

ZIGBEE Home Automation

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Abstract: *A robust and scalable home automation system has become a critical component in modern smart home environments, driven by demands for energy efficiency, enhanced security, and improved quality of life. The Zigbee protocol, a low-power wireless communication standard, has emerged as a promising solution for seamless integration of heterogeneous devices in home automation networks. This research systematically examines the design, implementation, and performance evaluation of Zigbee-based home automation systems. The manuscript discusses key elements such as network topologies, hardware and software design issues, communication protocols, and integration challenges with existing Internet of Things (IoT) platforms. Experimental results and performance analysis provide insights into energy consumption, reliability, and scalability of the proposed architectures. The analysis also considers interference issues, security implications, and real-world deployment challenges. The study culminates with a discussion on future research directions to optimize system design and foster the integration of emerging smart technologies. The findings are relevant for academics and industry practitioners seeking to advance the state of Zigbee home automation in increasingly complex smart environments*

Keywords: Zigbee; Home Automation; Wireless Sensor Networks; IoT; Smart Home; Energy Efficiency

