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INSTITUTE OF TECHNOLOGY

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Project name : *Environmental Monitoring*

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PROJECT

Building environmental monitoring using IoT involves various components and technologies. Below, I'll provide you with a high level Python code example for a simplified smart public restroom system.

Keep in mind that this is a basic example, and a real-world implementation would require more robust hardware, sensors, and a backend system for managing data

Requirements:

The Components that are required are:

1. Raspberry Pi (or any other IoT device)
2. Sensors (e.g., Temperature sensor, Humidity sensor)
3. IoT Platform (e.g., ThingSpeak for data visualization)
4. Actuators (e.g., LED lights, fans)
5. Relay module for controlling actuators
6. Internet connectivity

PYTHON CODE :

```
import time
import Adafruit_DHT
from gpiozero import LightSensor,
LED import csv
import datetime

# Define GPIO pins for sensors
DHT_PIN = 4 # DHT22 (AM2302) Temperature and Humidity Sensor
LIGHT_SENSOR_PIN = 17 # Light Sensor (LDR)
LED_PIN = 18 # LED (Actuator)

# Create sensor objects
dht_sensor = Adafruit_DHT.DHT22
light_sensor = LightSensor(LIGHT_SENSOR_PIN)
led = LED(LED_PIN)
```

```
# Create a CSV file for data logging
csv_file = "environmental_data.csv"

# Function to read data from the DHT sensor
def read_dht_sensor():
    humidity, temperature = Adafruit_DHT.read_retry(dht_sensor, DHT_PIN)
    return humidity, temperature

# Function to log data to a CSV file
def log_data_to_csv(timestamp, temperature, humidity, light_intensity):
    with open(csv_file, mode='a') as file:
        writer = csv.writer(file)
        writer.writerow([timestamp, temperature, humidity, light_intensity])
    try:
        while True:
            timestamp = datetime.datetime.now()
            humidity, temperature = read_dht_sensor()
```

```
light_intensity = light_sensor.value

# Simulate an actuator based on the light sensor data (e.g., turn on an LED)
if light_intensity < 0.2: # Adjust the threshold as needed
    led.on()
else:
    led.off()
# Log data to the CSV file
log_data_to_csv(timestamp, temperature, humidity, light_intensity)
# Print data to the console
    print(f"Timestamp: {timestamp}, Temperature: {temperature}°C, Humidity: {humidity}%, Light
Intensity: {light_intensity}")
# You can adjust the time interval for data collection
time.sleep(300) # Collect data every 5 minutes (300 seconds)
except KeyboardInterrupt:
    Pass
```

CONCLUSION :

Cutting-edge environmental monitoring technology is transforming the landscape of environmental oversight, not only in public but also private facilities. By harnessing cutting-edge features like occupancy sensors, odor detection systems, and real-time supply level monitoring, these advanced monitoring solutions are ushering in a new era of environmental sustainability, resource efficiency, and heightened user satisfaction.

Looking ahead, the future of environmental monitoring is brimming with potential, as AI-driven systems, voice-activated controls, and blockchain-based solutions loom on the horizon. By embracing these technological breakthroughs, facilities can create forward-thinking environmental monitoring solutions that adapt to the ever-evolving needs and expectations of users, thereby contributing to a greener and more sustainable future.

THANK YOU