LPG Gas Safety and Booking Alert System using IOT

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Abstract-The LPG Gas Safety and Booking Alert System utilizing IOT technology present a comprehensive solution to enhance safety and convenience in the usage of liquefied petroleum gas (LPG). This system integrates smart sensors to monitor gas levels and detect potential leaks, ensuring prompt alerts to users and relevant authorities in case of emergencies. Additionally, it incorporates an IOT- based booking system, allowing users to remotely schedule gas refills based on real-time consumption data.. Through seamless connectivity and data-driven insights, it not only safeguards households but also streamlines the LPG replenishment process, fostering a more efficient and user-friendly experience. It mainly focuses on the application of the IOT used to Monitoring the gas and automatic booking of a new Cylinder. The Load cell is used to measure the weight of Cylinder which is interfaced to Microcontroller. The Booking status are notified to the User via GSM Module. This System Ensures LPG gas Safety by integrating sensors to detect leaks. It automatically alerts Users and allows instant booking for professional inspections. It Enhancing Home Safety.

I. INTRODUCTION

Withthe integration of smart sensors and Internet of Things IOT capabilities, this system addressescritical aspects of liquefied petroleum gas usage in households. Its foremost objective isto ensure safety by detecting gas leaks and abnormal conditions in real-time, allowing for swift responses and preventive measures. Simultaneously, the system streamlines the LPG refill process by automating gas level monitoring, alerting users when refills are needed through a seamless mobile app or web interface. The IOT infrastructure enables remote monitoring and control, providing users with real-time insights into their LPG cylinders and enhancing accessibility. Emergency shutdown mechanisms further fortify safety measures, demonstratinga comprehensive approach to accident prevention. The IOT Technology makes the communication between two or more Things through Internet. The user difficult to check the quantity of the LPG left in the Cylinder that situation where gas will empty.2 The proposed LPG Gas Safety and Booking Alert System utilizing IoT presents a comprehensive solution to address Safety concerns and streamline the management of liquefied petroleum gas (LPG) resources. The system integrates smart sensors into the LPG infrastructure to detect gas leaks, abnormal pressure changes, and potential hazards in real- time. These sensors continuously monitor the environment, enabling quick and precise identification of safety risks.This timely notification prompts users to place refill orders, preventing unexpected gas shortages and ensuring a consistent gas supply. The IoT architecture allows for remote monitoring and control, enabling users to access real-time information about their LPG cylinders from anywhere

2.1 Block diagram

Gas Monitoring-Gas Sensor continuously measures LPG levels. Arduino compares the readings with a predefined threshold. If gas levels are high, it triggers safety measures.Safety Measures-if gas levels exceed the threshold, Arduino activates the servo motor to shut off the gas valve,ensuring safety. Displays a warning on the LCD. Weight Measurements- Load cell and HX711 measure the weight of the gas cylinder. Arduino processes this data for monitoring gas consumption. Alert System- If gas levels are critical or in case of a safety issue, Arduino sends an alert through the GPRS- GSM module to a remote server or a designated mobile number. Booking System- Users can initiate a booking request through a predefined interface. Arduino processes the booking request and sends the information via GPRS- GSM for further processing. LCD Display Interface- LCD continuously updates the gas level and relevant information for user awareness. This system integrates gas safety monitoring, consumption tracking, and a booking system using IoT technologies for a comprehensive solution. Hardware and Software Requirement

II. ARDUINO UNO

The Arduino Uno R3 is a microcontroller board based on the ATmnega328. It has 14 digitalinput output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a l6 MHz crystaloscillator, a USB connection, a power jack, an lCSP header., and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USBcable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB- to-serial driver chip. the Atmegal6U2 (Atmega8U2 up to version R2) programmed as a USB-t0-serial converter. Revision 2 of the Uno board has a resistor pulling the 8U2 HWB line to ground, making it easier to put into DFU3.2 SIM800L This Small SIM800L GPRS GSM Module is equipped with a Micro SIM Card Core Board and a quad-band TTL Serial Port. It comes with two antennas included, providing excellent wireless connectivity. The SIM800L GSM/GPRS module is a compact GSM modemthat can be seamlessly integrated into various IoT projects. With this module, you can achieve a wide range of functionalities similar to a regular cell phone, including sending and receiving SMS text messages, making phone calls, and connecting to the internet via GPRS, TCP/IP, and more! Moreover, this module supports a quad-band GSM/GPRS network, ensuring global compatibility.

III. MQ2 GAS SENSOR

MQ2 gas sensor is an electronic sensor used for sensing the concentration of gases in the air such as LPG, propane, methane, hydrogen, alcohol, smoke and carbon monoxide.

MQ2 gas sensor is also known as chemiresistor. It contains a sensing material whose resistance changes when it comes in contact with the gas. This change in the value of resistanceis used for the detection of gas.

MQ2 is a metal oxide semiconductor type gas sensor. Concentrations of gas in the gas is measured using a voltage divider network present in the sensor. This sensor works on 5V DC voltage. It can detect gases in the concentration of range 200 to 10000ppm.

IV. SERVO MOTOR

The SG90 Micro Servo Motor is a small, high- performance servo motor commonly used in robotics, model making, and other hobbyist projects. It has a compact form factor and is relatively low-cost, making it an attractive choice formany applications. The SG90 has a 9- gram weight and a size of 22.8 x 11.8 x 22.7 mm, making it small enough to be used in compact and lightweight robotic designs. It hasa torque rating of 1.8 kg/cm, which is sufficient for most hobby applications and small roboticprojects. The servo motor also features a dead- band width of only 1 μs, which provides precise control and positioning of the servo's output shaft.

In the Arduino programming language, sketches are computer programs (IDE). Using a text editor, these drawings were created and saved as. ino files. Text replacement and text search features are included in the editor. The message box highlights problems with saving and exporting and provides feedback. The terminal shows text generated by the Arduino Software (IDE), together with additional data and detailed error messages.
. In the window's bottom right corner, the configured board and serial port are shown. The toolbar buttons may be used to make, open, and save drawings, validate and upload programs, and start the serialmonitor.

The term "IDE" refers to an official program introduced by Arduino.cc that is mostly usedfor editing, compiling, and uploading code to the Arduino Device. Virtually all Arduino modulesare compatible with this open source software, which is simple to install and begin compiling code on the fly. In this tutorial, we'll go through the software, how to install it, and how to getit ready for programming apps with Arduino modules. The Arduino IDE is an open source program used primarily for developing and compiling code for the Arduino Module. It is an official Arduino program, making code compilation so simple that even a layperson with no prior technical expertise may start learning. It is easily available for operating systems such asMAC, Windows, and Linux and operates on the Java

Platform, which has built-in functions and commands for debugging, editing, and compiling code in the environment. A variety of Arduino modules are available, including the Arduino Uno, Mega, Leonardo, and Micro, among others. Each of them has a microcontroller on the board that is programmed and takes data in the form of code.

V. CONCLUSION

The LPG gas safety and alert booking system employing IoT technology represents a ground breaking approach to ensuring real-time safety and efficiency. This innovative system not only leverages the power of the Internet of Things to monitor and manage LPG gas usage but also introduces a unique alert booking feature. By seamlessly integrating IoT devices with the gas supply infrastructure, the system provides continuous monitoring, enabling immediatedetection of potential safety hazards. The real-time nature of this solution empowers users with instantaneous alerts and booking capabilities, enhancing overall safety measures. This pioneering system not only redefines safety standards but also exemplifies the potential of IoT in revolutionizing traditional utilities, making it a standout advancement in the realm of gas management. The "Virtual Brain" stands as a testament to the potential of technology in unraveling the complexities of the human brain, paving the way for more informed interventions and understanding in the future.

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