

Project Design Phase-I

Solution Architecture

Date	06 May 2023
Team ID	NM2023TMID02708
Project Name	Project – IoT Based Weather Adaptive Street Lighting System

Solution Architecture:

Devices:

IoT devices are installed on each street lamp post to monitor weather conditions, including temperature, humidity, and precipitation levels. Light sensors are also installed to measure the amount of ambient light in the environment. Each street lamp is equipped with LED lights and a microcontroller.

Data Collection Layer:

The IoT devices collect data from the environment, including weather conditions and ambient light levels. The collected data is sent to a cloud-based platform for processing and analysis.

Data Processing Layer:

The cloud-based platform processes the collected data using machine learning algorithms to determine the appropriate lighting level for each street lamp. The algorithms take into account factors such as the time of day, weather conditions, and traffic density.

Control Layer:

The platform sends control signals to the microcontrollers on each street lamp to adjust the brightness of the LED lights. The brightness level is adjusted based on the results of the data analysis and the current environmental conditions. The microcontrollers communicate with each other to ensure that the lighting is coordinated across the entire street.

Data Storage and Analysis Layer:

The platform stores historical data on weather conditions, ambient light levels, and lighting levels for each street lamp. The data is analyzed to identify patterns and trends over time. The analysis can be used to optimize the system and improve its performance over time.

User Interface Layer:

A web-based user interface allows administrators to monitor the system and adjust its settings as needed. The interface provides real-time data on weather conditions, ambient light levels, and lighting levels for each street lamp. The interface also provides tools for data analysis and system optimization.

The system uses machine learning algorithms to adjust lighting levels based on environmental conditions and can be optimized over time using historical data and data analysis techniques. The web-based user interface provides administrators with real-time data and tools for system monitoring and optimization.

Example - Solution Architecture Diagram:

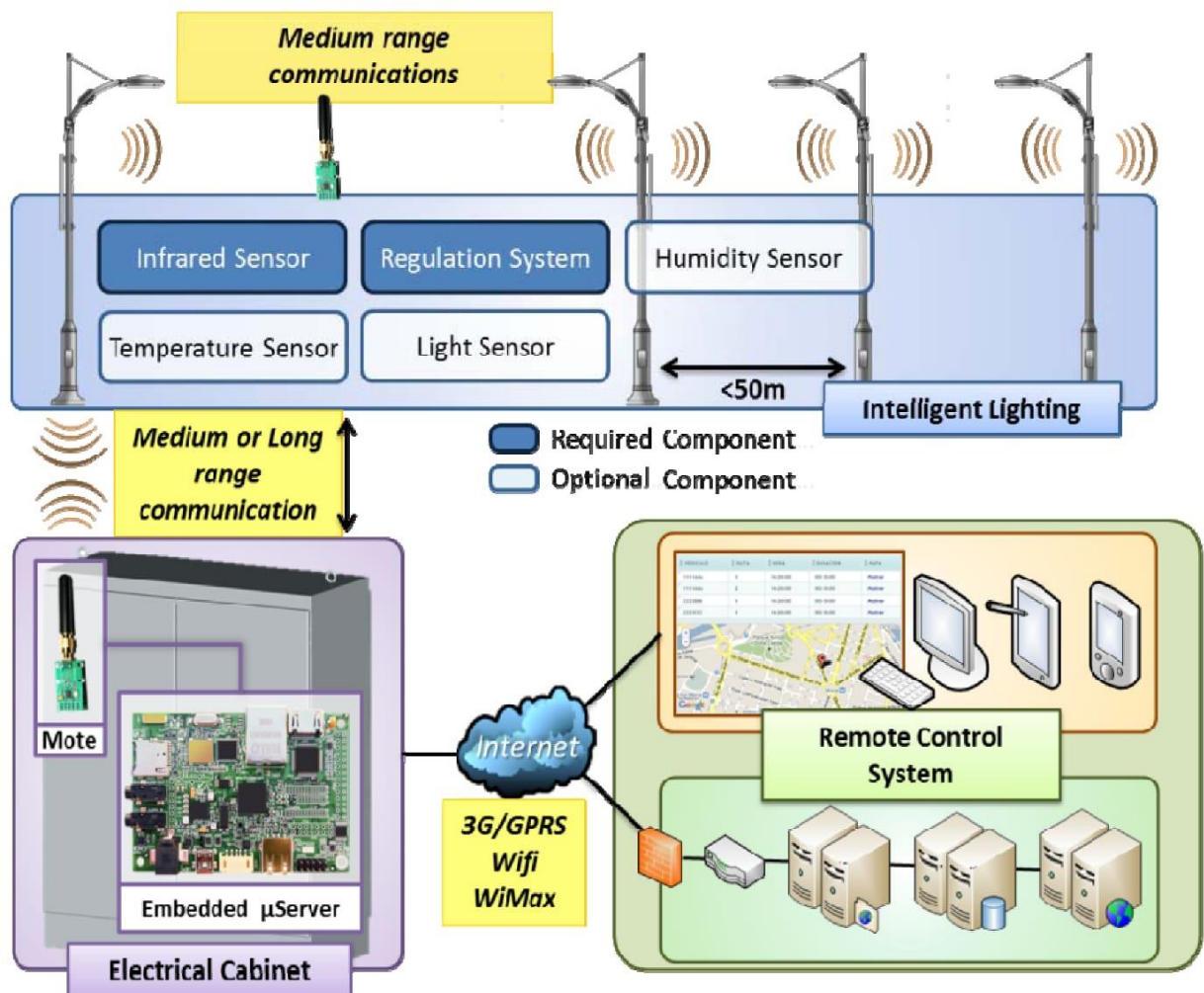


Figure 1: Architecture and data flow of the IoT Based Weather Adaptive Street Lighting System