Design and Optimization of Luggage Tracking System on Airport

Varun Gupta, Roushan Kumar, Raj Gaurav Mishra, Anirudha Semwal and Sweety Siwach

Abstract The loss or mishandling of luggage in airports is increasing nowadays, tremendously raising its associated costs. It is expected that the constant monitoring detects possible errors in a timely manner, allowing a proactive attitude when correcting this kind of situations. There are several devices in the market but all have some problems such as power consumption, location, portability, etc. The current research provides a novel idea to track the luggage in real time with the help of a microcontroller system, which is wearable and handy. Using wireless communication techniques the proposed system has been designed. Power consumption is the most important feature in the luggage tracking system. With the inclusion of accelerometer, the device consumes less power. The proposed system increases the monitoring detail when compared to current monitoring systems because it allows the individual tracking of luggage. It has also a web application to know about location of luggage and GSM module for the text application.

Keywords Luggage tracking system · Luggage handling process · Real-time event processing · Flexible luggage monitoring · Wearable

1 Introduction

The luggage handling process in the airports is very complex and uncertainty factors in most of the passenger's opinion. Many passengers feel uncomfortable when they see their luggage disappearing behind the check-in. In the current scenario, the luggage tracking is done with the help of RFID. Chung [1] medication tracking and medical assistance device and method comprises an RFID tag coder for reading from and/or writing to an RFID. The tracking device, which fits inside or is attached to luggage, pinpoints the identity of a bag in real time. The method of

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tracking through RFID is popular earlier but now the method of tracking in my project has something new technology from RFID. RF identification system for identifying objects by communication between a RF transceiver, mounted on luggage and a RF receiver. The preferred electronic signaling chip or device is an RFID tag that is affixed to luggage. RFID tag contains a transponder, which is energized by the excitation signal to transmit a response signal which contains identifying information back to the interrogator. Every RFID has a unique identity. With this unique identity when we touch this RFID with the luggage, then person can find their luggage. Chadil et al. [2] proposed the system which has GPS/GPRS module that can easily track the location and sends the message though web server. Peijiang and Xuehua [3] proposed the system which has remote monitoring system based on SMS of GSM.

In this paper luggage tracking system has no RFID. It is ARDUINO processor based. In which we have ARDUINO processor, GSM module, Wi-Fi module, GPS module, and accelerometer for the power factor and the device is chargeable (can run without power supply). The working procedure of this device is that it has been kept in the luggage at the airport though which user can get the SMS or he can get a message from android app in his phone regarding their location. As this device is chargeable it is automatically turned off when the plane takes off. This is so because plane generates acceleration and accelerometer prepares the device to enter in airplane mode. And after that when the plane is landing the device is automatically turned ON with the help of accelerometer (plane generates acceleration during landing also) and sends the location via SMS or message on the android application. Thus user can find their luggage.

2 Proposed System

The system comprises of a luggage tracking device that tracks the luggage using a GPS module and sends the location of the luggage using GSM module. The GSM module sends a text message to the user's mobile specifying the location of the misplaced luggage.

2.1 Block Diagram

Figure 1 shows the system block diagram. The system includes a GPS module, a GSM module, and a microcontroller.

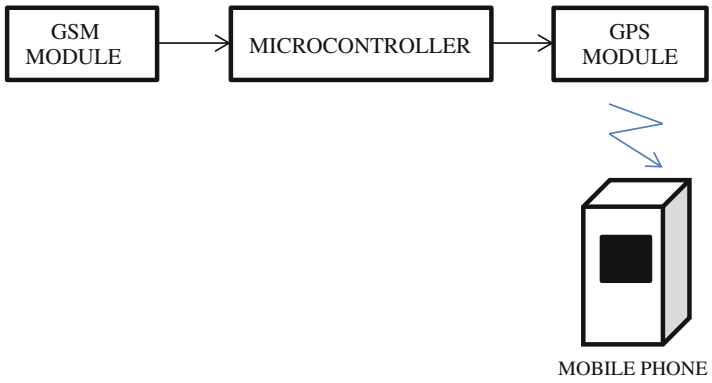


Fig. 1 System block diagram

2.2 Prototype Development

The main modules of the system are as follows:

1. **GSM module**: GSM SIM 900 module is used to send text message to the user mobile. It operates at 12 V DC.
2. **GPS module**: This module is used to get the coordinates of the location of the luggage.
3. **Control unit**: Control unit comprises Arduino UNO microcontroller. It is a 8-bit microcontroller and operates at 16 MHz frequency.

2.3 Circuit Diagram

Figure 2 shows the circuit diagram which includes the GSM module, GPS module, and Arduino UNO. GSM module is connected to the microcontroller via a RS-232 module. TX and RX pin of GPS module is connected to RX and TX pin of the microcontroller.

3 Proteus Simulation

This software is used to check the feasibility of the circuit before it is implemented (Fig. 3).

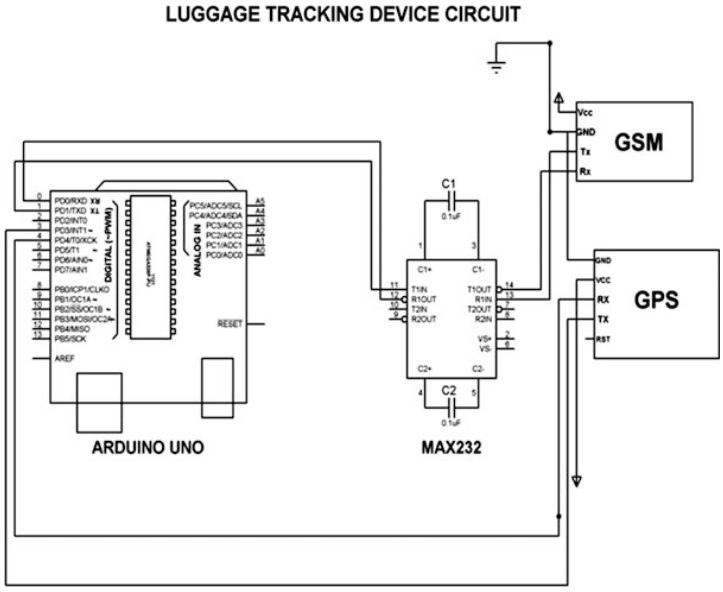


Fig. 2 System circuit diagram

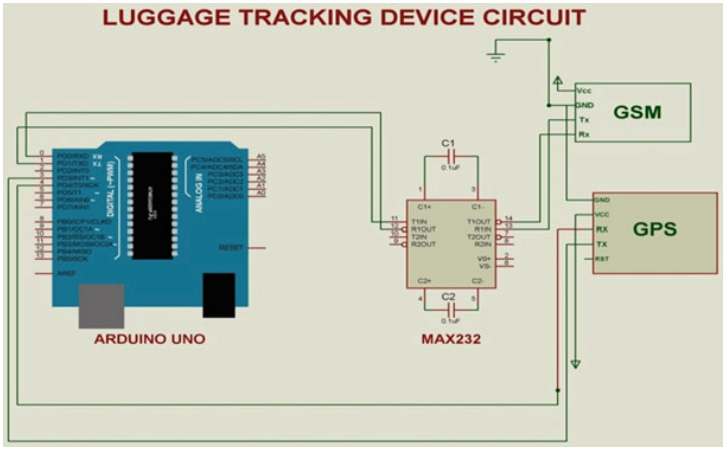
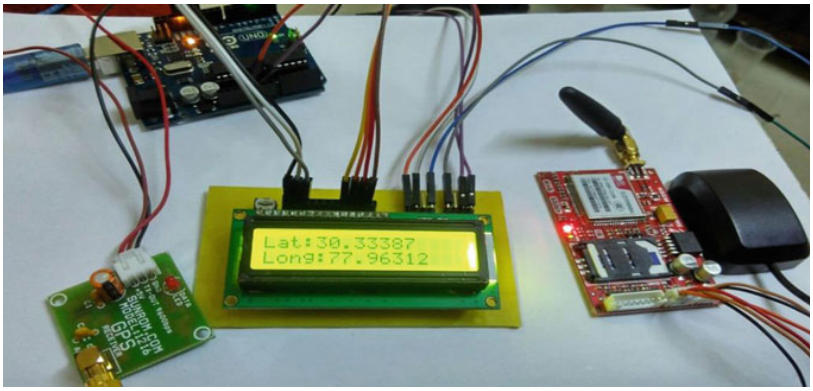


Fig. 3 Proteus simulation of the system circuit diagram

4 Result and Conclusion

In this paper, an efficient controller-based luggage tracking system for airport luggage was proposed. A number of technologies have been implemented to speed these processes but one technology that has the potential to revolutionize baggage handling technique is controller-based technique. This system helps us to find the luggage in real-time with the help of user mobile. This system is different from RFID system. User can track their luggage from anywhere from world. The system provides significant improvement in communication between user and luggage. This will improve passenger security and satisfaction as well as reducing delays in flight caused by mishandled luggage.



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