AWS CONNECTED SMART HOME AUTOMATION REDEFINING LIVING SPACES WITH CLOUD-POWERED INTELLIGENCE

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ABSTRACT

This project presents a cutting-edge Smart Home Automation system driven by the AWS Alexa console, signaling the arrival of the future of smart homes. This project seeks to revolutionize home automation experiences by utilizing the AWS Alexa console's capabilities. Users can easily manage devices, keep an eye on security, maximize energy use, and take advantage of voice-activated automation with this system. This Smart Home Automation system guarantees that homes are not only smart but also intelligent, adaptable, and extremely efficient thanks to its smooth integration with the AWS ecosystem.

KEY WORDS:

AWS (Amazon Web Services), Smart Home Automation, Internet of Things (IoT), Cloud Computing, Cloud-Powered Intelligence

INTRODUCTION

The swift progress of Internet of Things (IoT) innovations and cloud computing has greatly changed conventional living spaces into intelligent, interconnected smart residences. Home automation utilizes sensors, actuators, and intelligent devices to facilitate automated management of home functions like lighting, climate control, security, and energy usage. Among different cloud platforms, Amazon Web Services (AWS) has become a strong and scalable option for deploying smart home systems because of its reliable IoT services, instant data processing abilities, and smooth integration with artificial intelligence and machine learning technologies

LITERATURE SURVEY

The swift advancement of smart home technologies has garnered considerable research interest, with numerous studies examining the combination of IoT and cloud computing to improve functionality, scalability, and user experience. Initial smart home automation systems mostly depended on localized controllers and exclusive protocols, restricting interoperability and flexibility among various device ecosystems. Alam et al. emphasized the significance of IoT in facilitating smooth interactions among devices and integrating context-aware services within intelligent settings. Their study highlighted that a centralized, cloud-based method could solve scalability challenges and enhance overall system efficiency.The rise of powerful cloud platforms has led to numerous studies suggesting architectures that use cloud services for

RELATED WORK

Home automation has advanced considerably with the incorporation of Internet of Things (IoT) and cloud computing technologies. Initial systems depended on local controllers, which restricted scalability and remote access. To tackle these issues, scholars suggested cloud-enabled smart home frameworks that facilitate real-time oversight, device

management, and data coordination. Alam et al. showcased the implementation of IoT frameworks to facilitate interoperability and context-aware functionalities in intelligent settings, whereas Khan et al. introduced cloud-based models that enhanced scalability and user access via web and mobile interfaces. Nevertheless, these methods encountered issues concerning latency and reliance on a constant internet connection. Recent research has utilized Amazon Web Services (AWS) for smart home automation because of its scalable and secure IoT solutions. Sharma and Gupta demonstrated that AWS IoT Core and serverless solutions effectively manage substantial amounts of sensor data and facilitate smart automation. Moreover, studies on security and hybrid edge–cloud frameworks have highlighted the significance of secure authentication and decreased latency.

EXISTING SYSTEM

Current smart home automation systems mainly depend on local controllers or simple IoT platforms to control household devices like lighting, security, and appliances. These systems generally utilize microcontrollers and short-range communication methods, facilitating restricted automation and manual operation via mobile or web applications. Although operational, these systems frequently fall

short in scalability, adaptability, and real-time insights. Many conventional implementations fail to fully utilize cloud features, leading to restricted data processing, reduced remote access, and little assistance for smart decision-making. Moreover, challenges concerning interoperability, security, and system scalability continue to be considerable obstacles. These constraints emphasize the necessity for a strong cloud-based solution to enable intelligent, expandable, and secure smart home automation

PROPOSED SYSTEM

The proposed system offers a framework for smart home automation connected to AWS that makes use of cloud-driven intelligence to enhance user convenience, security, and scalability. In order to enable real-time monitoring, automated management, and intelligent decision-making in the context of smart homes, the system integrates IoT-capable sensors and actuators with Amazon Web Services (AWS). Under this framework, intelligent devices collect operational and environmental data, which is then safely sent to AWS IoT Core using lightweight communication protocols. While cloud databases keep track of device statuses and user preferences, AWS services like

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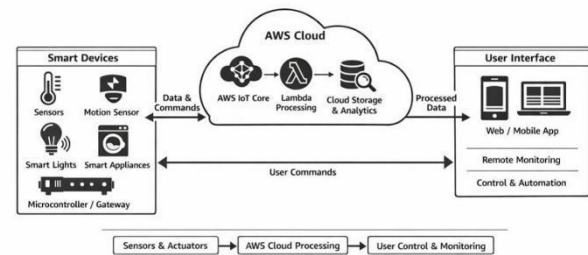
SYSTEM ARCHITECTURE

Fig 1: System Architecture

METHODOLOGY DESCRIPTION

To enable secure data gathering, cloud processing, and smart device management, the proposed AWS-integrated smart home automation system utilizes a structured methodology. The initial stage of the process involves gathering data from IoT-enabled sensors and actuators distributed across the smart home setting. These devices connect to a microcontroller or gateway that employs lightweight

communication protocols such as MQTT to gather sensor data and transmit it to the cloud.AWS IoT Core authenticates device identities and ensures secure communication once the data is sent to the AWS cloud. Sensor data is received and processed by AWS Lambda functions, which implement predefined automation rules based on user preferences and environmental factors. Cloud storage services retain device states and processed data for later reference, analysis, and oversight.

RESULTS&DISCUSSION

These improvements will further strengthen the intelligence, responsiveness, and adaptability of the smart home automation framework. retain device states and processed data for later reference, analysis, and oversight. These devices connect to a microcontroller or gateway that employs lightweight communication protocols such as MQTT to gather sensor data and transmit it to the cloud.AWS IoT Core authenticates device identities and ensures secure communication once the data is sent to the AWS cloud
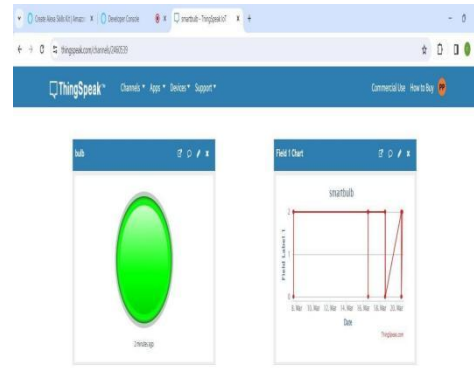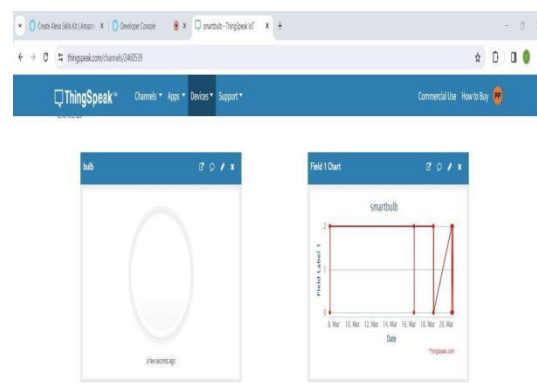

Fig 2: Bulb on Diagram

Fig 3: Bulb off Diagram

CONCLUSION AND FUTURE ENHANCEMENT:

This document introduced a smart home automation system connected to AWS that utilizes cloud-based intelligence to improve convenience, scalability, and security in contemporary living environments. The suggested system facilitates real-time monitoring, smart automation, and remote management of home appliances by connecting IoT-enabled devices with AWS cloud services. Utilizing AWS IoT Core along with serverless processing guarantees secure communication, effective data management, and excellent system dependability.In summary, the suggested

system showcases the efficiency of cloud-based structures in transforming smart home settings. It provides enhanced flexibility, energy savings, and user-focused control in comparison to conventional automation systems

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