IoT-Based Home Automation System Using Digital Logic

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**Introduction**

This project presents an IoT-based home automation system using basic sensors and actuators controlled via Arduino and WiFi. It allows automatic control of appliances based on sensor readings like motion, light, temperature, and humidity.

**Objective**

To design and implement a smart home system using Arduino and IoT that automatically controls lights based on motion and light intensity.

**Components Used**

* ESP32/NodeMCU
* DHT11 Temperature and Humidity Sensor
* PIR Motion Sensor
* LDR (Light Dependent Resistor)
* Relay Module
* Breadboard & Jumper Wires
* WiFi Network

**Block Diagram**

(Refer to the uploaded block\_diagram.png in the repository)

**Circuit Diagram**

(Refer to the uploaded breadboard\_circuit.png in the repository)

**Working**

The system detects motion using the PIR sensor and reads ambient light using the LDR. When motion is detected and the light level is below a set threshold, the system turns on a light via the relay. The DHT11 sensor monitors temperature and humidity, and all sensor data is served on a simple web page hosted by the ESP32/NodeMCU over WiFi.

**Advantages**

* Energy-efficient automation
* Remote access via local network
* Affordable and simple to build

**Applications**

* Smart home lighting
* Automated offices
* Energy management systems

**Conclusion**

This IoT home automation system effectively demonstrates the use of sensors and actuators to control appliances based on environmental conditions, making homes smarter and more efficient.