

# Automatic Trolley Human Follower

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**Abstract**— This project produced an Automatic Trolley Human Follower for general or industrial user. An automatic trolley human follower is developed to help a user or production industry. This automatic trolley human follower is controlled by a PIC 16F877A microcontroller that can follow the user automatically with integrated circuit of ultrasonic and IR sensor. The 12V DC motor was used as the power supplied to move the trolley automatically follow a user in hypermarket or industrial use. In this project a robotic vehicle is fabricated which runs like a regular trolley by carrying tools from place to another to reduce the utilization of human energy in order to carry heavy things. This is done by using a set of receiver and transmitter ultrasonic sensor to detect a user in a 1 meter range and it will follow the user. Ultrasonic receiver will be placed on the user belt and it transmitter placed in the body of trolley while IR sensor is use to detect an obstacle and completely to trace a user in range 1 meter.

**Key words:** Trolley Human Follower, DC motor

## I. INTRODUCTION

Shopping trolleys are available in the shopping mall which are wheeled and are to be carried by the person. The shopping trolleys are available in various sizes and with baby sitters. Trolleys are fitted with the castor wheels and normal wheels for easy to move on the floor while shopping. Some people are uncomfortable to carry the trolley since it is tedious and uncomfortable to push or pull it in the crowd. We are proposing to make the automatic trolley for shopping mall which can sense us and follow us.

The beauty of all this system is that it uses all of these sensors in the most effective way to help it react. Unmanned operation requires sensor system for target position, sensors for load position, and control and communication equipment on the trolley and remote consoles for control signals. To remain fully operational with the terminal at all times requires extraordinary work flows, narrow time schedules and lots of work which do considerably drive up the overall investment. Now a day, automatic trolley has become popular especially in localization scheme. It is a non-touching recognition system where it can tag and send tag data wirelessly at various distances. In order to prevent objects collision, ultrasonic sensor, light dependent resistor was used in this project. The trolley will have the drive and steering mechanism being motorized by DC batteries. The tag when shown to the trolley will get activated and the tag is sticked to the pant and the trolley will sense the tag and starts following the tag on the person. If somebody comes in between, it stops and gives buzzer sound and when the obstruction moves away, it starts moving.

In this we are making a four wheel vehicle with trolley mechanism on top to hold the various types of materials being taken from the various racks in the shopping

mall. The trolley will have the drive and steering mechanism being motorized and is backed by DC batteries. The IR emitter tag when shown to the trolley will get activated and the tag is sticked to the pant and the trolley will sense the tag and starts following the tag i.e., follows the person. The IR emitter is continuously emitting the signals and the receiver is on the scanner fixed to the steering mechanism which diverts the direction as per the emitter to drive the trolley in that direction controlling the direction as per the person's movement. If the person is out of the way, the scanner scans around to sense and once sensed will move towards the person. If somebody comes in between, it stops and gives the buzzer sound and when the obstruction moves away, it starts moving. If anything comes in between and the person is out of reach, the scanner scans all around and even if not sensing the person, then the buzzer sounds or the recorded sound calling the person's name will repeatedly calls, so that the person can reach back the trolley and again take the activation and makes the trolley to follow.

## II. METHODOLOGY

Shopping trolley is a convenience and necessary tool for customers who are shopping in a supermarket. They can put a lot of things inside without carrying themselves but just have to push the shopping trolley. However, there is a problem faced by retailers or manager of the supermarket nowadays.

Apart from this, a shopping cart which is designed to allow kids to be sat inside can cause a problem to customers as well. There was a case happened to Orem where a mother had her daughter sat on the shopping trolley was molested by a stranger. The stranger took the opportunity to approach the victim when the mother walked away for a few minutes.

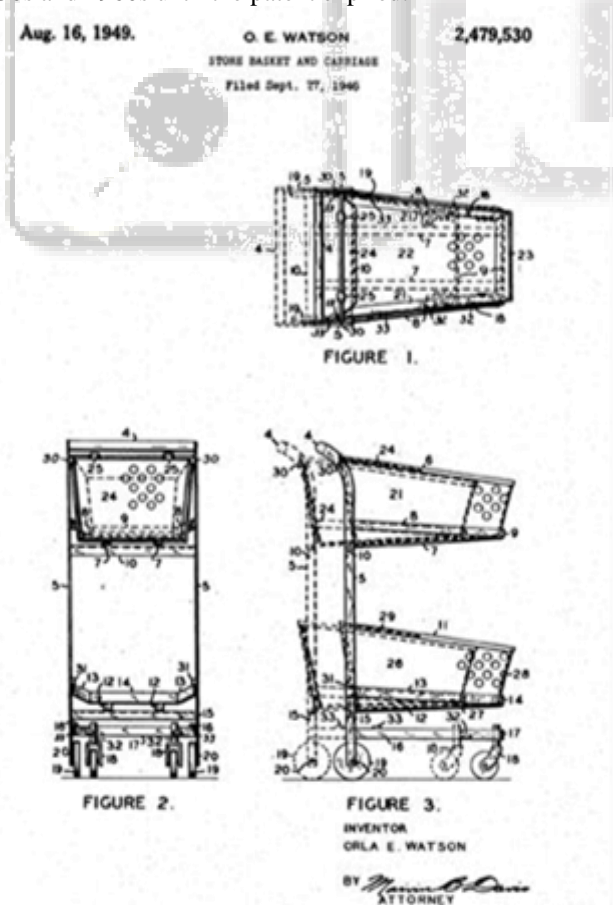
On the other hand, the new technology allows an automatic braking system to be installed on a shopping cart. However, it can cause the users to get shocked and hurt. The technology uses an underground antenna and it sets a perimeter around the store. When a user pushes the shopping cart over the perimeter, a signal is sent to automatically lock the wheel. However, there is no sign and warning at all and thus it can cause a shock and hurt the user. This is one of the methods used by company to prevent their carts to get stolen or damaged. The companies spent lots of dollars to making shopping carts.

## III. PRIOR APPROACH

In 1946, Orla Watson devised a system for a telescoping shopping cart which did not require assembly or disassembly of its parts before and after use like Goldman's cart; Goldman's design up until this point required that the cart be unfolded much like a folding chair. This cart could be fitted into another cart for compact storage via a swinging one-way rear door. The swinging rear door formed the basis of the

patent claim, and was a major innovation in the evolution of the modern shopping cart. Watson applied for a patent on his shopping cart invention in 1946, but Goldman contested it and filed an application for a similar patent with the swinging door feature on a shopping cart with only one basket in 1948 which Goldman named the "Nest-Kart". After considerable litigation and allegations of patent infringement, Goldman relinquished his rights to the patent in 1949 to Watson and his company, Telescope Carts, Inc. realizing that the swinging rear door feature was the key to Watson's patent. Watson was awarded patent 2,479,530 on August 16, 1949. In exchange, Goldman was granted an exclusive licensing right in addition to the three other licenses previously granted; Telescope Carts, Inc. continued to receive royalties for each cart produced by Goldman's company that incorporated the "nesting" design. This included any shopping cart utilizing his hinged rear door, including the familiar single basket "nesting" designs similar to those used in the present.

Owing to its overwhelming success, many different manufacturers desired to produce shopping carts with the rear swinging door feature but were denied due to the exclusive license issued to Goldman. The federal government filed a lawsuit against Telescope Carts, Inc. in 1950 alleging the exclusive license granted to Goldman was invalid, and a Consent Decree was entered into where Telescope Carts, Inc. agreed to offer the same license to any manufacturer. Orla Watson and Telescope Carts, Inc. licensed their telescoping shopping cart design to several manufacturers throughout the 1950s and 1960s until the patent expired.



#### IV. OUR APPROACH

A line following robot is a kind of robot that is designed to follow a predetermined line or path. Infra-Red (IR) line sensor equipped with IR transmitter and receiver to trace black line with white surface or vice versa on the floor. The sensor output will be fed to the microcontroller and thus the microcontroller can give a suitable command to motor driver in order to allow motor moving according to the command given. The microcontroller will be programmed to make the robot move in any direction based on the output of line sensor. Hence, a robot can move according to the line or path given.

In this circuit 555 is used in astable mode generated 5 Hz clock pulse which are decode by 4017 decade counter. and it given to transistor name is bc547 NPN transistor. Isolated output is driven three PWM remote of different frequency.

LM358 consists of two independent, high gain operational amplifiers in one package. Important feature of this IC is that we do not require independent power supply for working of each comparator for wide range of power supply. LM358 can be used as transducer amplifier, DC gain block etc. It has large dc voltage gain of 100dB. This IC can be operated on wide range of power supply from 3V to 32V for single power supply or from  $\pm 1.5V$  to  $\pm 16V$  for dual power supply and it also support large output voltage swing.



Fig. 4: Project Picture

A line following robot is a kind of robot that is designed to follow a predetermined line or path. Ultrasonic sensor equipped with ultrasonic transmitter and receiver to trace line with white surface or vice versa on the floor. The sensor output will be fed to the microcontroller and thus the microcontroller can give a suitable command to motor driver in order to allow motor moving according to the command given. The microcontroller will be programmed to make the robot move in any direction based on the output of line sensor. Hence, a robot can move according to the line or path given.

## V. CONCLUSION

The project aims to develop an automatic human guided shopping trolley with a smart shopping system. This shopping trolley can lead a user to the items' locations in supermarket and he or she is able to know the items' locations through a shopping map. It will follow user. Accuracy - advance IR systems improve accuracy by improving. With the aid of automatic line following and human leading functions portable robot, supermarket owners need only to purchase the portable robot and can easily install it under shopping trolleys. Users can then enjoy shopping without pushing the shopping trolleys themselves. Meanwhile, the smart shopping system allows users to access the location of items that they plan to purchase in supermarket by using their Android application and call the shopping trolley to move automatically. Thus, the shopping trolley can lead the users to their desired location of items that they use which results in easy and accurate turning of missile towards target. We provide low cost guided.

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