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DOMESTIC LPG LEVEL MONITER AND AUTOMATIC LPG BOOKING AND ALLOTING SYSTEM

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ABSTRACT

Peoples In recent years there has been rapid development in technology which has made human life easier in several aspects. The future of communication & computing is moving with the advancement in IoT.Cooking gas is one of the essential things in every body's day to day life and it is very important to keep it available all the time. But it is not possible to check the level and monitor it manually all the time, some time human error may occur so we designed a complicated IOT system to monitor and constantly update to the user and notify him/ her to book gas in the right time and building a app for the user to view the level and also book the LPG to the agency and also get notified about the delivery time of the LPG cylinder, and also building website to connect the website and the app to building a customer care service. The IOT device also includes a gas leakage monitoring system to detect the leakage and notify the user and also automatically close the regulator of the LPG as a precaution to avoid causalities

I. Introduction

Today in present era where technological advances are at Its zenith, there's not even a single sector which remains Untouched by technology. Technology has not only made Our lives simpler, but also offers a high level of safety and Security wherever required One of the most significant Technologies is IoT (Internet of Things) which makes the Way to connect two hardware devices through internet. It is Widely used in various sectors like medicine, industries etc, And its Implementation is also expanded in domestic sectors. In our day to day lives The product consist of 3 modules an IOT device to detect leakage and monitor the level of the LPG cylinder and second module consist of a android and IOS app to connect the IOT device and control it and also book LPG gas once it about to finish, the app also used as a customer care service to connect with the agency for queries. The 3rd module contains a website used by the agency for storing the booking and allotting the LPG cylinder and also notifying the customer the date and time of the delivery. The fourth module consist of a prototype of a LPG cylinder regulator which is connected to the IOT device through Wifi which will automatically closes the regulator once the leakage of the gas is detected

II LITERATURE REVIEW

DEHEMS: creating a digital environment for large-scale energy management at homes

domestic energy management system provides effective positive behaviour change by offering end users direct and ambient feedback based on their monitored energy consumption and experiences. DEHEMS, as a wide scale domestic energy monitoring

and managing system differs from others by enabling real-time and historical electricity monitoring and feedback. However, there is also a requirement to be able to monitor and report domestic gas consumption in order to reason and represent more complete energy feedback information to achieve effect positive behaviour changes. In this paper, we present the gas monitoring system in DEHEMS, that implements automatic retrieval of gas readings. We describe how the system is designed, integrated within the DEHEMS architecture, as well as its implementation and deployment

Design of Gas Sensor Setup and Study of Gas (LPG) Sensing Behavior of Conducting Polyaniline/Magnesium Chromate (MgCrO4) Composites

Sensor setup for the measurement of gas sensing behavior was designed using square glass chamber with gas flow control facility. Polyaniline (PANI) and polyaniline/magnesium chromate (PANI/$MgCrO_4$) composites were synthesized by single step insitu polymerization technique and characterized by Fourier transform infrared spectra (FTIR) & scanning electron micrograph (SEM), which confirms the presence of $MgCrO_4$ in PANI matrix. The variation of resistance with temperature suggests thermally activated exponential behavior. Using the designed gas sensor setup, authors have studied the change in resistance with concentration of liquid petroleum gas (LPG) of polyaniline and polyaniline/magnesium chromate composites. The increase in electrical resistance and hence decrease in conductivity is due to transfer of charge from sensing material to analyte gas and penetration of gas into the polymer, accompanied by swelling of polyaniline and its composites. The time response of sensor chamber shows that, there is a linear increase in concentration of gas inside the chamber with time.

Dielectric Breakdown-Based Gas Leakage Detector Using Poly-Si Microtips

There has been a growing need for portable gas detection device for gas leakage monitoring. Here, we report the development of dielectric breakdown-assisted ionization (DBAI)-based on-chip gas sensor (GSEN) and temperature sensor (TSEN), which were integrated to serve as leakage gas (L-gas) identification and detection device. The TSEN with single microtip architecture provides high temperature sensitivity but renders itself chemically inert toward different L-gases. The GSEN with an array of microtips imparts high chemical specificity toward different L-gases together with high temperature sensitivity. High chemical and thermal responsiveness of GSEN make it suitable for the chemical identification of different L-gases in air through the temperature-driven DBAI process. The TSEN plays the role of the temperature monitor. The chemical recognizability of the integrated device for different L-gases was demonstrated using Ar, O_2, and CO_2 as L-gases in air. This chemical recognizability of GSEN for different L-gases was imparted through their characteristic molecular polarizability, resulting in different rates of DBAI and hence the output current. The device finds the application for the detection of a wide variety of ionizable L-gases

A wireless home safety gas leakage detection system

Located at the consumer-end of the Smart Grid, domestic energy monitoring and management systems aim to provide direct energy feedback whilst (or shortly

after) consumption occurs, so as to persuade users to achieve energy saving and efficiency. However, existing solutions are challenged by the lack of large-scale practice and study on user behaviours and preferences. In this paper, we present a domestic energy management system (DEHEMS), which deploys electricity and gas monitoring in European-wide homes. The system has been developed in three cycles in order for households to participate and contribute. Results based on both qualitative and quantitative data analysis show that less energy has been consumed using the system. Additionally, positive behavioural changes have been achieved among households.

Analysis of Gas Leakage Early Warning System Based on Kalman Filter and Optimized BP Neural Network

A wireless safety device for gas leakage detection is proposed. The device is intended for use in household safety where appliances and heaters that use natural gas and liquid petroleum gas (LPG) may be a source of risk. The system also can be used for other applications in the industry or plants that depend on LPG and natural gas in their operations. The system design consists of two main modules: the detection and transmission module, and the receiving module. The detection and transmitting module detects the change of gas concentration using a special sensing circuit built for this purpose. This module checks if a change in concentration of gas(es) has exceeded a certain pre-determined threshold. If the sensor detects a change in gas concentration, it activates and audiovisual alarm and sends a signal to the receiver module. The receiver module acts as a mobile alarm device to allow the mobility within the house premises. The system was tested using LPG and the alarm was activated as a result of change in concentration.

Novel Sensing Approach for LPG Leakage Detection: Part I—Operating Mechanism and Preliminary Results This paper proposes a method for gas leakage early warning system based on Kalman filter and back-propagation (BP) neural network to address the issue of inaccurate gas leakage detection and incapability of predicting concentration change of gas. First, Kalman filter is adopted to filter the noise from the gas concentration that is measured by a sensor. Then, predictions about the change of gas concentration are made using the BP neural network that is optimized by genetic algorithm. Next, the gas leakage early warning system, based on the proposed method, is designed. Last, to verify the effectiveness of the method proposed by simulation, methane, the main component of gas is chosen as an example. Also introduced in this paper are the determinant coefficient, mean absolute error, correlation coefficient and root-mean-square error-the four evaluation indicators methods to demonstrate the effectiveness and feasibility of the algorithm this paper proposed by comparing with Support Vector Machine (SVM), Long Short-term Memory (LSTM) and general Back Propagation Neural Network (BPNN). The best validation performance of BP neural network through simulation experiments and is 0.013518, and the probability of the relative error between the predicted value and the actual value within 10% is 0.7692. The proposed method can effectively improve the accuracy of gas concentration prediction as comparison results show, and it has advantage in fitting degree and error fluctuations.

Virtual instruments used for LPG pipeline network monitoring

Gas sensing technology has been among the topical research work for quite some time. This paper showcases the research done on the detection mechanism of leakage of domestic cooking gas at ambient conditions. Micro-electro mechanical systems-based interdigital sensors were fabricated on oxidized single-crystal silicon surfaces by the maskless photolithography technique. The electrochemical impedance analysis of these sensors was done to detect liquefied petroleum gas (LPG) with and without coated particles of tin oxide (SnO_2) in form of a thin layer. A thin film of SnO_2 was spin-coated on the sensing surface of the interdigital sensor to induce selectivity to LPG that consists of a 60/40 mixture of propane and butane, respectively. This paper reports a novel strategy for gas detection under ambient temperature and humidity conditions. The response time of the coated sensor was encouraging and own a promising potential to the development of a complete efficient gas sensing system.

Fault Diagnosis of Gas Pressure Regulators Based on CEEMDAN and Feature Clustering

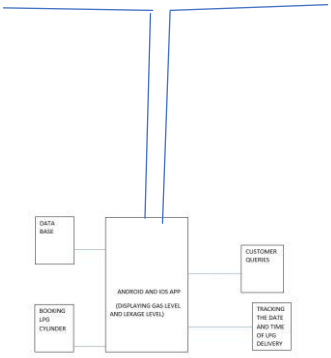
The paper presents a pipeline liquefied petroleum gas network (PLPGN) monitoring system based upon the virtual instrument architecture. Starting from the introduction of development requirements and environment for the monitoring system, the paper discusses its hardware configuration and software functionalities, in detail. Practical application has demonstrated that the virtual instrument-based structure is very effective and the obtained monitoring system is highly flexible.

III IMPLEMENTATION

our proposed system deals with IOT device which uses weight sensor to detects the LPG cylinder weight and analyse the weight and if the weight gets below a certain level it sends a alert message to the user in the app, it also indicates the day to day LPG level to the user in the app, it also detects the leakage of the gas, and displays the gas level leakage in the app, if the leakage reaches above a certain level it sends a message to the regulator device which automatically closes the regulator and also alert the user.

The gas sensor attached to the IOT device constantly analyse the gas leakage and notify the user.The regulator is an another IOT module which automatically closes the regulator if the gas leakage is detected. The app is designed for both android and IOS device which is used to remote monitor the LPG level and leakage, the app is designed using flutter, the app can also used to book the LPG cylinder once the current one is finished, the app also have a feature to contact the agency for any queries.The app also notify the exact date and time of the LPG delivery so that the working people and busy kind of people can allocate time to get the LPG.The website can be used as a admin create new users or save the booking of the LPG cylinder and allocated date and time for the delivery of the LPG Cylinder, it can be also used to send alert message for the users.

ARCHITECTURE DIAGRAM



Architecture Diagram

LIST OF MODULES

Our proposed system is made up of these following modules:
Module 1: IOT Module for Monitoring Weight Of the LPG Cylinder
Module 2: Automatic regulator For Closing the knob
Module 3: App for booking , queries and remote monitoring
Module 4: Additional Website for maintaining booked customers and allotting date and time for delivery

MODULE 1: IOT MODULE FOR MONITORING WEIGHT OF THE LPG CYLINDER

Module 1 consists of esp8266 Wifi arduino which is connected with load cell (hx711), which is used to calculate the weight of the LPG cylinder placed above it, the result is constantly feeded to the app and when the weight is reached below a certain level, an alert is sent to the app which is in access, for the user. It also consists of the gas sensor which is used to detect the gas level, so when the LPG is leaked, the gas sensor will detect it and will calculate the value, when the level is reached above a certain limit, it will send a message to the module 2 ,which is a prototype gas regulator which will automatically clos the knob and will close the gas connection.

The power is supplied through a battery (5v), that will serve as the source for it to function.

MODULE 2: AUTOMATIC REGULATOR FOR CLOSING THE KNOB

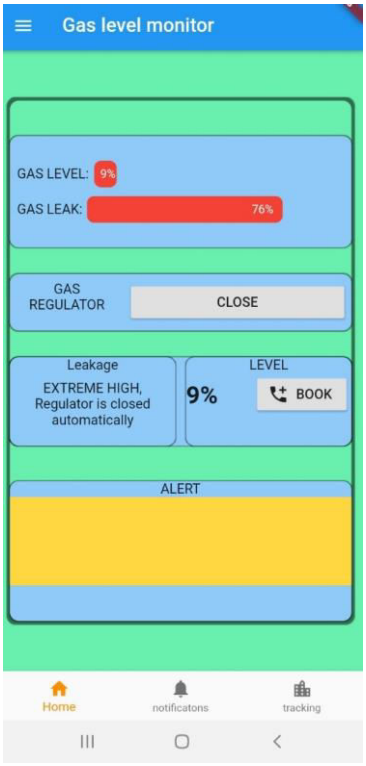
Module 2 consist of a prototype gas regulator system which is connected to the module 1, it consists of ESP8266 and a servo motor which is connected to a battery of 5v.It is used to close the knob of the regulator, when there is leakage , by halting the flow of pressurised gas to the Stove or used system.

When the message, regarding the leakage is received through the module1 the esp8266 takes control over the servo motor and closes the knob ,thus preventing it from any further leakage and updates the database about the state of the knob.

MODULE 3: APP FOR BOOKING ,QUERIES AND REMOTE MONITORING

The 3rd module consists of an app designed for both android and IOS platform.The first screen which is in the app, shows the level of the gas and level of leakage, if any. When it reaches a level ,which is below a certain limit it alerts the users about the leakage that is happening and provides with options for booking when the weight of the cylinder reduces by around 20 percent it further takes the customer to the booking page and proceeds with booking of the LPG cylinder, which later sends a message to the website.

It also has an option for the users to ask queries which will be answered from the other end, by the agency.



MODULE 4: ADDITIONAL WEBSITE FOR MAINTAINING BOOKED CUSTOMERS AND ALLOTING DATE AND TIME FOR DELIVERY

The module 4 is about the website which provides with details such as date and time of delivery, of the lpg cylinder. Which could be accustomed as per convenience of the user. The information regarding the arrival of the lpg cylinder is also updated in the app to which the user will have access, henceforth it will notify the user about the delivery of the lpg cylinder and will serve has a reminder. The website will also provide with options for new users to creat there very own account for bookings, which will not involve a lot of complex procedures and could be done at the comfort of creating it anywhere, any time.

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