GSM BASED AUTOMATION SYSTEM

A COURSE PROJECT REPORT

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Under the guidance of

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BONAFIDE CERTIFICATE

Certified that this mini project report "**GSM BASED AUTOMATION SYSTEM** " is the bonafide work of **S.THARUN ANAND, RA2111027010043** who carried out the project work under my supervision.

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INTRODUCTION

The use of automation systems has grown significantly in recent years, with the advancement in technology making it possible to operate various devices remotely. In the field of computer communication, older automation systems used Bluetooth and Wi-Fi connectivity to operate devices. However, the latest automation technology utilizes GSM (Global System for Mobile Communications) to control devices remotely without the need for Wi-Fi or Bluetooth. This article focuses on the architecture, functionality, and benefits of the existing GSM-based automation system in the field of computer communication.

ABSTRACT

The GSM-based automation system is an innovative and highly advanced system that allows users to control and monitor various devices using their mobile phones. This system combines the power of the Global System for Mobile Communications (GSM) technology with automation technologies, such as sensors, actuators, and controllers, to provide a seamless and efficient automation solution. The GSM-based automation system is an ideal solution for home automation, office automation, and industrial automation, as it can be customized to meet the specific needs and requirements of each user.

The GSM-based automation system works by integrating a GSM module into the automation system. The GSM module allows the system to communicate with the user's mobile phone, enabling them to control and monitor the system from anywhere in the world. The system can be programmed to respond to specific commands, such as turning on the lights, adjusting the temperature, or opening a door lock. The system can also be set up to send alerts and notifications to the user's mobile phone, such as when a sensor detects movement or when a device malfunctions.

One of the key benefits of the GSM-based automation system is its convenience. Users can control and monitor their automation system from anywhere in the world using phones, making it easy to manage their environment and devices remotely. This convenience is particularly useful for people who travel frequently or who have busy schedules. Another benefit of the system is its efficiency. The system can be programmed to optimize energy usage, helping users to save on their electricity bills and reduce their carbon footprint.

In conclusion, the GSM-based automation system is a highly advanced and sophisticated solution that combines the power of GSM technology with automation technologies to provide a seamless and efficient automation solution. The system is highly versatile, customizable, and convenient, making it an ideal solution for home, office, and industrial automation. With the ability to control and monitor devices remotely, users can enjoy greater convenience, efficiency, and peace of mind.

EXISTING SYSTEM

The existing Wi-Fi and Bluetooth automation systems are designed to make our lives easier by allowing us to control various devices through a single app on our smartphones or tablets. These systems have become increasingly popular due to the rise of the Internet of Things (IoT), which connects various devices to the internet for remote control and automation.

Wi-Fi automation systems are typically used to control smart home devices such as thermostats, lighting systems, and security cameras. These systems use Wi-Fi connectivity to allow users to control these devices remotely through a mobile app or web interface. Wi-Fi automation systems often require a central hub that connects to the home network and communicates with the various devices.

Bluetooth automation systems, on the other hand, are typically used for more personal devices such as headphones, speakers, and fitness trackers. Bluetooth connectivity allows these devices to communicate with a user's smartphone or tablet, enabling remote control and automation. Some Bluetooth automation systems also allow for the creation of "mesh networks" that enable multiple devices to communicate with each other and extend the range of the Bluetooth signal.

EXISTING SYSTEM ARCHITECTURE

The existing architecture of WiFi and Bluetooth automation systems involves the use of various hardware and software components to enable wireless connectivity and automation of devices. WiFi and Bluetooth are both wireless communication protocols that allow devices to communicate with each other without the need for physical wires or cables.

The architecture of a WiFi automation system typically involves the use of a wireless access point (WAP), which acts as a central hub for all wireless devices to connect to. The WAP is connected to a local area network (LAN) or the internet, which allows for remote control and monitoring of devices connected to the network. Devices such as smart home appliances, security systems, and entertainment systems can be connected to the WiFi network and controlled through a mobile app or web interface.

Bluetooth automation systems, on the other hand, use a different architecture that involves the use of Bluetooth Low Energy (BLE) beacons, which are small devices that transmit signals to nearby devices. BLE beacons can be used to automate tasks such as turning on lights, unlocking doors, and controlling temperature, among other things.

To create an automation system using WiFi and Bluetooth, various software tools and programming languages such as Python, Node.js, and Arduino can be used. These tools allow developers to create custom automation workflows and applications that can be deployed on the WAP or BLE beacons.

In summary, the existing architecture of WiFi and Bluetooth automation systems involves the use of wireless communication protocols, hardware components such as WAPs and BLE beacons, and software tools and programming languages to enable automation and remote control of devices.

DISADVANTAGE OF EXISTING SYSTEM

There are several disadvantages associated with existing Wi-Fi and Bluetooth automation systems:

Interference: Wi-Fi and Bluetooth signals can be affected by interference from other electronic devices, such as microwaves, cordless phones, and other Wi-Fi and Bluetooth devices, which can affect the reliability and performance of the automation system.

Range limitations: Wi-Fi and Bluetooth signals have limited range and can be affected by physical barriers, such as walls and floors. This means that the automation system may not work reliably in large or multi-level homes or buildings.

Security: Wi-Fi and Bluetooth automation systems can be vulnerable to security breaches, such as hacking or unauthorized access, which can compromise the privacy and security of the network and the connected devices.

Compatibility: Wi-Fi and Bluetooth automation systems may not be compatible with all devices, particularly older devices that do not have Wi-Fi or Bluetooth capabilities, which can limit the flexibility and functionality of the automation system.

Power consumption: Wi-Fi and Bluetooth devices consume a significant amount of power, which can result in reduced battery life for mobile devices, such as smartphones and tablets, and may require additional power sources for connected devices, such as sensors and cameras.

PROPOSAL SYSTEM

The proposal system of the GSM (Global System for Mobile Communications) automation system is a process by which a proposal is created and presented to potential clients to secure a contract to install or maintain an automated GSM system. The system is designed to automate the process of communication between mobile devices, allowing for efficient and reliable transmission of voice and data over wireless networks.

The proposal system typically involves several stages, including the initial consultation with the client to determine their requirements and the scope of the project, the development of a proposal outlining the solution and cost estimate, and the presentation of the proposal to the client for approval.

During the consultation phase, the vendor will typically discuss the client's requirements in detail, including the number of users, coverage area, and any specific features or functionality that the client requires. This information is then used to develop a customized proposal that meets the client's needs and fits within their budget.

The proposal typically includes a detailed description of the system, including the hardware and software components, network architecture, and any additional services or features that are included. It will also provide a detailed breakdown of the costs associated with the project, including the installation and maintenance costs, as well as any ongoing fees or charges.

Once the proposal is complete, it is presented to the client for review and approval. The client may request changes or modifications to the proposal before accepting it, and negotiations may take place to finalize the terms of the contract.

Overall, the proposed system of GSM automation is a critical component of the sales process, as it allows vendors to showcase their expertise and demonstrate their ability to meet the needs of potential clients. It also provides a structured and transparent process for negotiating and finalizing contracts, ensuring that both parties are fully informed and satisfied with the final agreement.

PROPOSAL SYSTEM ARCHITECHTURE

A GSM-based automation system is a type of automation system that utilizes the Global System for Mobile (GSM) network to control and monitor devices and processes remotely. The architecture of a typical GSM-based automation system consists of the following components:

1. Sensors and Actuators: These are the devices that are used to measure and control physical parameters such as temperature, pressure, and humidity. They are connected to a microcontroller that processes the data and sends it to the GSM module.

2. GSM Module: This module is responsible for communicating with the GSM network. It sends and receives data using the GSM network, and is responsible for establishing and maintaining the connection with the remote device.

3. Microcontroller: The microcontroller is the brain of the system. It receives the data from the sensors, processes it, and sends the control signals to the actuators. It also communicates with the GSM module to send and receive data.

4. Power Supply: The power supply provides the necessary voltage and current to run the system.

5. Remote Control: The remote control is used to send commands to the system. It communicates with the GSM module, which in turn sends the command to the microcontroller.

6. Software: The software is responsible for managing the data and control signals. It communicates with the microcontroller and the GSM module to send and receive data, and to control the devices.

Overall, the architecture of a GSM-based automation system is designed to enable remote control and monitoring of devices and processes using the GSM network. By leveraging the power of this network, the system can provide real-time data and control capabilities, making it ideal for a wide range of applications, including home automation, industrial control, and environmental monitoring.

USE CASE

GSM (Global System for Mobile Communications) based automation systems are widely used in various fields such as home automation, industrial automation, and agriculture automation. These systems use GSM networks to enable communication between devices and allow remote control and monitoring of various processes. Here are some use cases for GSM-based automation systems:

Home Automation: GSM-based automation systems can be used to remotely control various home appliances such as lighting, air conditioning, and security systems. These systems can be programmed to turn on or off at specific times or under certain conditions, which can help save energy and increase convenience.

Industrial Automation: In industries, GSM-based automation systems can be used for monitoring and controlling various processes such as temperature control, machine control, and safety systems. These systems can help increase efficiency, reduce downtime, and enhance safety.

Agriculture Automation: In agriculture, GSM-based automation systems can be used to monitor and control various parameters such as temperature, humidity, and soil moisture. This can help farmers optimize crop growth and increase yields.

Remote Monitoring: GSM-based automation systems can be used for remote monitoring of various processes such as water level monitoring in reservoirs, pipeline monitoring, and energy consumption monitoring. This can help detect issues and prevent disasters before they occur.

Security Systems: GSM-based automation systems can be used to remotely monitor and control security systems such as door locks, surveillance cameras, and alarm systems. This can help enhance safety and provide peace of mind.

In conclusion, GSM-based automation systems have a wide range of use cases in various fields. These systems can help increase efficiency, save energy, enhance safety, and provide convenience. With the growing availability of GSM networks, the use of GSM-based automation systems is expected to increase in the future.

MODULES

GSM message receiving protocol:

GSM message receiving protocol involves a series of steps to receive messages on a mobile device. First, the device must register with a network and receive a temporary identifier. When a message is sent to the device, it is received by the nearest base station and routed to the mobile switching centre. The message is then sent to the recipient device via the base station controller. The device uses its identifier to request the message from the network, and the message is delivered to the device's inbox. The device may also receive messages via push notifications or through a data connection. Finally, the device may display or play the message, depending on its type and format.

GSM message sending protocol:

GSM message sending protocol is a set of rules and procedures for transmitting short text messages between mobile devices over a cellular network. The protocol involves several layers of communication, including the physical layer for transmitting signals over the air, the data link layer for managing the transmission of data packets, and the network layer for routing messages to their intended destinations. The protocol uses a store-and-forward mechanism, where messages are temporarily stored at various points in the network until they can be delivered to the recipient's device. The message format includes a maximum length of 160 characters and can be sent either as a text message or as a binary data message.

GSM message feedback protocol:

The GSM message feedback protocol is a system used in mobile communication networks to allow for the confirmation of successful message delivery between devices. When a message is sent, the sender's device will receive a delivery report indicating whether the message was successfully delivered to the recipient's device. This protocol is commonly used for text messages and multimedia messages (MMS). It ensures that messages are reliably delivered and provides users with peace of mind that their messages have been received.

GSM MAIN PROTOCOL- PRINCIPLE AND WORKING:

GSM (Global System for Mobile communications) is a digital cellular communication system used for mobile phones. It uses a combination of time division multiple access (TDMA) and frequency division multiple access (FDMA) techniques to allow multiple users to share the

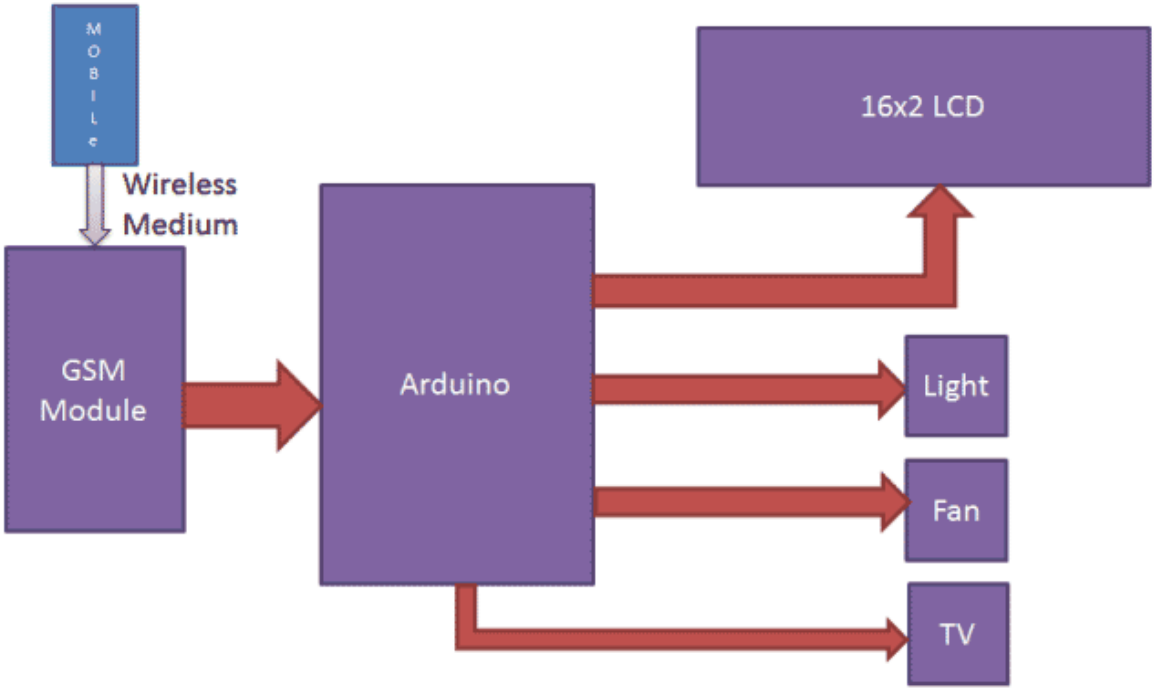
same frequency band. GSM operates in the 900 MHz and 1800 MHz frequency bands. In GSM, each user is assigned a unique time slot for transmission and reception of data. The system uses digital signalling to ensure high quality voice calls and efficient data transfer. GSM also supports various features such as caller ID, call waiting, SMS, and MMS. The working of GSM involves the use of base stations, mobile stations, and a network of switches and controllers. The base station communicates with the mobile station and the switches, which in turn connect to the public switched telephone network (PSTN) or the Internet. This enables users to make and receive calls and access data services on their mobile devices.

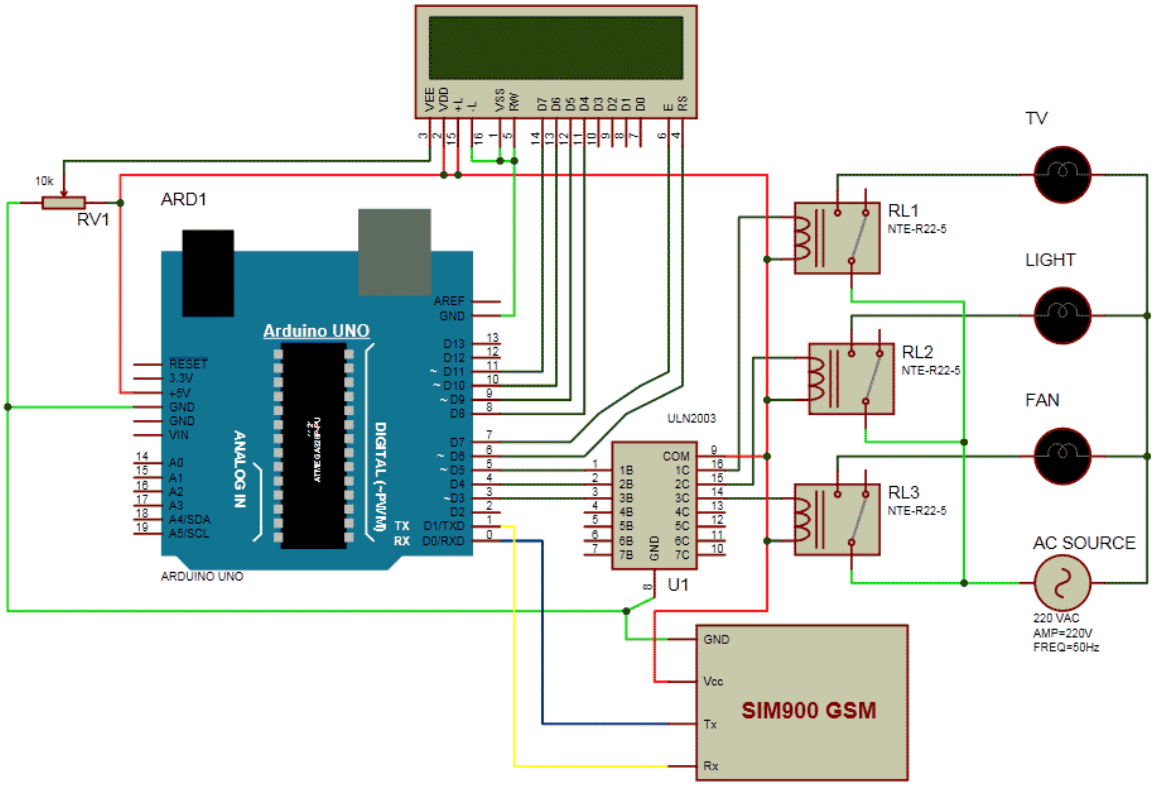
5 VOLT RELAY WORKING PROTOCOL:

A 5V relay can be used in a GSM system to control electrical devices remotely using a mobile phone. The working protocol of such a system involves the following steps:

1. The user sends an SMS message from their mobile phone to the GSM module connected to the relay.
2. The GSM module receives the message and decodes it to extract the control command for the relay.
3. The control command is then sent to the microcontroller that is interfaced with the relay.
4. The microcontroller activates the relay by providing a signal to the coil, which in turn energizes the relay.
5. Once the relay is energized, the electrical contacts of the relay switch and the connected device is turned on or off as per the control command received from the mobile phone.
6. The microcontroller sends an SMS confirmation message to the user confirming the status of the relay.

In summary, the 5V relay is controlled by a GSM module that receives commands from a mobile phone via SMS. The relay is activated using a microcontroller that is interfaced with the GSM module. This allows for remote control of electrical devices using a mobile phone.





RESULT:

Thus, a **GSM BASED AUTOMATION SYSTEM** was created and output was verified.