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MOBILE BASED HOME AUTOMATION USING IOT

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ABSTRACT

The Internet of Things (IoT)-based smart home automation system is intended to provide a connected and intelligent environment in a domestic setting. The system allows for the automation, control, and monitoring of numerous household systems and devices by utilizing sensors, actuators, and internet connectivity. The smart home automation system improves inhabitants' convenience, energy efficiency, security, and general comfort by integrating IoT technology.

Keywords: Home Automation System, Wi-Fi Control, Smart lighting, Mobile app, Internet of Things (IoT).

I. INTRODUCTION

The home animation serves as a central control point for all of the devices in the house. Nowadays, more tasks are being carried out automatically every day, which is known as automation. Typically, the fundamental duties of remotely or locally turning on and off a device and more. The underlying wireless data network, such as IEEE 802.11 (Wi-Fi), is used in the RF-based system idea. In recent years, wireless networks have become more and more popular in homes, and because to advancements in computer technology, personal digital devices now frequently have the ability to connect via wireless networks. Therefore, in a residential setting with a high data rate, it is appropriate to employ an RF-based location determination systems are appropriate for estimating the location of personal digital devices in homes with high data rate transmission; WLANs that enable multimedia applications may be possible.

A computer-based system, a mechanical switch, a single light, a loudspeaker with a microphone, or some sort of personal remote controller using a regular PC, laptop, or table PC with stand-alone software or a web-based user interface are just a few of the many possible ways and places to control an intelligent home automation system. All of a home's electrical gadgets will soon be connected to a network. The network of physical items, or "Things," that are integrated with sensors, software, electronics, and network connectivity and that allow them to exchange and gather data is known as the internet of things (IOT). By enabling remote object sensing and control via current network infrastructure, IOT opens the door to more direct integration between computer-based systems and the physical world, improving efficiency, accuracy, and financial gains.

II. METHODOLOGY

A.GSM Based Home Automation System:

Global System for Mobile Communication is used for home automation [9]. GSM is characterized by its batteryoperated nature and use of the mobile network. It is composed of two key parts: the microcontroller and the GSM modem. The GSM modem serves as the end-user's communication interface with the Home Automation System (HAS). Both the actuators and sensors of the household appliances are connected to the GSM by the microcontroller. Here, the users are identifiable by their cellphone numbers, which are stored during configuration in the Electrically Erasable Programmable Read-Only Memory (EEPROM) of the system. SMS (Short Message Service) transmitted from the GSM modem receives information from the authorized user via the mobile device over the GSM network. The AT89C55 microcontroller, which receives and decodes the instructions, is coupled to the GSM modem. Relays, which are coupled to the sensors and actuators that operate



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or monitor the device, are utilized to establish serial communication between the GSM modem and the AT89C55 microcontroller.



Figure 1. GSM based Home Automation System

B. Wi-Fi Control:

Wi-Fi is essential to smart homes because it makes it possible to automate and remotely operate a variety of equipment. With smartphones or voice assistants like Alexa and Google Assistant, homeowners can control lighting, appliances, thermostats, and security cameras from any location. Smooth connection between devices is ensured by high-speed Wi-Fi, which improves energy efficiency, convenience, and security. Wi-Fi networks can be slowed down by numerous connected devices, so it is advised to use a powerful router, such as Wi-Fi 6, to manage traffic effectively. In order to stop unwanted access to smart home devices, secure Wi-Fi connections are also crucial.

C. Smart lighting:

Home automation with smart lighting transforms how families control their lighting systems by providing increased security, efficiency, and convenience. These systems let users manage lighting using programmed schedules, voice assistants like Google Assistant or Alexa, or smartphones. Dimming, colour changes, motion sensors, and timers are among the features that maximize energy efficiency and cut expenses. By mimicking occupancy while a person is not home, smart lighting increases security and discourages burglaries. Smart lights with LED bases are also eco-friendly and energy-efficient. Smart lighting combines style and utility to offer a seamless home experience with customization choices including mood-based lighting and music synchronization.

D. Mobile App:

Because they give customers centralized management over smart devices, mobile apps are essential to home automation. With the help of these apps, homeowners can remotely control appliances, cameras, security systems, lighting, and thermostats from their smartphones or tablets. Well-known technologies with intuitive user interfaces for smooth device integration include Apple HomeKit, Google Home, and SmartThings. Among the features are scheduling, real-time monitoring, and automation according to user choices or triggers like motion or time detection.

Accessibility is improved by mobile apps' support for voice commands via assistants like Alexa and Siri. They ensure efficiency and safety by providing notifications for device failures, energy consumption insights, and security alerts. Users can create custom sceneries with customization choices, such lowered lights and a relaxing temperature. Additionally, mobile apps guarantee interoperability among various smart device brands, making them adaptable instruments for contemporary households. They provide customers with comfort and control while maintaining data security through strong encryption techniques.

E. Internet of Things (IoT):

Through device connectivity and smooth communication, the Internet of Things (IoT) is revolutionizing home automation. With smartphones, voice assistants, or scheduled schedules, homes may remotely control appliances, security systems, lighting, heating, and cooling thanks to the Internet of Things. Important uses consist of:



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Smart lighting promotes energy savings by allowing lights to change their brightness in response to user preferences or natural light levels.

Security Systems: Real-time monitoring and alarms are provided via IoT-powered cameras, motion sensors, and smart locks.

Energy management: By adjusting to human behaviour and environmental factors, gadgets such as smart thermostats maximize energy usage.

Smart Appliances: Ovens, washing machines, and refrigerators may be accessed and monitored remotely. Convenience, security, and sustainability are improved by IoT ecosystems that combine various devices for centralized control through platforms like Google Home and Alexa.





Through the use of a mobile device, usually a smartphone or tablet, users can remotely control and monitor several aspects of their house thanks to a technology known as mobile-based home automation. This system offers consumers convenience, energy savings, improved security, and more by integrating various smart devices—such as lights, security cameras, thermostats, door locks, and appliances—into a single platform. An examination of the main elements, advantages, difficulties, and developments around mobile-based home automation is provided below:



Accessibility and Convenience:

Remote Control: Whether at work, on the road, or just not at home, users may operate devices from any location with an internet connection.

Centralized Control: This eliminates the need for individual remote controls or manual controls by allowing several devices to be operated from a single interface (app).



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Efficiency of Energy:

Automated Schedules: Energy-saving systems, such as smart lights or thermostats, can be programmed to only turn on when necessary.

Energy Usage Tracking: Some systems give users thorough information on how much energy they consume, which can help them find areas where they can save money.

Improved Security

Real-time Alerts: If a user forgets to lock doors or switch off the lights, or if something strange occurs, like a security breach, mobile-based systems can send out immediate alerts.

Remote Monitoring: Users can remotely lock or unlock doors, watch doorbell movies, and check security cameras.

Better Quality of Life:

Customization: Comfort can be improved with customized settings (such as favorite lighting sequences or heating preferences).

Voice Control: Hands-free control is made possible by integration with voice assistants.

A rise in the value of property:

Because they appeal to tech-savvy consumers, homes with automation systems may be more valuable when they are sold.

IV. RESULTS AND DISCUSSION

Sensor data is delivered to the web server for system monitoring once home applications have successfully connected to the server. The web server page that will enable us to monitor and manage the system is depicted in the picture. This web server page will show up when you enter the specified IP address in the web browser. The web server provides data on the temperature in various areas of the house as well as the motion condition of the house. Additionally, it provides the status of the different electrical devices that we can manage remotely, such as fans and lights. The primary outcome is that we can use our hands to control electronics from any location.

Smartphone-based mobile home automation provides a practical and effective method of controlling household appliances. It enhances comfort, energy management, and remote access, allowing users to operate lights, appliances, and security systems from anywhere. The system is economical and easy to operate, particularly when combined with Internet of Things technologies. However, reliable internet or Bluetooth connectivity is required for its operation, and appropriate encryption and authentication are required to solve security issues like unwanted access. Mobile-based automation offers a potential step toward smarter and more responsive homes in spite of these obstacles.

V. CONCLUSION

This study used GSM and the ATMEGA328p microcontroller to create and implement an Internet of Thingsbased smart home and security system. The system offers a variety of sensors integrated into a low-cost home automation system. Human presence was detected by a PIR sensor, gas leaks were detected by a MQ2 sensor, and fire was detected by a flame sensor. The associated alarm system produces sound, and the outputs of the sensing devices send SMS via GSM modules. Through the control of household appliances, the system also lowers energy consumption. Although the system's precision was 94.44%, it could do better in future research by adding more sensors. False alarms from employing PIR sensors to identify intruders could be decreased by implementing computer vision algorithms as well.

VI. REFERENCES

- [1] V. Govindraj, M. Sathiyanarayanan and B. Abubakar, "Customary homes to smart homes using Internet of Things (IoT) and mobile application," 2017 International Conference On Smart Technologies For Smart Nation (SmartTechCon), Bengaluru, India, 2017, pp. 1059-1063, doi: 10.1109/SmartTechCon.2017.8358532
- Shah SK, Mahmood W. Smart home automation using IOT and its low cost implementation. IJEM2020; 10:28-36



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www.irjmets.com

- [3] Vincent Ike Anirch. Design and Implementation of Smart Home System Using Internet of Things.2019;10.22624
- [4] Mandeep Singh. Smart home Automation Based On IOT. 2023;10.5504
- [5] C K Gomathy. The Home Automation using IOT. 2022
- [6] Ilusanmi banjo Oluwafemi, Oluwaseyi Bello, Toyo Obasanya. Design And Implementation Of Smart Home Automation System. 2023;10.22159/ijet.2022.v10i1.46883
- [7] Smart Home Automation and Security System using Arduino and IOT, Siddharth Wadhwani1, Uday Singh2, Prakarsh Singh3, Shraddha Dwivedi, International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 02 | Feb-2018.
- [8] AyushGajjar, Deepak Mishra, Shubham Ingale, Aniket Kore, "SMART HOME SYSTEM." Presented at International Research Journal of Engineering and Technology (IRJET), 01 | Jan 2019
- [9] Abhijit Shejal, Amit Pethkar, Akash Zende, Pratyusha Awate, Prof. Sudhir.G.Mane, "DESIGNING OF SMART SWITCH FOR HOME AUTOMATION." Presented at International Research Journal of Engineering and Technology (IRJET) 05 | May 2019.
- [10] Sudha Kousalya, G Reddi, Priya Vasanthi, B Venkatesh, IOT Based Smart Security and Smart Home Automation presented at International Journal of Engineering Research & Technology 04, April-2018.