IOT BASED WEATHER ADAPTIVE STREET LIGHITING SYSTEM

SYSTEM ARCHITECTURE

The system architecture of an IoT-based weather adaptive street lighting system typically involves various components and their interactions. Here's an overview of a typical system architecture:

1.Weather Sensors:

Weather sensors are deployed in strategic locations to measure weather conditions such as light intensity, temperature, humidity, rain, fog, or snowfall. These sensors provide real-time data that is used to dynamically adjust the street lighting.

2.Street Lights:

The street lights are equipped with microcontrollers or IoT devices that control their operation. These devices receive commands from the central control system and adjust the lighting intensity based on the weather conditions and other factors.

3.Communication Infrastructure:

A communication infrastructure is established to enable connectivity between the street lights and the central control system. This can be achieved using various communication protocols such as Wi-Fi, cellular networks, or LPWAN technologies like LoRaWAN or NB-IoT.

4.Central Control System:

The central control system serves as the brain of the entire system. It receives data from the weather sensors, processes it, and sends commands to the street lights to adjust their brightness levels. The central control system can be implemented on a cloud platform or a local server.

5.Cloud Platform:

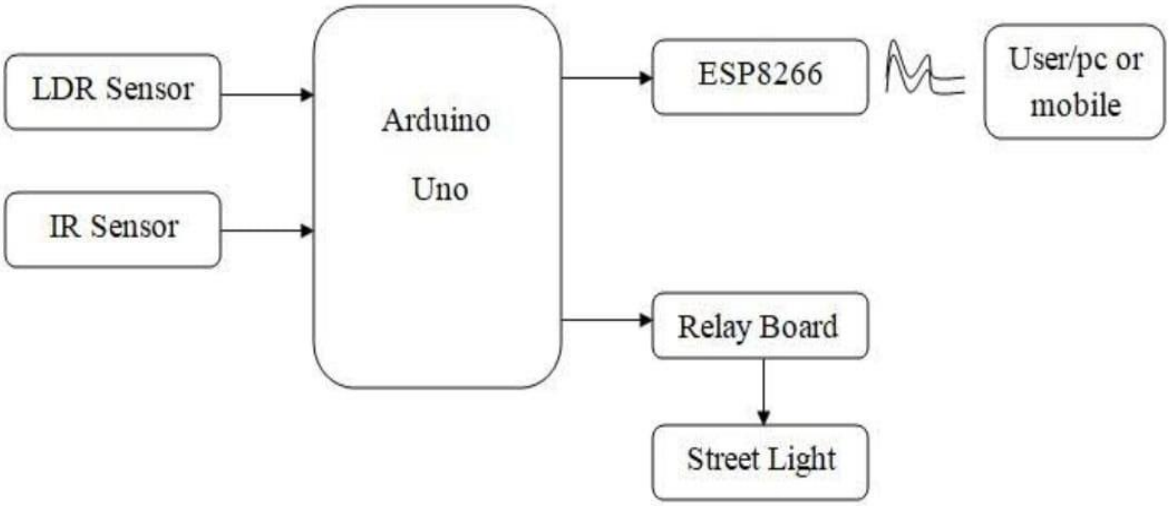
In a cloud-based architecture, the central control system is hosted on a cloud platform such as Azure IoT, AWS IoT, or Google Cloud IoT. The cloud platform provides scalability, reliability, and data processing capabilities. It also enables remote monitoring and control of the street lights.

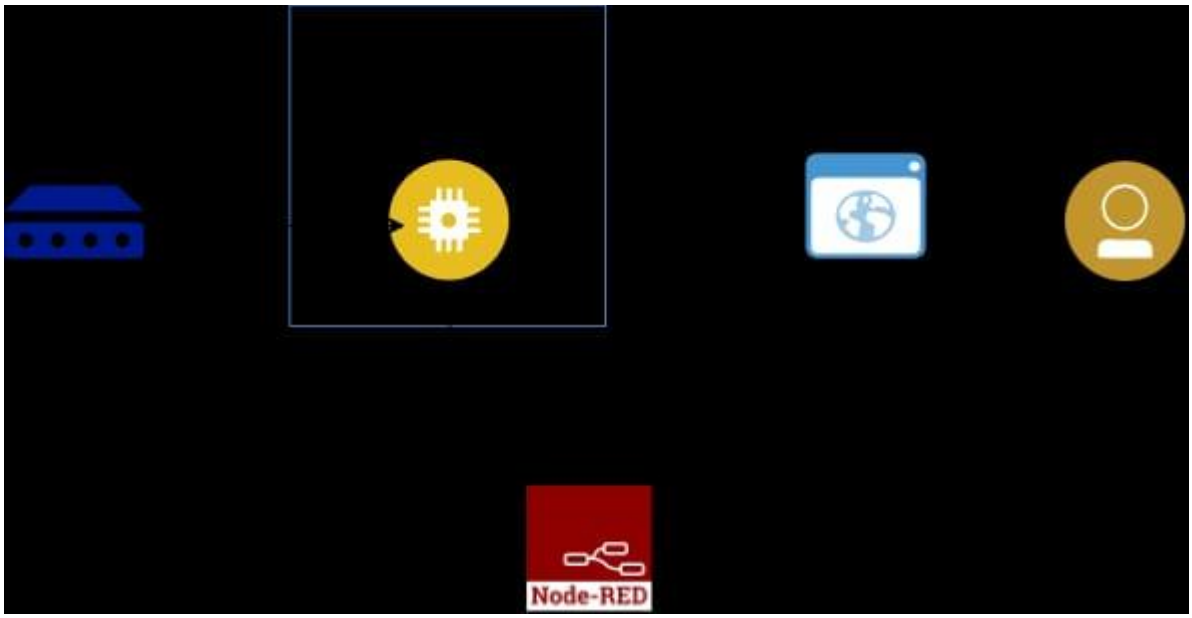
6.Data Storage and Analytics:

The collected data from the weather sensors and street lights can be stored and analyzed on the cloud platform. Data storage mechanisms, such as databases or data lakes, are used to store the data. Data analytics tools and algorithms are employed to extract insights and patterns from the data.

7.User Interface:

A user interface is developed to allow administrators or operators to monitor and control the street lighting system. The interface can be a web-based dashboard or a mobile application that provides real-time status updates, scheduling options, and manual overrides.


LDR Sensor
IR Sensor
Arduino
Uno
ESP8266
User/pc or
mobile
Relay Board
Street Light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8.Security and Authentication:

Security measures, including encryption and secure communication protocols, are implemented to protect the system from unauthorized access or tampering. Authentication mechanisms ensure that only authorized users can access and control the system.

9.Integration with Other Systems:

The IoT-based street lighting system can be integrated with other smart city infrastructure, such as traffic management systems, surveillance cameras, or parking sensors. This integration allows for a more comprehensive and interconnected urban environment.

It's important to note that the specific architecture may vary depending on the project requirements, the chosen technologies, and the scale of the deployment. The architecture should be designed to ensure scalability, reliability, and ease of maintenance for the system.