AUTOMATIC LUGGAGE FOLLOWER

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Abstract: In this paper, we explained how robots can act in concert with human behavior. Our aim is to develop a robot capable of maneuvering through busy airports behind its owner while hauling his or her luggage. In this paper, In order to follow a human, a mobile robot needs to know the position of the person and must be able to determine its own path in order to follow his target. We consider a method using an transmitter &receiver. In order to prevent collision with obstacles, ultrasonic sensors are used to detect objects that may be in its path. We present the effectiveness of our approaches by showing the experimental result using a real platform. In this article we describe the research carried out in the attempt to develop a human-following robot.

***Key Words*: Carrying luggage, Obstacle detection, GSM, GPS, Dry batteries, PIC.**

1. INTRODUCTION

Automatic or automation means, as by electronic devices, reducing human intervention to a minimum. This will reduce the time delay and human efforts in luggage management system.

Now a days-everybody uses a luggage for travel especially to airport all of them dragging out heavy luggage. Passenger need to carry his /her own luggages. This is very slow and expensive process. And it becomes hectic journey. This problem can be overcome by automatic luggage follower system. It is nothing but smart luggage. It reduces the time delay and human efforts in luggage management. For the implementation of design ultrasonic sensor and dc motors plays important role. For the anti-theft tracking purpose GSM and GPS are used. Whenever the bag is lost, the user can access the location by GSM and GPS tracking system [1, 2].

Another feature in this system is dry batteries. Generally lithium batteries are used for battery pack. But lithium batteries catch fires, when it punctured. So it is harmful for system. And dry batteries are rechargeable and easy to carry.

2. OBJECTIVES

- A luggage easy to be carry and to be manageable by any person.
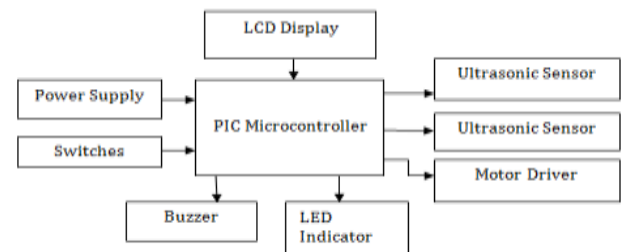- A more way to carry the luggage in case of any problem.

- Comfortable cost according to everyone's perspective.
- A luggage with an attractive and innovative exterior design.
- A security system that the user can be free of worries of his or her luggage.

3. BLOCK DIAGRAM

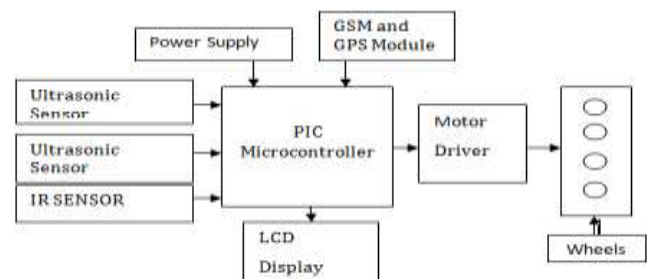Fig.1: Block Diagram Of Transmitter

Fig.2: Block Diagram Of Receiver

3.1 PROPOSED SYSTEM DESIGN:

A. Target Detection:

Fig3: Ultrasonic sensor.

Detection is the process of finding both position user and robot. Here we are using ultrasonic sensor. The ultrasonic sensor is the key element in target detection. Ultrasound sensor measure distance by using ultrasound waves. It is based on the properties of acoustic waves with frequency above human audible range. There are two main parts in the sensor, a transmitter to transmit the sound waves and receiver to receive echo. Transmitter converts electrical energy to sound energy and receiver part receives the echo and turn the received echo and received sound waves into electrical energy. And the robot will move forward, right or left in accordance with the detected human presence. The basic principle behind the operation is that the ultrasonic transmitter emitted the ultrasonic waves in one direction. And started timing when it launched. Ultrasonic spread in the air. And would return immediately when it encountered obstacle on the way. At last, the ultrasonic receiver would stop timing when it received it received the reflected waves. As the ultrasonic spread velocity is 340m/s in the air based on the timer record t. We can calculate the distance (s) between the obstacle and transmitter namely,

$$s = 340t/2$$

This is called as the time difference distance measurement principle. [3]

B. PIC:

Peripheral interface controller with 40 DIP is used in automatic luggage follower for controlling operations. It operates in 5.5V supply voltage with internal oscillator frequency 16MHz. PIC operates with 75 instructions and having USART pin for serial communication. This microcomputer controls the GSM and GPS, sensors and motors. PIC having high-current sink/source 25mA/25mA. Timer 1 and 2 oscillator each having 800nA @ 32 kHz.

C. Obstacle Detection:

Fig4: IR sensor.

The obstacle detection is done on the robot by providing an infra red eye to it. The infra red eye is the IR transceiver circuit through which the robot detects the obstacles and controls itself either by changing direction for stationary obstacles or by stopping itself. waiting for the obstacle to move away. IrDA specification requires that the optical channel operate in the infrared spectrum from 850 nm to 900 nm.

D. GPS:

The Global Positioning system is one of the systems that are space based radio navigation system made up of at least 24 satellites. It is nothing but a global navigation satellite system that provides geo-location and the time information to a GPS receiver anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellite. If we want to calculate 2-D position (latitude and longitude) and track movement, a GPS receiver must be locked on to the signal of at least 3 satellites. The GPS system does not require the user to transmit any of the data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information.

E. GSM module:

GSM is a standard developed to describe second generation digital cellular protocols used by mobile phones. It is a TDMA (Time division multiple access) based network technology. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates. One key feature of GSM is the subscriber identity module commonly known as a SIM card. It operates at 850 MHz, 900 MHz, 1800 MHz and 1900 MHz frequency bands.

F. DC motor:

Fig5: DC Motor.

A DC motor is any of a class of rotating electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. The speed DC motor can be controlled by varying the supply voltage or by changing the current in its field winding. The circuit use a 100 RPM 12 V DC motors with gearbox, 6mm shaft diameter with internal hole, 125 gm weight, Stall torque = 1.5 Kg/cm torque, No load current = 60 mA (max), and Load current = 300 mA(max).

This was the challenging portion for us to implement an algorithm which results the rigid robot body to track the associated transmitter holder as well as the user. As the proper usage of ultrasound sensor is only able to provide us with the distance of the location of the user but not the exact position of the user.

So to implement the automated system as we desired we were needed to implement a person tracking algorithm which will not only teaches the rigid robot body to trace the person carrying associated smart card correctly but also to face the obstacles which may the proposed automated system may face while following the passengers through the airport. Thus the proposed automated system, if meets any kind of the obstacles while following the smart card holder it will easily calculate the alternative way to avoid the clash and follow its smart card holder without any kinds of hazards.
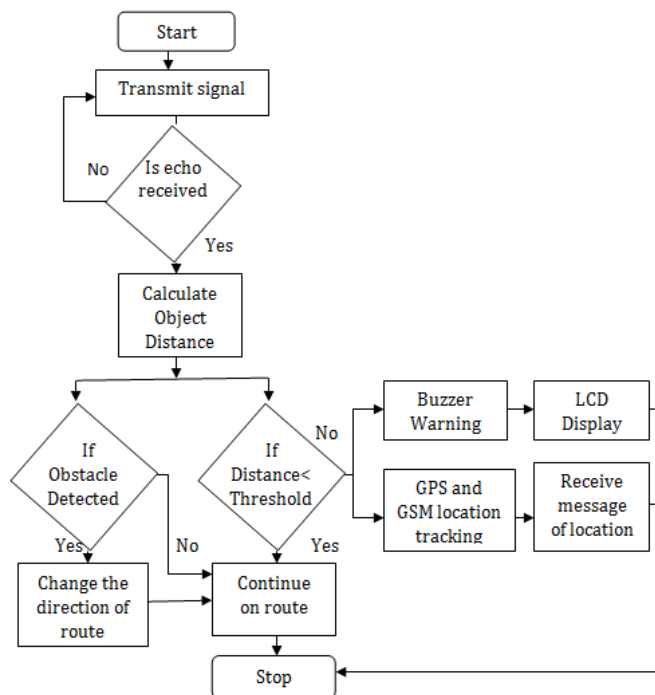
4. FLOWCHART

Fig.6 Flow Chart.

1. Where ever the people travel they used to carry luggage especially through airports all of them dragging out their heavy luggage. Perhaps trailing of the bag is very difficult task for old peoples. If a bag that follows passengers by utilizing human following concept, then entire problem gets vanished following technique is implemented using data taken from two ultrasonic sensors. Ultrasound sensors always measure distance between bag and human by sending sound waves and collects the reflected waves when it strikes an obstacle. The forward, right and left movement of the bag is based on the signal strength received at each receiver section.

2. The algorithm compares the readings from the two sensors and decides whether to turn left, right or to forward. Movement of bag is made through motors by the program codes burned in the PIC. To make the bag to follow the human, distance from the ultrasonic sensor is compared with a fixed distance specified earlier in the PIC program PIC

microcontroller always checks the conditions and if human is far or near to the specified distance, bag stops. A constant distance is provided to avoid object interference between human and bag Anti-theft tracking feature is another valuable feature inbuilt in the bag. Luggage bag may contain valuable and costlier things so chance of its theft is probably high. GPS and GSM are used for implementing anti-theft facility. Whenever the bag is lost, the user can access the location by sending a message to the bag. After getting this message GPS get activated and the approximate current location of the bag is send back to the same number by GSM. Location received from GPS is latitude and longitude based data of the bag's current location and its accurate position is obtained by searching on the web.

5. DEMO HAND DEVICE

6. PROTOTYPE PERFORMANCE

This prototype has target detection capability of 1 meter and also the obstacle detection power around the 30cm. so, this prototype realized all most all the properties of the proposed system. But, it gets activated only if the weight of the luggage does not exceed 2kg.

7. CONCLUSION

In day to day life when we are traveling luggage carrier is big problem. Using this technique we can overcome this problem. A security system that the user can be free of worries of his or her luggage being stolen or left behind. In future we will add features like headphone points, USB point, Wi-Fi technology, fingerprint system for security purpose. And focus on to make less expensive and easy to handle.

8. REFERENCES

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