ENVIRONMENTAL MONITORING

PROJECT OBJECTIVES

Checking the real time environmental humidity and temperature in near by park

IOT DEVICES DESIGN

- **DHT22 sensor:**It can be used for detecting ambient temperature and humidity, through the standard single-wire interface.

- **Adruino Uno:** Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects. This board can be interfaced with other Arduino boards, Arduino shields, Raspberry Pi boards and can control relays, LEDs, servos, and motors as an output.

- **Data Logging:**Set up a data logging system to record sensor readings over time. This could be done with a microcontroller like Arduino or Raspberry Pi.

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ENVIRONMENTAL MONITORING PLATFORM

- https://wokwi.com/projects/377674649114328065

INTEGRATION APPROACH

- Wi-Fi: IoT devices with Wi-Fi capabilities can connect directly to the internet and transmit data to the monitoring platform through a Wi-Fi network. This method is suitable for devices located within the range of a Wi-Fi access point.

- Cellular (3G/4G/5G):Cellular networks provide wide-area coverage, allowing IoT devices to transmit data over long distances. Cellular connectivity is ideal for remote or mobile IoT devices, such as weather sensors placed in remote locations or vehicles.

- Ethernet: In cases where IoT devices are stationary and located near a wired network connection, they can use Ethernet to transmit data to the monitoring platform.

- LoRaWAN:For low-power, long-range IoT devices, LoRaWAN (Long Range Wide Area Network) is a popular choice. It allows devices to transmit data over long distances with minimal power consumption, making it suitable for outdoor environmental monitoring sensors.

- Bluetooth and Bluetooth Low Energy (BLE): IoT devices can use Bluetooth to communicate with a gateway or a smartphone, which then forwards the data to the monitoring platform. BLE is especially suitable for low-power, short-range applications.

- Zigbee:Zigbee is a wireless communication protocol often used for home automation and industrial applications. It can be used for local environmental monitoring networks where devices communicate through a Zigbee coordinator.

- MQTT (Message Queuing Telemetry Transport):MQTT is a lightweight publish-subscribe messaging protocol commonly used in IoT applications. Devices can publish data to MQTT brokers, which then relay the data to the monitoring platform.

- CoAP (Constrained Application Protocol): CoAP is designed for resource-constrained devices and is often used in IoT applications. It works over UDP or DTLS and is suitable for low-power devices.

- HTTP/HTTPS: IoT devices can send data to the monitoring platform using standard HTTP or HTTPS requests. This method is common when devices have direct internet access.

- Custom Protocols: In some cases, specialized environmental monitoring systems may use custom communication protocols tailored to their specific requirements.

- To implement data transmission from IoT devices to the environmental monitoring platform, you'll need to consider factors such as security, data format, scalability, and integration with the monitoring platform's API or backend systems. Additionally, you may need to set up data preprocessing, storage, and visualization components on the platform to effectively collect, analyze, and present the environmental data received from the IoT devices.