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Study and Development of a Hybrid Temperature and Humidity Monitoring System

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Abstract: *This paper presents the development and implementation of a temperature and humidity monitoring system tailored for industrial environments. The system utilizes a DHT22 sensor and ESP8266 NodeMCU to collect and transmit real-time environmental data from various factory locations, including the AC lab, chassis assembly, and maintenance room. The data is transmitted wirelessly via Wi-Fi to a local web server and logged into a database managed by PHPMyAdmin. A user-friendly interface displays dynamic graphs of temperature and humidity against timestamps, with alerts and LED indicators triggered by threshold breaches.The prototype demonstrates the system's accuracy, cost-effectiveness, and feasibility in automating the manual recording of environmental data. It effectively showcases its ability to provide continuous real-time monitoring, ensuring optimal environmental conditions are maintained within an industrial setting. The proposed automation reduces the risk of human error, increases efficiency, and provides immediate alerts for any deviations from set parameters, enhancing overall safety and operational efficiency. Further, the system offers a robust solution for real-time environmental monitoring and lays the groundwork for future enhancements and wider adoption in industrial applications.*

Keywords: Temperature and Humidity Monitoring; DHT22 Sensor; ESP8266 NodeMCU; Real-time Data Collection; XAMPP; PHPMyAdmin; Industrial Environment Monitoring