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SMART BAG

(It can follow you)

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Abstract - *All the robotic inventions are to reduce manual effort upon mechanical work and to create an interaction between human and machine. Human following robots are one of the finest technologies in electronics and by utilizing its advantages and applications in day to day life the aim of this paper is to create a bag which follows its owner. Several techniques are introduced to follow a machine behind men. For the following feature human detection is done by using ultrasound sensors. In terms of privacy, the bag can be activated by SMS and also location can be identified using GPS. It facilitates charging of mobile phones and laptops when there is no way of a power source, especially during the traveling. In this bag within a small platform, all the facilities implemented together efficiently.*

Key Words: GPS, GSM, PIC, Ultrasound sensors, PIC16F886

1.INTRODUCTION

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 get vanished [1].

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 [3]. 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 [4].

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.

Recharging port is also provided in this project. For recharging port an inbuilt power bank is used. Recharging port mainly used for charging of mobile phones and laptops.

2. PROPOSED MODEL

The block diagram consists of the PIC microcontroller, GPS, GSM, ultrasound sensors and DC motors. Power supply for all these devices are provided by using an inbuilt 12V rechargeable Li-ion battery.

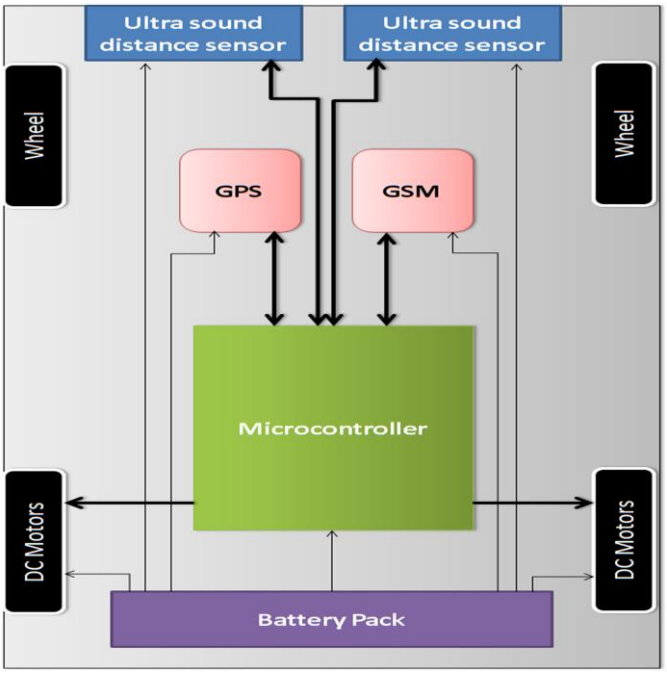

Fig -1: Block diagram of smart bag

2.1 Hardware Description

a) PIC: Peripheral Interface Controller 16F 886 with 28 DIP is used for controlling operations in smart bag. It has enhanced Flash-Based 8-Bit and is CMOS Microcontroller with nanoWatt Technology. It operates in 5 V supply and having Precision Internal Oscillator with 4 MHz. PIC 16 operates with only of 35 instructions and having USART pin for serial communication. This micro computer controls the sensor, GSM and GPS and the motors. It is factory calibrated to ±1% and the Software selectable frequency range of 8 MHz to 31 kHz. Operating Speed:
- DC – 20 MHz oscillator/clock input
- DC – 200 ns instruction cycle

B) Ultrasound sensors: Ultrasound sensors 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 the echo. Transmitter converts electrical energy into sound energy and receiver part receives the echo and turn the received sound waves into electrical energy. Ultrasonic sensors measure the distance to the target from transmitter is by measuring the time between the emission and reception.

c) GPS: The Global Positioning system (GPS) is a space based radionavigation system made up of at least 24 satellites. It is a global navigation satellite system that provides geolocation 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 satellites. To calculate 2-D position (latitude and longitude) and track movement, a GPS receiver must be locked on to the signal of atleast 3 satellites. The GPS system does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information

d) 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 120Mbps of data rates. One key feature of GSM is the Subscriber Identity Module commonly known as a SIM card. It operates at 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands

e) DC Motors: 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 of the 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 Kgcm torque, No load current = 60 mA(max), and Load current = 300 mA (max).

2.2 Work description

Technology used here are

a) Object detection using ultrasound sensors

The bag can be activated by sending an SMS from the mobile device. Two ultrasonic sensors are used to detect human presence and is connected in such a way that the transmitter section of each sensor is placed in middle and receiver section is placed on two sides. The transmitter section continuously emits sound waves through air and would return when it strikes the obstacles on the way. The forward, right and left movement of the bag is based on the signal strength received at each receiver section. The algorithm compares the readings from the two sensors and decides whether to turn left (if the left sensor returns maximum signal), right or to forward (if the output of the two sensors is similar). If the range drops or the distance between the bag and human is less than a predefined value, the bag stops. Antitheft feature is equipped within the bag by using GSM and GPS. The present location of the bag can be accessed by sending SMS through GSM.

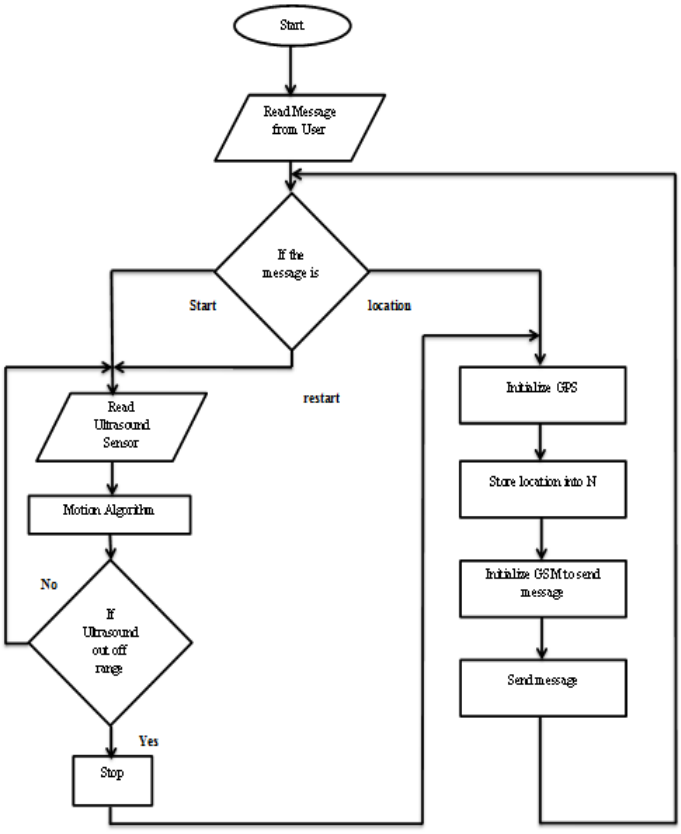

Fig.2 Smart bag flowchart

3. FUTURE SCOPE

In future, we are planning to include some interesting features like automatic object avoidance, stair case climbing and some extra woman safety features. These extra features make the bag more powerful and user friendly.

4. CONCLUSIONS

Smart bag is an innovative carry on suitcase that makes life easier and smoother. Carrying luggage is the main difficulty faced by each and every passenger. Here we try to solve the dragging of luggage difficulty and also providing better security and intelligent features that suitable for modern era. In this project we developed a new low cost human following technology to assist low cost consumer product implementation, so that the overall production cost of a automatic user following bag will be less. The inbuilt power bank can provide sufficient power and at the same time share power to users gadgets like smart phone, laptops etc.

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