SANKALCHAND PATEL UNIVERSITY
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Shri C. J. Patel College of Computer Studies, Visnagar

SSIP

Student Startup & Innovation Policy

- By Team Elite

Name of Innovator: (Team Leader): Panchal Harshkumar M.

Name of Team: Team Elite

Team ID:

Title of Innovation: Smart Dustbin

Duration of the Project:

- By Team Elite

Details Of Mentor

Name : Patel Yogeshbhai
Institute Name : Shri C J Patel College Of Computer Studies
Department: Faculty Of Computer Science
Email-ID : yjpatel.fcs@spu.ac.in
Mobile No.: 9723862458

Name : Shanavajkhan Pathan
Institute Name : Shri C J Patel College Of Computer Studies
Department : Faculty Of Computer Science
Email-ID : sapathan.fcs@spu.ac.in
Mobile No.:98988 08805

Details of Team Member

Details Of Team Leader:

Name : Panchal Harshkumar M.
Institute Name : Shri C J Patel College Of Computer Studies
Department : Faculty Of Computer Science
Semester : VI
Enrollment No.: 2023095900009962
Email-ID : harshpanchal2125@gmail.com
Mobile No.: 9574702484

Name : Hingu Krupa H.
Institute Name : Shri C J Patel College Of Computer Studies
Department: Faculty Of Computer Science
Semester : VI
Enrollment No.: 2023095900013503
Email-ID : krupahingu@gmail.com
Mobile No.: 9016959817

Name : Patel Krupa S.
Institute Name: Shri C J Patel College Of Computer Studies
Department : Faculty Of Computer Science
Semester : VI
Enrollment No. : 2023095900013511
Email-ID : krupaaptel23102005@gmail.com
Mobile No.: 9664847465

Name: Suthar Drashti A.
Institute Name: Shri C J Patel College Of Computer Studies
Department: Faculty Of Computer Science
Semester: VI
Enrollment No. : 2023095900013283
Email ID: drashtisuthar26@gmail.com
Mobile No.: 8511265295

Aim and Objective

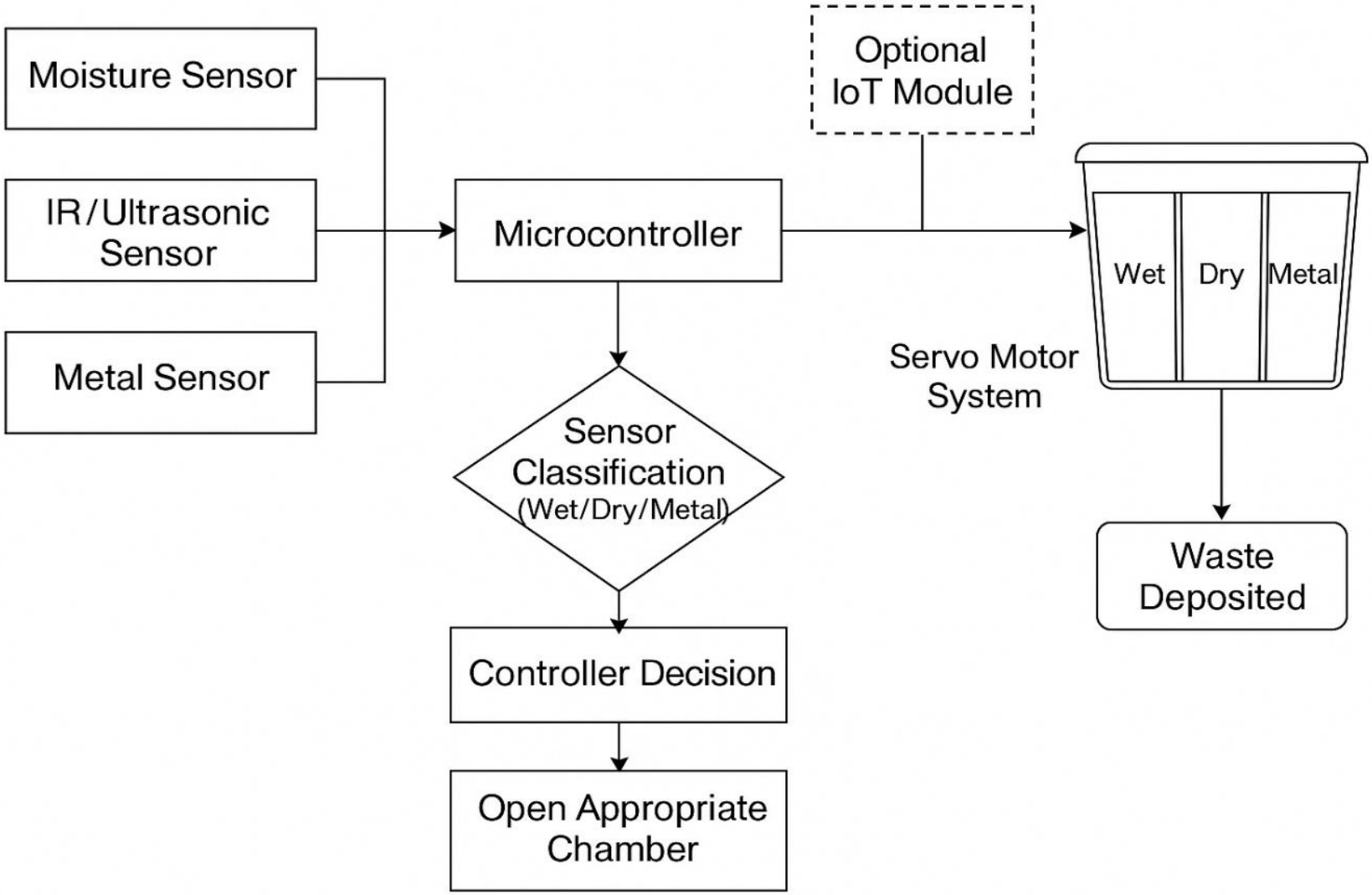
- Aim:

  - To develop a sensor-based smart dustbin that segregates wet, dry, and metal waste.

- Objectives:
  - Automatically detect and segregate waste type.
  - Promote hygiene and cleanliness.
  - Support sustainable development goals.
  - Encourage innovation among students.

Problem Statement

- Manual segregation is unhygienic and inefficient.
- Mixed waste leads to pollution and poor recycling.
- Smart segregation aids Swachh Bharat and smart city goals.



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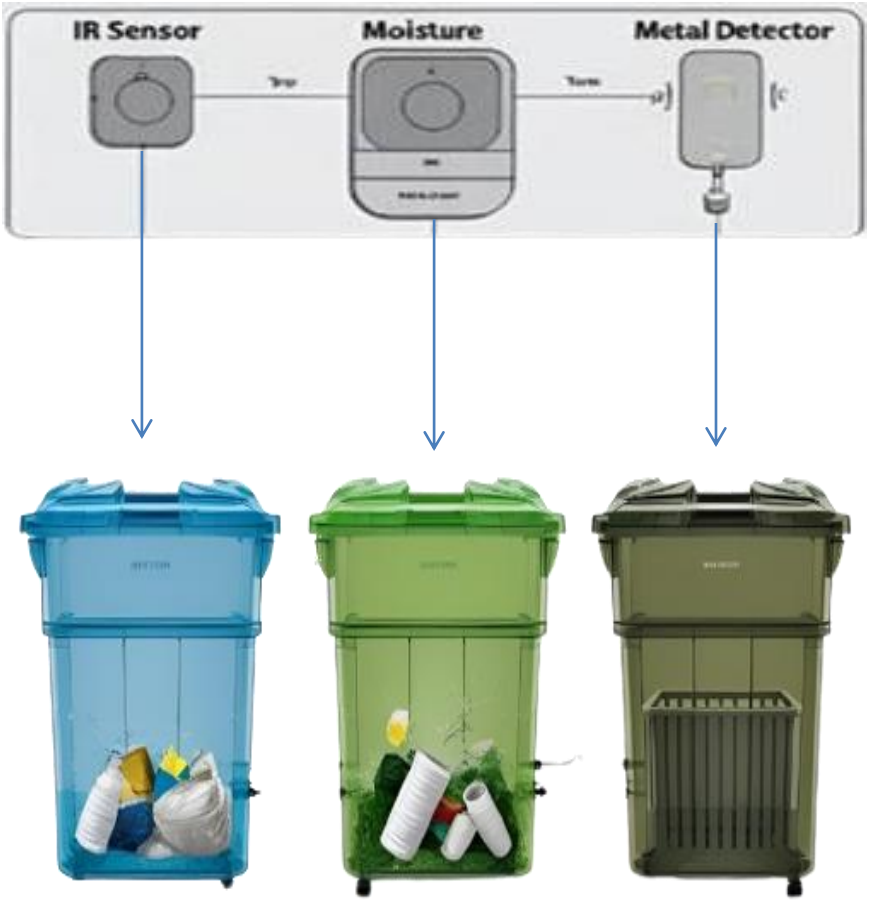
Proposed Solution (Diagram)



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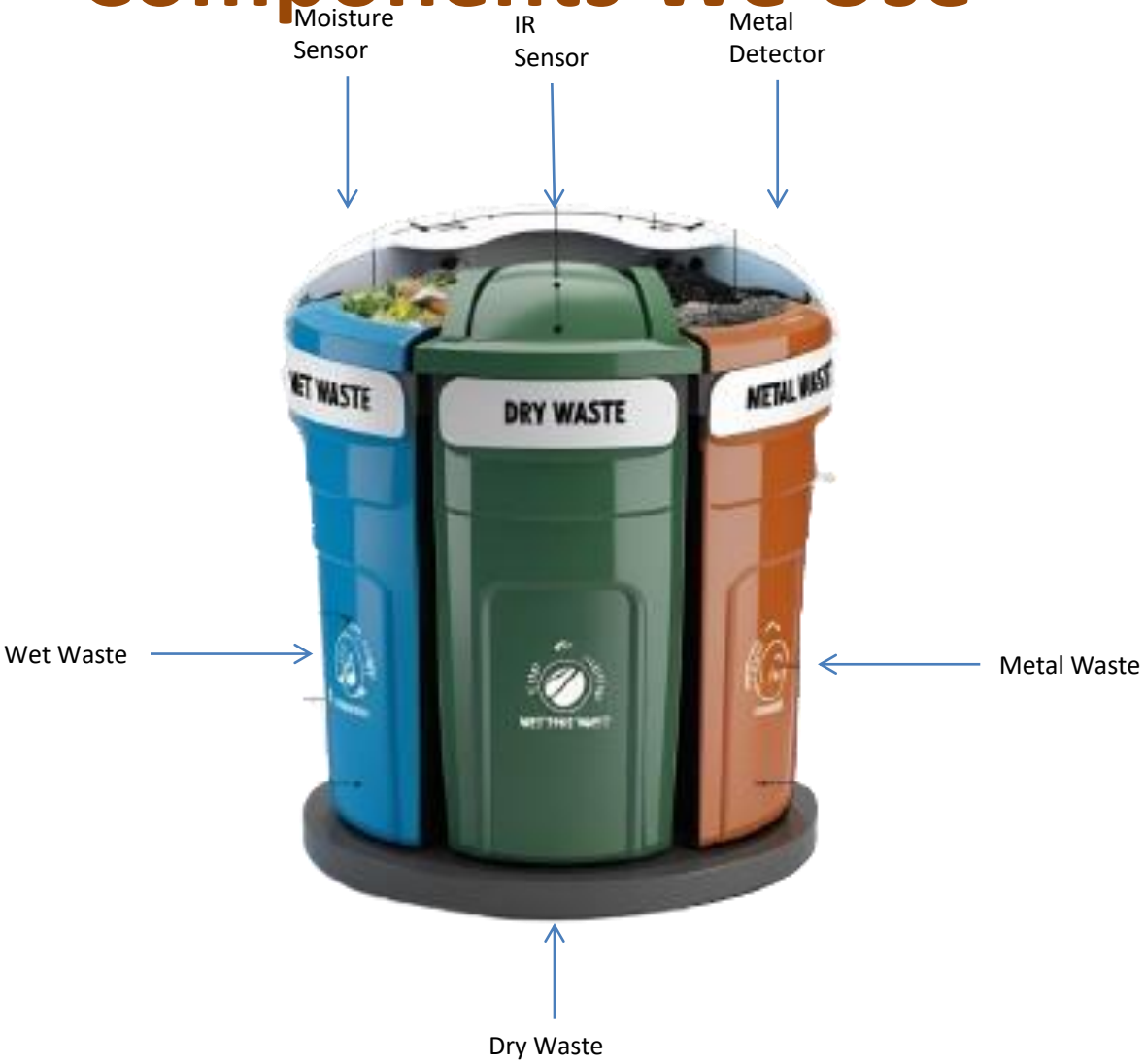
Proposed Solution

- Microcontroller processes sensor input.
- Servo motor opens corresponding bin section.
- Powered by battery or solar.
- Optional: mobile app, GPS tracker, fill-level alert.

Technical Components

Component	Purpose
Moisture Sensor	Detect wet waste
Capacitive/Inductive Sensor	Detect metal content
IR/Ultrasonic Sensor	Object/bin level detection
Rasberry pi5/Arduino	Microcontroller
Servo Motors	Chamber movement

Components We Use



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Innovation and Uniqueness

- Triple chambered design for automatic segregation.
- Sensor fusion for accuracy.
- IoT-ready for smart city applications.
- Real-time monitoring and alerts.

Target Users / Beneficiaries

- Hospitals (For Ex. –Nootan Hospital)
- Government Offices
- Urban Local Bodies & Smart Cities
- Educational Institutions
- Residential Societies

Budget :

Item	Estimated Cost
Sensors (Moisture, IR, Metal)	₹3000
Microcontroller (ESP32/Arduino)	₹5000
Servo Motors	₹1500
Battery/Solar	₹2000
Chassis/Enclosure	₹1500
Miscellaneous	₹1000
App/Cloud Services (if applicable)	₹1800
Total :	₹15800

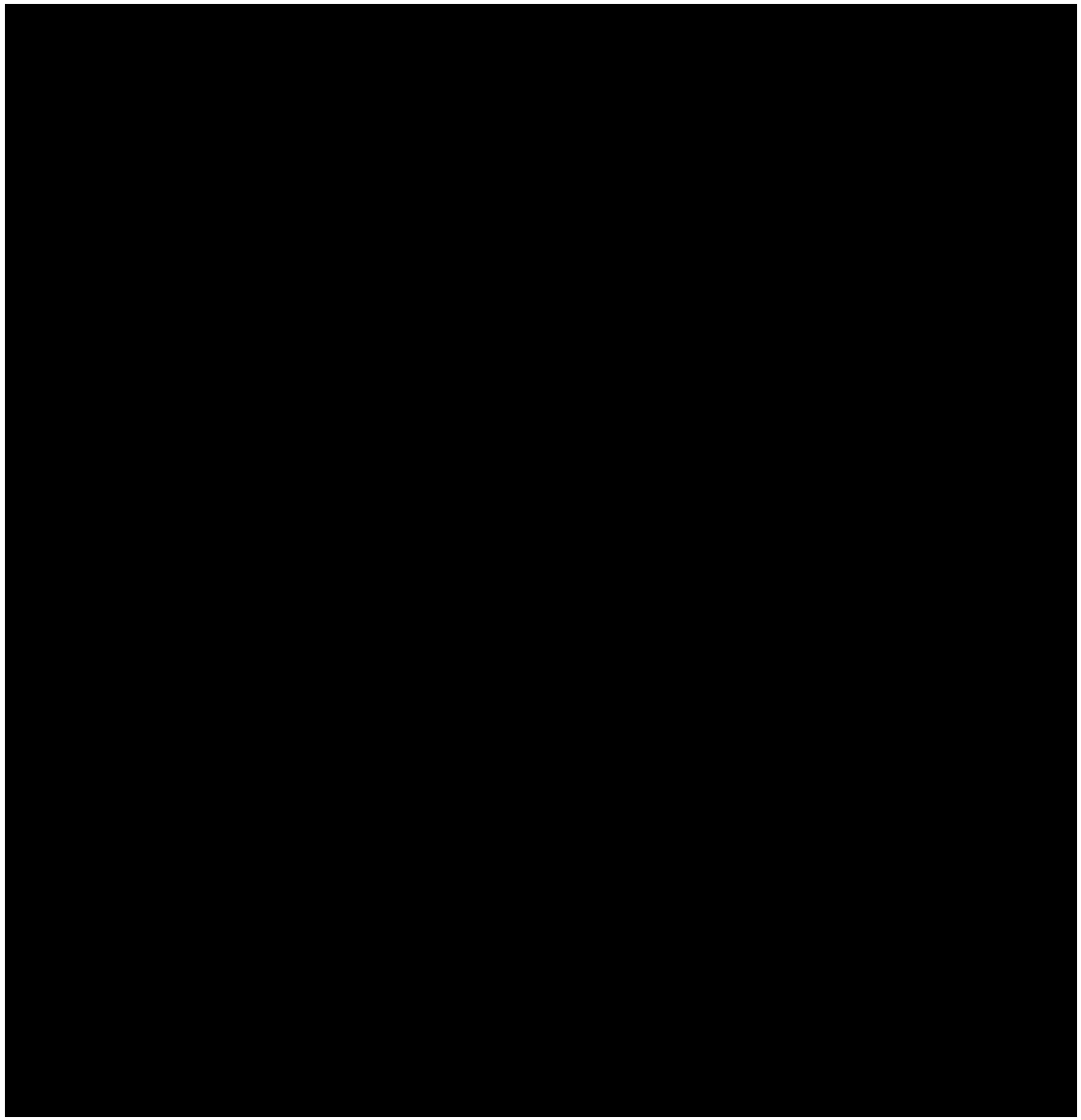
Expected Outcome

- A functional prototype of smart dustbin.
- Promotes waste segregation at source.
- Supports smart and clean environments.
- Scalable and incubatable solution.

Future Scope

- Bio-Waste Processing
- E-Waste Handling Module
- Smart Dashboard & Analytics
- Mobile App Integration
- Solar-powered enhancements

Automatic Waste Segregation Dustbin



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Student Startup & Innovation Policy

- By Smart Student

Name of Innovator: (Team Leader): Panchal Harshkumar M.

Name of Team: Smart Student

Team ID:

Title of Innovation: Smart Luggage System

Duration of the Project:

Details Of Mentor

Name : Patel Yogeshbhai
Institute Name : Shri C J Patel College Of Computer Studies
Department: Faculty Of Computer Science
Email-ID : yjpatel.fcs@spu.ac.in
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Semester: VI
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Email ID: drashtisuthar26@gmail.com
Mobile No.: 8511265295

Aim and Objective

- Aim:

  To develop a smart luggage system with theft detection, GPS tracking, and real-time alerts.

- Objectives:

Detect unauthorized access, impact, and movement.
Provide real-time GPS location updates.
Send alerts via SMS/cloud without internet dependency.
Support item monitoring with sensors.

Current Status

- A working prototype has been built using:

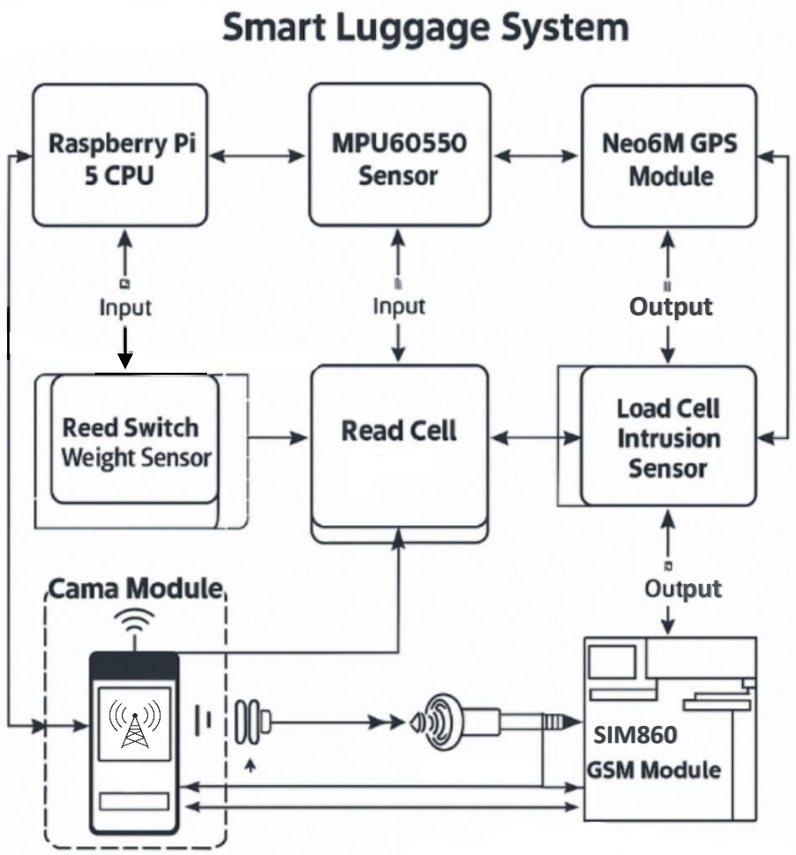
  - MPU6050 for shock detection
  - Neo-6M GPS for location
  - Reed switch & Raspberry Pi 5 for intrusion capture
  - Load cell for detecting item addition/removal
  - SIM860GSM module for SMS-based communication

Proposed Methodology and Plan of Work

- Workflow:
  Detect shock → Send GPS alert
  Detect opening → Take photo
  Detect item changes → Send image + alert
  All alerts sent via GSM (SMS/Cloud)

- Modules Used:
  MPU6050, Neo-6M GPS, Raspberry Pi 5 , Load Cell, SIM860GSM
  No dependency on Wi-Fi/Bluetooth

System Architecture Block Diagram



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ProtoType Architecture

Justification and Novelty

- Justification:

  Addresses common issues during travel: theft, misplacement, and tampering.

- Novelty:

  Independent operation using GSM(Global System for Mobile Communication)
  Combines AI (optional) , IoT , and low-cost hardware
  Ideal for travelers with internet access
  Customizable and scalable

Year-wise Budget and Timeline

- Year 1:
  Component procurement, prototype development.
  Testing and validation

- Estimated Budget: 43,000

Deliverables and Beneficiary

- Deliverables:
  A fully functional smart luggage system
  Documentation and user manual
  Potential mobile app for remote alerts

- Beneficiaries:
  Travelers (air/train/intercity)
  Luggage manufacturers
  Tourism and transport industry

Budget

Component	Purpose	Approx. Cost (INR)
Raspberry Pi 5 , Raspberry Pi Camera Module 3	Microcontroller with Camera	₹19,000
SIM800L GSM Module	SMS/Cloud Alerts	₹2300
Neo-6M GPS Module	Global Positioning System	₹2600
MPU6050	Shock/Impact Detection	₹500
Load Cell + HX711	Weight Detection (items added/removed)	₹1000
Magnetic Reed Switch	Detect Bag Opening	₹500
Li-Po Battery + Charger	Power Supply	₹2000
MicroSD Module	Store Images/Data	₹600
Wires, PCB, Breadboard	Circuit Setup	₹1500
Domain and subscriptions	web hosting	₹5000
Cables: (jumper/USB/GPS Antenna & etc….)	Connecting module	₹3000
Miscellaneous	Other	₹5000
Total		₹43,000

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Future Scope :

1.Mobile Application.
2.AI-based Theft Detection.
3.Solar-Powered Charging System.
4.Voice Assistant Integration.
5.Geofencing Alerts.
6.Smart Locking System.
7.Advanced Sensors.
8.Multilingual Alert System.
9.Integration with Airline Systems.
10.Commercialization & Packaging.

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The Future Of Secure Travel

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