Automatic Human Following Trolly

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***Abstract*— Nowadays, supermarkets are almost developed with many technological advancements. People purchase different items from the supermarkets and put them into a trolley because it is the easiest method used in supermarkets to carry goods. However, throughout the whole process of shopping, customer must push the trolley manually by their own effort and when it comes to the billing process customers must wait in long queues to pay their bills. This is a time wasting process due to the busy schedule of people. To avoid these problems the research group have introduced an effective and highly advance system. Although there are some existing Smart Trolleys which includes some of the above mentioned aspects there is no proper multifunctional automated trolley to make shopping life easier. The research "Path Following" has developed a multifunctional trolley which makes shopping life easier and convenient to customers. Path Following consists of series of technologies such as automatic human guided travelling with use of an Arduino Mega, goods tracking. Furthermore, Follow Me consists of automatic parking to its slot and automatic charging while the trolley is parked in the slot. The research group has provided an accurate, user friendly smart shopping trolley to make customers shopping life more convenient and easier.**

***Index Terms*— Supermarkets, Trolley, Multifunctional, Path Following.**

I. INTRODUCTION

Shopping mall is a place where most people from all walks of life will get their daily needs ranging from food product, apparels, toiletries; gardening tools electrical appliances, and others. The numbers of small and large shopping malls keep on increasing over the years throughout the world due to the demand of the public. Thus, the level of advancement of shopping mall system and infrastructure also varies. There are still plenty of spaces for improvement in terms of providing quality shopping experience to the consumers. Consumers often face problems and inconvenience when shopping [1]. Nowadays, in mall for purchasing variety of items it requires trolley. Every time customer has to pull the trolley from rack to rack for collecting items [2]. It needs a lot of power to be done when shopping. But, trolleys in supermarkets were needed. A lot of goods in the shopping cart would be to push or pull, so the customers will limit the activity of the hand. When focused on pushing the trolley, buyers will often miss a lot of goods sold in supermarkets and only buy the important goods only, and of course this could harm the supermarket company [2-4].

In order to give the best services, it had been need a trolley that can follow automatically human movement. The direction could be detected using transducers, sensors or other detector. For example, the detector may be sensitive to weight, heat, sound, dielectric constant, and so on [7,8]. Design was divided into several parts namely the design of hardware, hardware relationships, the initialization of sensors and auxiliaries, and software design. As various kinds of robots have been developed to replace human works. Ultrasonic range sensors have been recently used for range detection and obstacle recognition in robots because of their low price, high efficiency, and relatively simple structure. While ultrasonic waves have better directivity than low-frequency waves in general, they are attenuated more rapidly. Ultrasonic sensor uses sound waves for its ranging and the speed of sound is influenced by a number of environmental parameters [7-9].

II. METHODOLOGY

A. Materials

- IR Sensor.
- Ultrasonic sensor
- 2200 mAH battery
- Arduino Uno
- Motor driver
- DC Motors 100 rpm
- Wheels

B. Procedure

Hand saw: It was used for approximately cutting wood and logs, making convoluted curves, and fragmenting wood for making the two pulley composition.

- Jig saw machine: a jig saw is a razor-edged power tool that is used for cutting pneumatic lines in wood or other kinds of materials. While most saws can only cut in a straight line, a jigsaw makes it easier to cut confusingly interrelated patterns and shapes.
- Circular saw machine: It is used for cutting wood or metal and may be hand-held or mounted on a machine. The wood is clamped in a vise and the saw is advanced slowly across it. As each tooth in the blade strikes the wood, it makes a small chip. The teeth guide the chip out of the workpiece, preventing it from binding the blade. The cut has a narrow kerf and a relatively smooth surface finish. In this process saw setting is done geometrically.

Its Advantages compared to contemporary trolleys are:

- The system saves a lot of mobility time
- It replaces the traditional transportation trolly pushing technique with the automatic path following idea.
- It reduces the human efforts of pushing the trolly.
- It is also used as marketing strategy for the shopping malls.
- It also opens the door of automation in the shopping malls

Figure 1 Basic model of our Autonomous Trolley

Figure 2 Frontal view of the model

C. Future Scope

- We can add billing system to the trolly itself to reduce the time we waste by waiting in the queue.
- By adding the billing system, we can also help customers to calculate the total billing amount and help them evaluate if it fits in their shopping budget or not.
- We are adding Bluetooth module which is for the trolly to track the customer.
- The addition of Bluetooth module will also help in path tracking.
- By the time we can also implement machine learning to get more accuracy.

III. CONCLUSION

Imagine a shopping trip where the trolley effortlessly follows you, freeing your hands and simplifying the entire process. This innovative design leverages advanced technology to create a more convenient and efficient shopping experience.

Equipped with sophisticated sensors, the trolley intelligently maintains a safe distance behind the shopper. The core of this innovation lies in the Arduino microcontroller, which processes sensor data and controls the trolley's movement with precision. This intelligent system enables the trolley to adapt to varying speeds and obstacles, ensuring a seamless shopping journey.

The potential for future advancements is immense. By incorporating machine learning algorithms, the

trolley can learn individual shopping patterns, optimizing its behavior over time. Additionally, GPS integration can enable autonomous navigation within shopping centers, further enhancing convenience.

This smart trolley represents a significant step towards the future of retail technology. By combining cutting-edge technology with practical applications, it not only improves the shopping experience but also showcases the potential of automation in enhancing daily life.

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