

CHAPTER-6

ADVANCED PROJECT

Advanced Level Project

Smart Baggage Tracker using IoT

A Smart Baggage Tracker using IoT is designed to provide travelers with real-time monitoring and tracking capabilities for their luggage, ensuring security and peace of mind throughout their journey.

1. End Users:

- End users of the Smart Baggage Tracker include travelers, airlines, airport staff, and baggage handling companies.
- Travelers benefit from knowing the real-time location and status of their luggage, reducing the risk of loss or theft.
- Airlines can use the system to streamline baggage handling processes, improve customer satisfaction, and reduce liability for lost luggage claims.
- Airport staff can monitor baggage movements and identify potential issues or delays in baggage handling operations.
- Baggage handling companies can enhance efficiency and accuracy in sorting, tracking, and delivering luggage to its final destination.

2. Solutions and Propositions:

- The Smart Baggage Tracker system consists of IoT-enabled tracking devices attached to luggage, equipped with GPS, Wi-Fi, Bluetooth, or cellular connectivity.
- These tracking devices continuously transmit location data to a centralized monitoring platform or mobile application.
- Travelers can access real-time updates on their luggage's whereabouts through the mobile app or web interface, receiving notifications when their luggage

reaches certain checkpoints or if there are any deviations from the planned route.

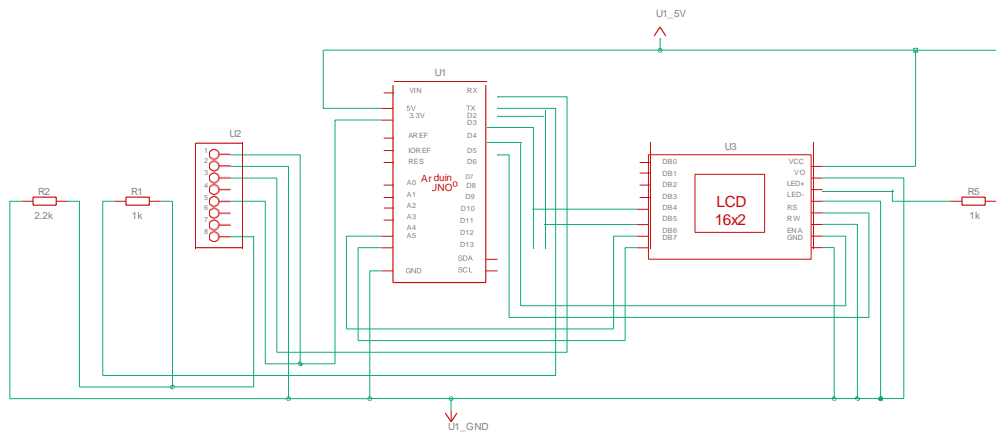
- Airlines and baggage handling companies can use the tracking data to monitor the movement of luggage through airport facilities, track loading and unloading processes, and identify any irregularities or delays.
- The system may include features such as geofencing to alert travelers when their luggage is approaching or leaving designated areas, as well as tamper detection to notify users of unauthorized access or interference with their luggage.
- Integration with existing airline and airport systems allows for seamless communication and coordination between different stakeholders involved in the baggage handling process.

3. Project Modeling:

- Project modeling involves defining the scope, objectives, requirements, stakeholders, resources, and timeline for the development and implementation of the Smart Baggage Tracker system.
- It includes selecting suitable tracking devices, communication protocols, data management solutions, and IoT platforms for the project.
- User interface design and user experience (UI/UX) considerations are essential for creating intuitive and user-friendly mobile apps and web interfaces for travelers and stakeholders.
- Security measures such as encryption, authentication, and access control should be implemented to protect travelers' data and ensure the integrity of communication channels.
- Stakeholder engagement and collaboration are essential throughout the project lifecycle to address user needs and preferences and ensure the successful adoption of the system.

Table 6 Components of smart baggage tracker using IoT

Name	Quantity	Component
U1	1	Arduino Uno R3
U2	1	Wifi Module (ESP8266)
R1, R5	2	1 k Ω Resistor
R2	1	2.2 k Ω Resistor
U3	1	LCD 16 x 2

Schematic View**Project source code**

The project source code is written purely in C++ programming language due to it's ease of writing code.

C++ Program:

```
#include<string.h>
#include <LiquidCrystal.h>
LiquidCrystal lcd(5, 4, 3, 2, A4, A5);
String ssid   = "Simulator Wifi";
String password = "";
String host   = "api.thingspeak.com";
const int httpPort = 80;
String uri = "/channels/1212200/fields/1.jsonapi_key=C1L2SHVVMW3W6K24&results=2";
char str[70];
String gpsString;
char *test="$GPGGA";
```

```
String latitude="No Range    ";
String longitude="No Range    ";
int temp=0,i;
boolean gps_status=0;
int setupESP8266(void) {

    // Start our ESP8266 Serial Communication
    Serial.begin(115200);
    Serial.println("AT");
    delay(10);
    if(!Serial.find("OK")) return 1;
    // Connect to 123D Circuits Simulator Wifi
    Serial.println("AT+CWJAP=\"" + ssid + "\",\"" + password + "\"");
    delay(10);
    if(!Serial.find("OK")) return 2;
    // Open TCP connection to the host:
    Serial.println("AT+CIPSTART=\"TCP\",\"" + host + "\",\" + httpPort);
    delay(50);
    if(!Serial.find("OK")) return 3;
    return 0;
}

void anydata(void) {
    //Construct our HTTP call
    String httpPacket = "GET " + uri + " HTTP/1.1\r\nHost: " + host + "\r\n\r\n";
    int length = httpPacket.length();

    //String httpPacket = "GET https://api.thingspeak.com/channels/1104800/fields/1.json?
    api_key=CX5ZHR91RBPV0RSW&results=2";
    //int length = httpPacket.length();

    // Send our message length
    Serial.print("AT+CIPSEND=");
    Serial.println(length);
    delay(10);
```

```
// Send our http request
Serial.print(httpPacket);
delay(10);
String ch;
ch = Serial.readString();
Serial.println(ch);
for(int i=369;i<453;i++)
{
    gpsString += ch[i];
}
Serial.println(gpsString);
gps_status=0;
int x=0;
while(gps_status==0)
{
    int str_lenth=81;
    latitude="";
    longitude="";
    int comma=0;
    while(x<81)
    {
        if(gpsString[x]==','){
            comma++;
        }
        if(comma==2)
            latitude+=gpsString[x+1];
        else if(comma==4)
            longitude+=gpsString[x+1]
        x++;
    }
    int l1=latitude.length();
    latitude[l1-1]=' ';
```

```
l1=longitude.length();
longitude[l1-1]=' ';
lcd.clear();
lcd.print("Lat:");
lcd.print(latitude);
lcd.setCursor(0,1);
lcd.print("Long:");
lcd.print(longitude);
Serial.print("Lat: ");
Serial.print(latitude);
Serial.print("\tLong: ");
Serial.println(longitude);
i=0;x=0;
str_lenth=0;
delay(2000);
}
if(!Serial.find("SEND OK\r\n")) return;
}

void setup() {
  //Serial.println(gpsString);
  lcd.begin(16,2);
  Serial.begin(9600);
  lcd.print("Baggage Tracking");
  lcd.setCursor(0,1);
  lcd.print("  System  ");
  delay(4000);
  lcd.clear();
  delay(2000);
  setupESP8266();
  anydata();
}

void loop() {
```

```
anydata();  
}
```

Output:

lat:5106.9792 long:11402.3003

lat:5117.5643 long:11678.7855

