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Controlling and Monitoring System for Smart LPG

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A B S T R A C T

Even in villages, LPG is used all over the world. It is utilized as a fuel for home, industrial, vehicular, and other purposes due to its versatility. But a significant concern now is how secure it is.LPG requires ongoing monitoring, which is carried out utilizing the Internet of Things (IOT). For home security, a wireless LPG monitoring system is proposed. This technology determines the regulator's state and notifies the consumer via a Wi-Fi module. When necessary, the user can utilize the Android app on their phone from anywhere to turn OFF the LPG regulator. The method also has the added benefit of automatically turning off the LPG regulator at the time the consumer specifies. This technology guarantees security and prevents explosions brought on by unneeded regulator opening. The system is cost-effective, real-time, and affordable.

Keywords: Smart LPG, Controlling and Monitoring System,

1. Introduction

LPG is a mixture of commercial Propane and the commercially available, adaptable nature of the LPG, which was initially introduced in 1910 by Dr. Walter Snelling. It is utilized for numerous purposes, including heating, lighting, transportation, industry, residential use, and many more, and the need for LPG is rising exponentially every day. Due to its appealing qualities, liquefied petroleum gas is widely used as fuel in residences, businesses, and automobiles. But safety has grown to be a significant problem. The monitoring of LPG in homes is a major issue today in order to prevent unneeded leaks that pose considerable risks to human life. In actuality, the leakage most often happens when the LPG regulator is turned ON.

The use of wireless communication is growing daily. This inspired the use of a cell phone to remotely manage the LPG regulator and to get updates on its condition. This paper describes a remote LPG control system that allows for both LPG control and LPG status monitoring via an Android application running on an Android smartphone. This method is very practical because there is no need for a wired connection between the switch and the LPG regulator, allowing it to be operated from anywhere in the world.

LPG AUTOMATION SYSTEMS AT THE MOMENT

Four key issues confront LPG automation systems: high cost of ownership, rigidity, poor manageability, and trouble achieving security. The connectivity of the current systems is provided via GSM modules. Additionally, the LPG regulator cannot be automatically switched off at the user-specified time. consists of Arduino programming and Android-based applications running on Android-powered smartphones. The Wi-Fi modem offers the user and the system the communication medium through an app. The app is made up of commands that must be carried out. The structure of the command is fixed. By tapping the buttons in the app, a command is transmitted over the internet to the Wi-Fi module. The microcontroller will extract and carry out the directives supplied once the Wi-Fi module has received the command. By examining the state, the system will read the commands and use the servo motor to ON/OFF the LPG regulator as needed [19] [20] [21] [22]. The system includes an RTC circuit that helps turn off the LPG regulator at night (about 10 PM) and sends a notification to the mobile phone via the Wi-Fi module for further home security and safety. The following is a full summary of the hardware and software:

I.USED HARDWARE

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The block diagram shows the hardware architecture of the system, which consists of many components, and each component in the architecture is described as follows. The hardware and software components of the system are separate. The hardware architecture includes a standalone embedded system built on an 8-bit architecture. [14]15][16][17] [18].

2. METHODOLOGY

This research suggests a sophisticated and original method for LPG monitoring. This paper's major goal is to build and implement an IOT-based LPG monitoring and control system that can be used to monitor and operate the LPG regulator using an intuitive Android app. The use of Wi Fi technology gives the suggested system a lot of versatility. This will improve the ability to upgrade and reconfigure systems while lowering the cost of deployment.

WI-FI MODULE, A.

More protection is needed for the communication channel. More security is offered by the Wi-Fi protocols for secure connections. Two ways exist for an Android application to establish a link. For initial testing, the first one uses the IP address of the Wi-Fi module that is directly coded into the program. The second is that it enables people to look for the gadget, which results in a choice. The user can then choose the device from a list to connect with. Both versions of the application required the same fundamental steps to connect to the Wi-Fi module. Once the user has the destination's IP address, they can utilize the Wi-Fi module to create a socket.

B. ATMEGA328P MICROCONTROLLER BOARD

The system's primary module is this one. The appliances are turned ON or OFF in accordance with the status of the regulator when the system receives the directives.

C.LED It is required to indicate the system's status as it carries out controlling and monitoring tasks. This is accomplished by employing an LED that displays the microcontroller-controlled LPG Regulator's status, including whether it is ON or OFF.

The D.SERVO Motor

A servo motor is utilized to switch the LPG regulator in line with the instructions issued by the microcontroller. Using a control signal, the servo motor's shaft can be moved to a precise location. If the control signal does not change, the motor shaft will remain in this position.

RTC CIRCUIT E

To make the system a real-time system, the microcontroller is interfaced to an RTC (Real Time Clock) circuit. The LPG Regulator is automatically turned OFF at the time set by the user for the added safety and security of the home. Only if we monitor the time, which is accomplished by integrating an RTC, is this additional capability activated.

II. ENGAGED SOFTWARE

ARDUINO, A

Users can create code in the open-source Arduino environment and upload it to the I/O board. Java is used to write the environment. The Arduino programming environment includes menus, a toolbar with buttons for typical tasks, a message box, a text console, and a text editor for writing code. In order to upload programs and communicate with them, it connects to the Arduino hardware. C++ or C are used to write Arduino programs. With just one click, Arduino features may compile and upload programs to the Board. Sketches are pieces of Arduino-written software. The text editor was used to write these sketches. Sketches are stored in files that end in ".ino." It provides tools for text searching and replacement as well as text cutting and pasting. When saving and exporting, the message section provides feedback and shows errors. The console shows text generated by the Arduino environment, along with detailed error warnings and other data. The current board and serial port are visible in the window's bottom right corner. You may create, open, and save sketches, validate and upload programs, open the serial monitor, and more using the toolbar buttons. AVR Studio or the more recent Atmel Studio, Atmel's development environment, may also be used to create software for the Arduino platform because it makes use of Atmel microcontrollers.

3.RESULTS:

.An open-source web application called App Inventor for Android was first made available by Google and is now maintained by the Massachusetts Institute of Technology (MIT). It enables the development of software apps for the Android OS (OS). Users can construct an application that can run on Android smartphones by dragging and dropping visual components on a graphical user interface. Here, we're developing an Android application for LPG automation that will enable one-click control of the LPG regulator. The application has a security feature that requires a password.

4.CONCLUSION

This paper provides a thorough explanation of an extremely practical, cost-effective, real-time, and commercial smart LPG monitoring and controlling system. It offers a straightforward and convenient method of controlling the LPG through an Android app. The system's primary benefit is the automated OFF switch for the LPG regulator. Additionally, using and installing the safety and security system in the home is simple. Even when the user is not at home, it tells them.[13] [14] 15] [16] [17] [18] .

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