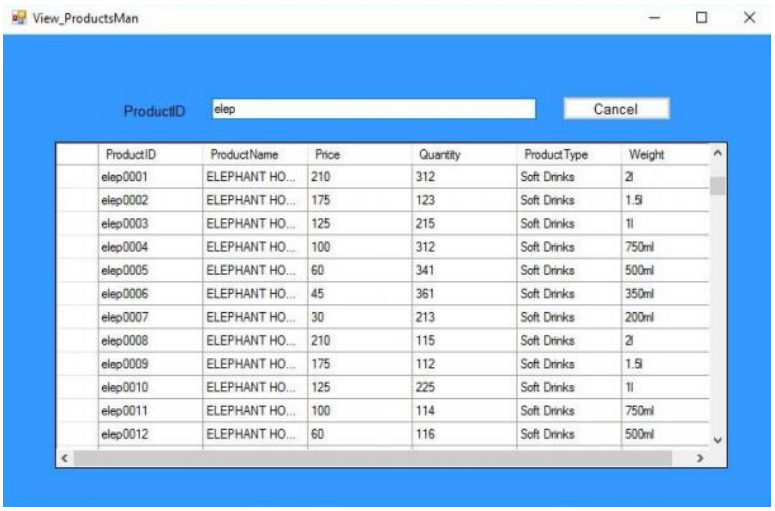

Figure 09: Desktop Application View Products Interface

The desktop application's See Products interface is depicted in Figure 9.

IV.RESULT

The accompanying robot's goal is to locate and accompanying the person who is obtained. Using an ultrasonic sensor and a raspberry pi camera, it is possible to track a person and avoid obstacles while also carrying out additional controlling tasks. The "Follow Me" trolley has a number of different functions, one of which is that it can follow customers automatically so that they don't have to push it manually. A significant occasion that this streetcar performs is the programmed stopping. The trolley returned to its slot without assistance from the customer after they had completed their purchases.

The limitations are:

a. Shoppers at supermarkets ought to be accustomed to an automated environment;

b. "Follow Me" streetcar identifies hands down the nearest object when voyaging consequently;

c. Battery life with lithium;

d. In terms of automated placing, Trolley only recognizes the dark and light path;

e. In order to access the developed Android and desktop applications, the server must be operational continuously;

To get around the restrictions listed above:

a. Cell of the streetcar should charge when it is stopped in the space;

b. Space of the item ID has given a little space so the streetcar recognizes the main the client who is closeto the gadget;

c. Stopping of the streetcar just identifies the highly contrasting way so that the highly contrasting should be attracted general stores to work the programmed stopping procedure;

V.FUTURE WORK

This can be further developed as:

a. Making up a route guide to the form distinguish the where the items are been put away.
b. Upcoming the application on the client's mobile device.
c. Following the purchase, sending an SMS or email.
d. Include a fixed payment option that allows customers to pay with a debit or credit card.

VI.FUTURE SCOPE

In the vast world of robotics, There are many fascinating applications in many industries like medicine and the military. By mounting a real-time video recorder, the robot might be used by the military for this capability. Additionally, we can track that trolley's location by integrating GPS with it.

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