IoT-Based Smart Home Automation System

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Abstract: *This paper presents a comprehensive study on the design and implementation of an IoT-based Smart Home Automation System. With the proliferation of smart devices and the increasing integration of technology in daily life, IoT enables enhanced interaction between humans and their living environments. This research investigates the architecture, components, and technologies involved in developing such systems, with a focus on real-time monitoring, automation, security, energy efficiency, and accessibility. Furthermore, the paper evaluates the challenges related to data privacy, interoperability, and power consumption, offering insights into solutions using advanced technologies such as edge computing, AI, and blockchain. Results from a prototype implementation demonstrate significant improvements in home management and user experience, positioning IoT as a critical enabler for future smart living ecosystems*

Keywords: IoT, Smart Home, Automation, Raspberry Pi, ESP32, Home Security, Energy Efficiency, Accessibility, Edge Computing, Smart Sensors