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SMART E-SWITCH FOR SMART HOME

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Abstract:

The Smart switch system is an advanced lighting solution that enables users to control and monitor their home or office electric connections. The system connects to the internet of things and becomes part of the IoT, allowing remote access via a mobile application and voice commands. The proposed work aims to enhance the existing smart switch system by integrating artificial intelligence to develop fully autonomous devices that make decisions based on residents' habits. This research paper describes the design and implementation of a platform for the remote control and monitoring of Wi-Fi smart switches within a home, offering an alternative for the optimal management of electrical energy. The proposed system will improve the quality of life and convenience in the home, provide greater security and more efficient use of energy.

Introduction:

Smart switches are an advanced version of the traditional switchboard, adding features that help automate homes or offices' electrical connections. They allow users to connect their switches to nearby wireless networks and become part of the internet of things (IoT). With a smartphone app or voice commands, users can operate their electrical appliances, making the system convenient and user-friendly. The Smart switch system is the first step in transforming homes into smart homes, allowing the collection and storage of e-switch information that can be used for further processing and analysis.

Relevance:

The Smart switch system is crucial in controlling and monitoring smart appliances and home features such as lighting, windows, and air-conditioning, improving the domestic environment and optimizing energy consumption. By optimizing energy consumption, households have reduced their energy consumption by approximately 5%, promoting energy conservation and sustainable living. The proposed system provides users with an app to control switches and smart appliances with one tap and Alexa device.

Existing Systems:

An extensive literature review was conducted to identify related work. Gram-Hanssen and Darby (2018) proposed the concept of a smart home and its relation to energy management within the home and at the network or grid level. Pan and McElhannon (2018) investigated the rationale, state-of-the-art efforts, enabling technologies, research topics, and typical IoT applications benefiting from edge cloud. Petrolo et al. (2017) proposed an integration to reduce the gap existing in the IoT fragmentation and interact directly with sensors at different layers. Jiang et al. (2019) evaluated the capabilities and behaviors of IoT technologies, including data range and rate, network size, RF channels, bandwidth, and power

consumption. Xie et al. (2018) defined the major requirements for building smart homes, classified according to the specific quality of the building blocks.

Block Diagram:

The basic diagram of the proposed mobile app flow is shown in Figure 1.

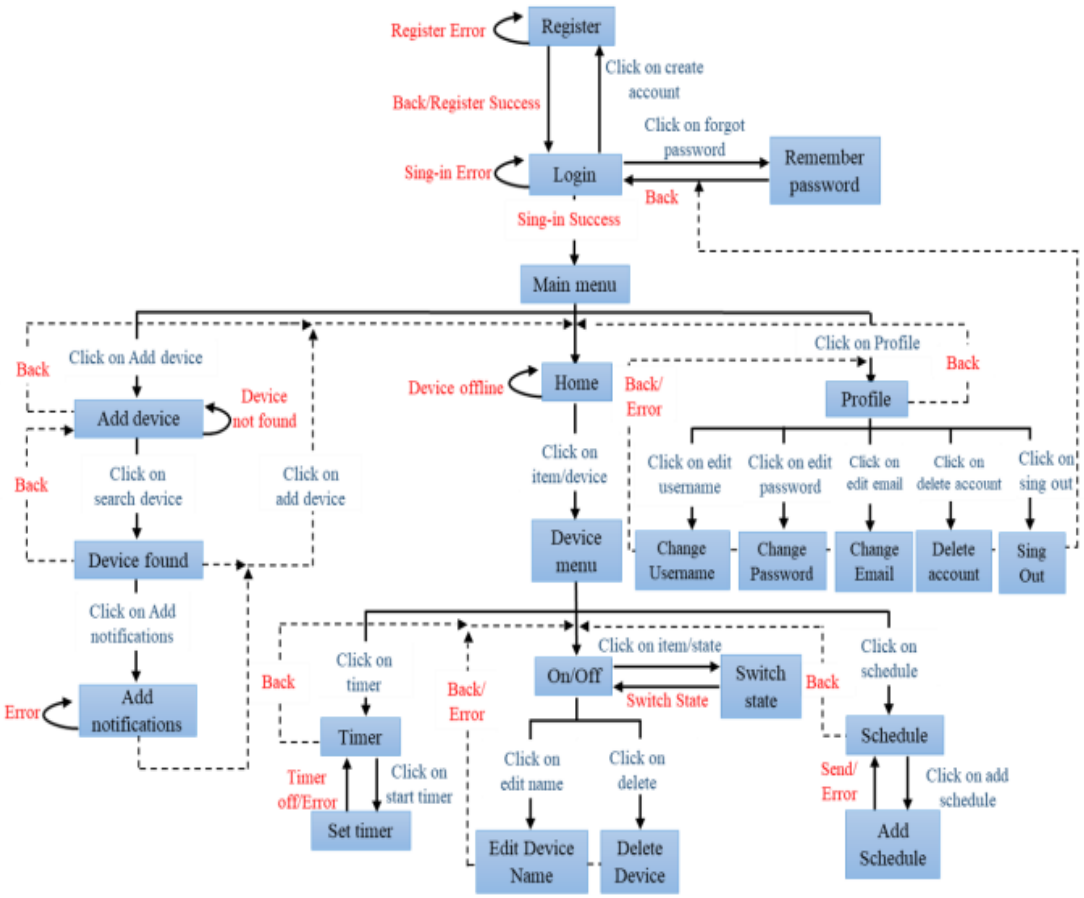

Fig. 1: Basic diagram of the mobile app flow.

Proposed Work:

Remote Control and Monitoring: The system will remotely control and monitor Wi-Fi smart switches within a home. This will enable residents to manage their energy usage more effectively, by turning off devices when not in use or adjusting their usage patterns to optimize energy efficiency.

Artificial Intelligence: The system will incorporate AI to enable autonomous decision-making based on the habits and preferences of the residents. The AI algorithms will analyze data from the smart switches, along with other inputs such as weather forecasts, to optimize energy usage and reduce wastage.

Voice Control: The system will be compatible with voice control via any IoT smart device like Alexa and Google devices. This will make it easier for residents to control their home appliances and manage their energy usage without having to physically interact with the system.

Enhanced Comfort and Security: By controlling and monitoring the main electrical appliances in the home, the system will enhance residents' comfort and security. For example, the system could be programmed to turn on lights or adjust the thermostat when the resident enters a room, or to alert the resident if there is an unusual activity detected in the home.

Efficient Energy Usage: By optimizing energy usage and reducing wastage, the system will provide more efficient use of energy, which will help reduce energy bills and contribute to a more sustainable environment.

Overall, the proposed work aims to develop a fully autonomous and intelligent system that will provide residents with greater comfort, convenience, security, and energy efficiency.

Conclusion:

The Smart switch system is an advanced lighting solution that offers an alternative for optimal management of electrical energy. By integrating artificial intelligence, the proposed system will develop fully autonomous devices that make decisions based on residents' habits, enhancing their comfort and convenience while promoting energy conservation and sustainable living. The system will improve the quality of life and convenience in the home, providing greater security and more efficient use of energy. The system can also be controlled via voice control through any IoT smart device like Alexa.

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