



IoT and Embedded Systems

1. Smart Waste Management System (Problem ID: HACK-8336)

Description: This project involves creating a smart waste management system that uses IoT sensors to track the amount of waste in bins and send real-time data to a central system for waste collection scheduling.

Problem Solving: This system optimizes waste collection by notifying the maintenance team only when the bins are full.

Example: An IoT sensor on a trash bin detects when it's full and sends a notification to the college staff, helping them plan collection routes more efficiently.

2. Smart Parking System with AI (Problem ID: HACK-2323)

Description: A system that uses AI and sensors to detect available parking spaces in real time and guide users to the nearest free spot. It can be integrated with a mobile app for easy tracking.

Problem Solving: This system reduces parking time and frustration by directing drivers to available spots instantly.

Example: A student arrives on campus, opens the parking app, and the AI suggests the nearest free parking space. It also allows students to reserve a spot in advance.

3. College Health Monitoring System (Problem ID: HACK-2754)

Description: A health monitoring system that tracks students' health metrics like body temperature, heart rate, and steps using wearable devices and updates a centralized database.

Problem Solving: This system can provide early alerts for potential health issues and streamline health services.

Example: A student who shows signs of fever and fatigue receives an alert on their phone, and college health services are notified to take appropriate action.

4. Smart Campus Energy Management System with Predictive Analytics(Problem ID: HACK- 1578)

Problem Description:

The **Smart Campus Energy Management System** is designed to monitor and reduce energy usage across a college campus. It uses IoT sensors placed in classrooms, labs, and other facilities to collect data on energy consumption. The system then applies predictive analytics to forecast future energy usage and automatically control devices like lights and fans. This helps the campus save electricity, reduce costs, and promote sustainability.

Problem Solving:

To address this problem, sensors are installed in various areas to track real-time energy usage. The collected data is then sent to a central system that uses machine learning models to predict patterns, such as when rooms are most likely to be occupied. Based on these predictions, the system can automatically turn off devices when not in use. For example, if a classroom is empty for a certain period, the system shuts off the lights and air conditioning. This approach not only saves power but also encourages efficient energy use across the campus.

Example:

Suppose a classroom usually remains empty between 2 PM and 4 PM every day. The system detects this pattern over time and learns that this room doesn't need power during those hours. So, it starts turning off all electrical devices automatically during that time. As a result, the college saves energy and reduces its electricity bill without any manual effort.
