ABSTRACT

In this project, we present the development and deployment of a light detection system utilizing a photoresistor integrated with NodeMCU (ESP8266) microcontroller. The primary objective is to accurately measure the intensity of light in the surrounding environment and provide real-time feedback based on the detected light level. The system is designed to offer a cost-effective and efficient solution for various applications including smart home automation, security systems, and environmental monitoring. The hardware architecture comprises a photoresistor as the light sensor and NodeMCU (ESP8266) as the main processing unit. The photoresistor acts as a variable resistor whose resistance changes in response to incident light intensity. This analog signal is then converted to digital data through the ADC (Analog to Digital Converter) module of NodeMCU, allowing precise measurement of light levels. The firmware for NodeMCU is developed using Arduino IDE, facilitating easy programming and integration with the sensor. The firmware includes algorithms for calibrating and processing the sensor data to obtain accurate light intensity readings. Moreover, the system is equipped with Wi-Fi connectivity, enabling remote monitoring and control via a web interface or mobile application. To evaluate the performance of the light detection system, extensive testing is conducted under various lighting conditions and environmental scenarios. The system demonstrates reliable and responsive operation, providing prompt feedback based on the detected light levels. Additionally, the system's versatility allows for customization and integration with other IoT (Internet of Things) devices, enhancing its applicability in diverse settings. Overall, the developed light detection system offers a practical solution for monitoring ambient light levels with precision and efficiency. Its simplicity, affordability, and scalability make it suitable for deployment in both residential and commercial environments, contributing to enhanced automation, security, and environmental awareness.