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Smart Luggage

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Abstract— *The idea behind smart luggage is widely used for bags and suitcases with various tech-savvy features such as GPS, Bluetooth, Motion sensor and the GSM module. Using those features luggage which could move automatically just by sensing owner's moment, alerting him/her in case of obstacle encounter, sending the exact location in case of luggage's lost.*

Keywords— Autonomous, Bluetooth, GPS, Smart, Sensor.

I. INTRODUCTION

The problem behind the existing system is carrying heavy luggage. The old age or young, carrying heavy luggage has always been a matter of distress. Another problem is bag loss. This paper aims to provide comfort and ease while traveling in addition to smart features that are user-friendly and avoiding obstacles in the path by raising an alarm on the user's smartphone. There is a facility for tracking the location of the luggage too as to avoid theft and losing the luggage. The location of the luggage will be sent on the user's smartphone via a message. The weight of the bag is measured using the load cell and another very cool feature is that easy access charging to the smart devices.

II. PROPOSED MODEL

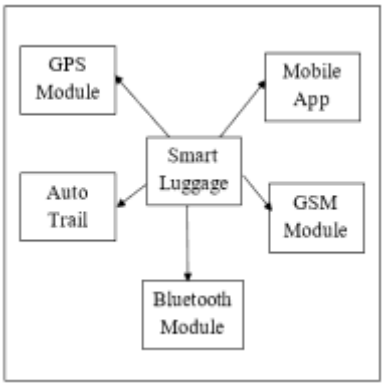

Fig 1: Block diagram of smart luggage

2.1 GSM and GPS used for Tracking and Tracing of Smart Luggage:

This system that uses a GSM module and the GPS module is used to track and trace loss luggage through the internet by TCP/IP connection and the sending alert message on the owner mobile. All the tracking details of the loss luggage are stored in the external database. The GSM module receives SMS request for location and the microcontroller checks for the closest location match inside the database with the received GPS coordinate data. The matched location detail is sent to the user as an SMS using GSM module thus completing the request.

2.2 Auto Trailing Bag of the Smart Luggage:

Auto trailing has to be done with the help of PIR motion detector. PIR sensors allow to sense motion, almost always used to detect whether a human has moved in or out of the sensors range.

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2.3 Proximity detection using the Bluetooth module:

Proximity detection using Bluetooth module to keep luggage close and safe from theft. If an unknown person took luggage and is strayed outside the range of Bluetooth signal then alert message will generate and sent a message on owner mobile app. After receiving an alert message on the mobile app then GPS automatically display the map. The connecting distance is fixed between the luggage and mobile say 10 meters.

2.4 Obstacle detection using IR sensor:

Obstacle detection has to be done with the help of the IR sensors. This Infrared obstacle detection sensor is super easy to use. The carrier detects the value of obstacles as early as possible with the help of IR sensors.

The IR sensors raising an alarm on luggage as well as on the user's phone and the message will be sent on the user's mobile.

III. FUNCTIONAL OVERVIEW

3.1 Motion Detection:

Motion Detection is to be done with the help of PIR (Passive Infrared Sensor) motion detector [1]. PIR sensors allow to sense motion, almost always used to detect whether a human has moved in or out of the sensors range.

3.2 Obstacle Avoiding:

Has to be done with the help of the IR sensors.

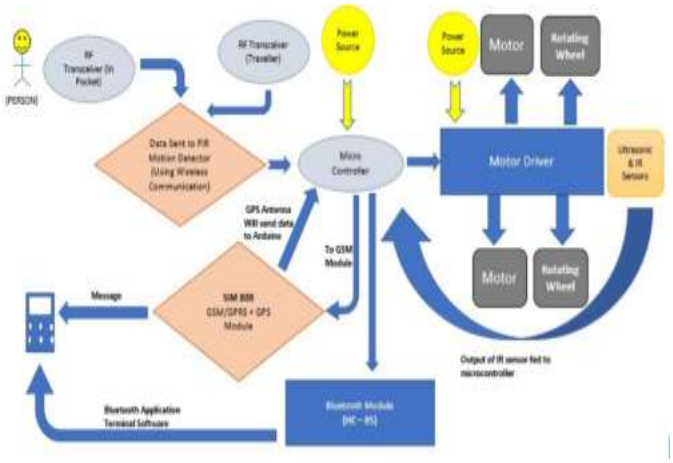
The carrier detects the value of obstacles as early as possible with the help of IR sensors.

The IR sensors raising an alarm on luggage as well as on the user's phone and the message will be sent on the user's mobile.

3.3 Tracking the Location:

The carrier is built with smart features like Bluetooth and GPS that allow the user to get the location of the luggage wirelessly on the mobile phone.

IV. WORKING OF SYSTEM ARCHITECTURE



4.1 Working:

The RF transceiver in the pocket and in the luggage will establish the connection, then both transceivers sent the signal to the PIR (Passive Infrared Sensor) to sense the foot movement of the person and those collect the data related to the PIR sensor [2] are sent to the microcontroller and it will send those data to the motor driver to drive the motors. In this way, the wheel of the

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luggage will automatically move to sense the foot movement [3]. The GPS and GSM module are used to track the location of the luggage and sent the alert message or alarm on the user mobile app. There is a facility of the Bluetooth connectivity which will help in raising alarm in case of any obstacle coming in the way of luggage by using IR sensors.

4.1.1 PIR Motion Detector:

The PIR motion sensor [4] consists of a two or more elements, the output of a voltage proportional to the amount of incident infrared radiation. The PIR module consists of an ultra-Nano power microcontroller to establish wireless communication between the two RF transceivers, one in the traveler and one inside the pocket of the person.

4.1.2 RF Transceiver:

Transceivers are able to establish a low-cost RF link module ensures that the luggage will follow only one person having the RF transceiver inside his/her pocket [5].

4.1.3 Microcontroller:

This processor is used in applications requiring control processing and connectivity capabilities. The microcontroller will work as the main controlling device. The output from the PIR sensor will be provided to the microcontroller to drive the motors of the luggage as per the output received.

4.1.4 SIM808 GPS Tracker:

SIM808 is a GSM+GPS module, this module uses a micro sim card to get the location of the luggage via a notification on using a smartphone. The GPS tracker gets the GPS signal through a UART interface and can store the information on the SD card.

4.1.5 Bluetooth module:

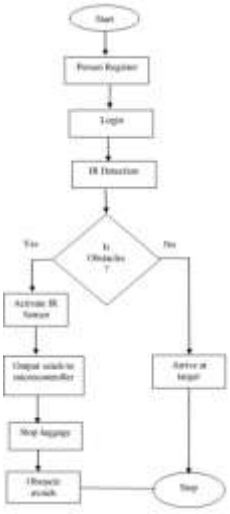
Bluetooth module, HC-05 will be connected to the microcontroller through UART. UART used for the serial communication. The Bluetooth module will help in connectivity between the traveler and the mobile phone via application software. If any obstacle will be arising them it will help in raising the alarms on the mobile

4.1.6 IR Sensors:

These sensors would be placed at the front of the luggage in order to sense the presence of any obstacle. The output of the sensor would be fed to the microcontroller to stop the luggage, raise buzzer and notifying an application developed.

V. FLOW CHART OF SMART LUGGAGE

5.1 Flow chart for the obstacle.



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Description of flow chart:

Step 1: start

Step 2: Person register in own mobile

Step 3: Person take login using his/her credential account.

Step 4: After taking login, the condition is checked obstacle present or not.

Step 5: If an obstacle is present then the IR sensor is active.

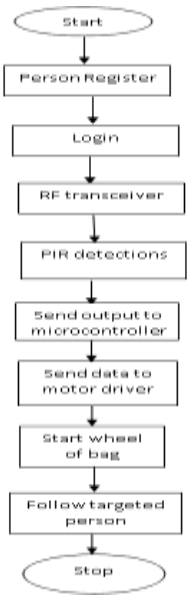
Step 6: Then the IR sensor send output to the microcontroller.

Step 7: Microcontroller to stop the luggage and avoid an obstacle.

Step 8: If obstacle not found then luggage is arriving at a targeted person

Step 9: Stop.

5.2 Flow chart for motion detection:



Description of flow chart:

Step 1: start

Step 2: Person register in own mobile

Step 3: Person take login using his/her credential account.

Step 4: After taking login, RF transceiver is inside the pocket.

Step 5: RF transceiver sends data to the PIR.

Step 6: PIR send output to the microcontroller.

Step 7: Microcontroller sends data to the motor driver.

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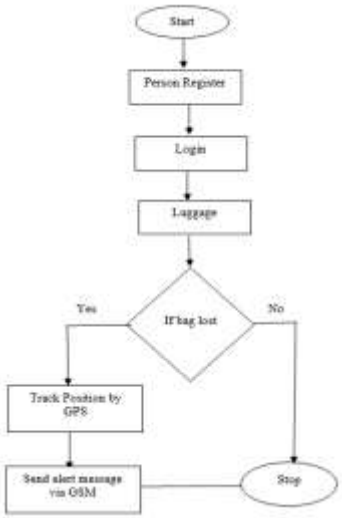
Step 8: Start the wheel of luggage and follow the targeted person.

Step 9: Stop.

5.3 Flow chart for Tracking luggage:



Description of flow chart:

Step 1: start

Step 2: Person register in own mobile

Step 3: Person take login using his/her credential account.

Step 4: After taking login, check condition if the bag lost then track position by GPS.

Step 5: Then send an alert message via GSM on owner mobile.

Step 6: Stop.

5.4 Flow chart for measuring luggage weight

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Description of flow chart:

Step 1: Start

Step 2: Owner start app on a smartphone.

Step 3: Put the luggage in a bag.

Step 4: System check condition if weight is > 25 kg then show the alert message on owner mobile.

Step 5: If the condition is false then display the weight of luggage.

Step 6: Stop.

VI. UPDATED TECHNOLOGY OF SMART LUGGAGE

In updated technology, the smart device is connected to the bag. The Arduino chip is putting on the bag. If the owner wants to open the bag using the smart device then every time getting the unique barcode and that unique barcode scan on the Arduino chip.

If the barcode is a match then the bag is open.

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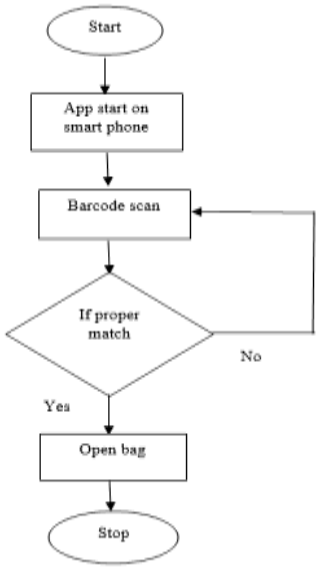
VII. FLOW CHART OF UPDATED TECHNOLOGY



Description of flow chart:

Step 1: Start

Step 2: User start app on his/her own mobile

Step 3: Then unique barcode scan on the Arduino chip.

Step 4: If the barcode is a match then the bag is open

Step 5: If the barcode is not matched then send message barcode scan again.

Step 6: Stop

VIII. ADVANTAGES OF SMART LUGGAGE

- The main advantage of smart luggage is easy to used and provide the security.
- This technology provides wireless connectivity such as GPS, Bluetooth, Wi-Fi.
- It is easy to understand functionality.
- It gives high performance.
- The users are carrying smart bag easily without back pain.
- If a bag is lost, the bag is easily finding.
- The user is easily measuring the weight of a bag.
- The user is easily open the bag when the bag key is lost.

IX. DISADVANTAGES OF SMART LUGGAGE

In smart luggage technology, one of the disadvantages will be a network error. If the network is not available in the mobile app, then this technology is not working properly, because it does not track the position of the bag when a bag is lost through Wi-Fi, GPS, and Bluetooth.

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X. FUTURE WORK

We can add high volume wireless speaker in the smart luggage and those speakers handle from the mobile app. I give suggestion this feature also add in the future in smart luggage.

XI. CONCLUSION

- Smart luggage is an innovative carry on suitcase that makes life easier and smoother.
- Carrying luggage is the main difficulty faced by every person. Here I try to solve the dragging of luggage difficulty and also providing better security and features.
- The bag lost problem and obstacle problem also solve in this paper.

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