

DESIGN AND BUILD DUST DETECTION DEVICES FOR AIR CONDITIONING SYSTEMS IN HOSPITALS

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ABSTRACT

Indoor air quality, particularly in hospital environments, is a crucial factor that affects both patient health and the comfort of medical personnel. Poorly monitored air conditioning (AC) systems can become a source of airborne dust particles, potentially leading to respiratory issues. Therefore, a device capable of monitoring temperature and dust concentration in real-time is essential to support air quality control. This research aims to design and develop a dust and temperature detection device for AC systems using the DHT22 temperature sensor, a Thermogun, and the GP2Y1010AU0F dust sensor. The DHT22 sensor is used for automatic temperature monitoring, while the Thermogun serves as a reference for temperature calibration. The GP2Y1010AU0F sensor is used to detect dust particle concentration in units of $\mu\text{g}/\text{m}^3$. Sensor data is processed by a NodeMCU microcontroller, displayed on an LCD, and transmitted in real-time to the Blynk application as part of an IoT-based monitoring system. Test results show that the device is capable of responsively detecting changes in both temperature and dust levels. The DHT22 sensor showed a reading difference of approximately $\pm 1^\circ\text{C}$ compared to the Thermogun, while the GP2Y1010AU0F sensor recorded increased dust levels in response to nearby activity. This system is effective for real-time and efficient indoor air quality monitoring in hospital rooms.

Keywords: *AC, dust, temperature, DHT22, Thermogun, GP2Y1010AU0F, NodeMCU, IoT*