IoT-Enabled Laundry Drying Rack for Smart Home

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Abstract

This study proposes the design and implementation of an IoT-enabled laundry drying rack specifically for smart home applications. It is particularly suitable for residents of tropical regions, where drying clothes mostly depends on sunlight, thus eliminating energy consumption in the drying process. The device consists of a drying rack and clothes hangers. The drying rack features a set of sliding rails and a carriage mechanism that allows clothes to be extended for drying and retracted when they are dry or in the event of rain. The system operates in two modes: auto and manual. In auto mode, the rack automatically retracts the carriage to store the clothes once they are dry, when rain is detected, or when the system detects heavy cloud cover indicating potential rainfall. In manual mode, users can control the movement of the carriage as desired. Additionally, the system enables users to monitor the status of drying clothes and weather conditions through a mobile application. An evaluation of the system's performance in measuring humidity showed that the sensor readings correlated strongly with data from weather services like Weather.com and AccuWeather.com, with discrepancies not exceeding 7%. In terms of operational accuracy, the system demonstrated a performance efficiency rate of 97.87%.

Keywords

Smart clothes drying rack, laundry drying rack, smart home, Internet of Things.