

A Survey on Automatic Detection of LPG Gas

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Abstract — In the modern world, human (woman/man) adopted the system of cooking food and their daily needs from wooden fire to a LPG (Liquid Petroleum Gas) supply system. During the usage of the system, number of instances that will happen around us where there is a result of losing a life or the destruction of the mankind. A kind of self-killing scenario of human being because of their negligence or busy schedule. To prevent this to happen knowingly or unknowingly, this paper gives the details of existing methods to prevent the reason for causing damage due to leakage of LPG cylinders in closed areas like kitchen. Along with this we list the drawback of existing methods and propose a method that may resolve the identified drawbacks.

Key words: LPG, Leakage, Sensor, measurements, environment

1. INTRODUCTION

In the fast growing world everything is obtained on demand with more purchase cost. Alongside the risk for life is also a growing factor. The things that we feel are good with time and accuracy make our lives more inappropriate and also harmful. Such a kind is the purchase of LPG gas for different purposes like Stove, Geyser, Vehicles, etc. It may be less costly to purchase but more risk for one's life if there is a

leakage due to damage or improper functioning of valves. LPG gas is the resultant of highly flammable chemicals like propane and butane. Number of methods is proposed to identify and solve the fire accidents by different agents by producing the products like Smoke detectors, fire alarms, fire extinguishers and sprinklers etc. these devices are just going to identify the leakage of gas and alert/stop the catch of fire, and failing prevents fire accidents which is a major disadvantage. So, some the techniques which are developed are surveyed and presented in the next section.

2. LITERATURE REVIEW

(D G Savakar, et al., (2018)) a method identifies nuts of a vehicle based on the shape of image. The application even works with the nut having a clear view or any entity added like mud, noise, colour, etc. on the surface of nut by applying median filter during pre-processing stage, the Sobel-edge-detector and Canny-edge-detector.

(D G Savakar, et al., (2018)) a method for construction of a 3D face model with the help of scanning a face from different views using a Intel RealSense technology for detection, segmentation and 3D mesh mapping along with texture export to produce a 3D face.

(Kumar Keshamoni, et al., 2017)) Identifies the emptiness of GAS container by creating awareness to the user, with the continuous weight measurement of the container integrated with the principle of piezo electric sensor which is interfaced with a micro-controller. The system is designed with an MQ-2(gas sensor) and LM-35 (temperature sensor), which will detect the surrounding environment for any chance of error.

(Shruthi Unnikrishnan, et al., (2017)) focuses on the issue of the monitoring the gas left out and leakage detection and alert the preferred user about the leakage of the gas by alerting with the buzzer and appropriate message. We have come to know how the system makes sure that the user let know the intended amount of LPG remaining in the gas. How the user can be notified about the gas leakage so that he can take preventive measures to avoid the explosion. The user gets alert buzzer whenever a small LPG gas is brought near the MQ-6 gas sensor.

(D G Savakar, et al., (2016)) The paper mainly goals the Reality systems to enhance the techniques used for the 3D image construction and also to segment the blurry areas in the image captured from different depths. Also the image is desirable to recognize 3D-objects of the system in the user's environment, in order to avoid manual based method

(Ajay Kumar, et al., (2016)) method is defined for LPG leakage detection, and then alerting the user through a message by switching off the mains power supply. This paper helped us to understand about microprocessor functionalities with respect to the gas detection and DC motor.

(Arijit Banik, et al., (2017)) develops a device that can automatically detect and stop gas leakages in those permeable areas. Leakage detection is done with a gas sensor. The system then alerts the customer by sending an SMS to the specified mobile-phone. From this paper, we learned that when gas leakage level increases sensor goes low prevents the environment from catching fire by giving a buzzer alarm.

(Kenneth V. Balmes, et al., (2015)) method helps us in measuring the content of LPG concentration the range of 85% to 100%. The system after identifying the LPG leakage send an SMS alert and turns on the exhaust fan.

(Lizeth Torres, et al., (2013)) method helps to identify the leakages in the pipelines made for the transfer of petroleum products. Form this paper, we have come to know how to measure the momentum and behavior of pipeline for leakage detection and isolation.

(Nivedhitha S, et al., (2013)) method detects the gas leakage level through smoke level identifier using LEDs using PUTTY software and gives alarm when gas leakage concentration increases. From this paper, we learnt that when gas leakage level increases the system prevents the environment from catching fire by switching off mains and audio indicates the same.

(Luay Fraiwan, et al., (2011)) method has the design built with detection and transmission modules for gas concentration in household devices like Gas and heaters. From this paper, we learn that depending on the sensor values showing the variation in the gas concentration measurements and audiovisual alarms were activated.

2.1 Summary

All existing system mainly provides the solution for the leakage detection and concerned with monitoring of the gas left out so that it prevent the user from the hazardous situations by finding the LPG level in gas container and turn off the knob after sensing the LPG gas smell using DC motor, using sensor and micro-controller later buzzer can be alarmed and exhaust fan can be made on, and notify using SMS by switching on exhaust fan.

3. PROPOSED METHODOLOGY

Number of systems are proposed and implemented to resolve the problem of identifying and rectifying the gas leakages. Some of the systems have identified by different ways like DC motors, micro-controller, etc. By the observations made, we still fee that the system existing can still be improved for detection and provide better solutions without using electronic device helps for notification because they may also catch up with the fire accidents.

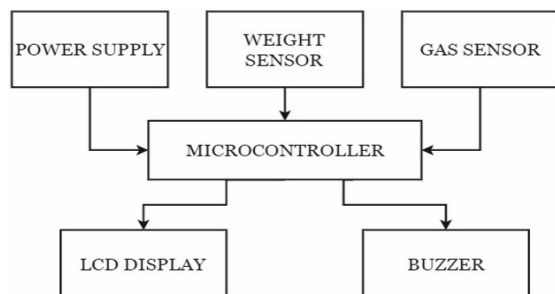


Figure 1: One among the existing System

From the existing system, if a failure arrives for providing a solution after detecting a gas leakage of one of a component then it will be a complete failure. To overcome this we propose a mechanical based automatic-locking and sensor based detection system

(existing) during leakage instead of electronic based existing system.

All the existing systems identify and inform the same to the user in the form of SMS, or an alert through buzzer, etc. but due to the signal transmission happens using electro-magnetic waves then there can also be chance of catching up with the fire due to the closed area where there is no outlets opened for Gas to escape. Hence in our proposed system we have planned to implement the detection and prevention system integrated in such a way that there will be a scenario where preventions is defined by a mechanical method that will close the gas cylinder's valve automatically when the threshold of the gas leakage measured to be more than the normal (increasing). In our system the advantage factor is that there is an inclusion of mechanical PULLY system that will be initiated by the valve that closes the cylinder's mouth to stop releasing the gas, immediately to open the window pane automatically along with an exhaust fan turning on. Hence, we may prove that when there is no chance of electricity, electro-magnetic waves or fire involvement during a leakage of gas then there may be no chance of catching of fire.

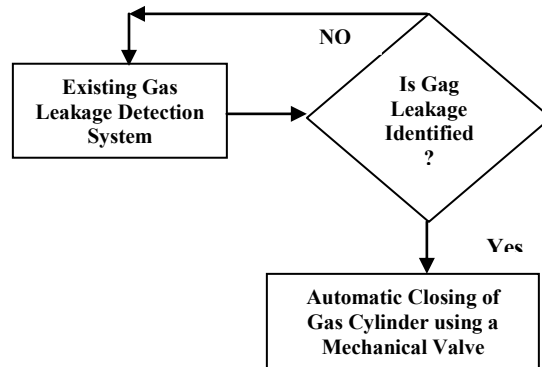


Figure 2: Proposed System

4. CONCLUSION

In this paper we discussed the different methods used for identifying the leakages and drawbacks of the proposed system that provide precautions in the form of alert signals or indications whenever there is a leakage. Also, we have proposed a method that can automatically close the valve of the gas regulator using a mechanical automated valve closing adopter.

FUTURE ENHANCEMENT

The proposed system is planned for implementation in all areas like vehicles such as car, auto, etc. and kitchen areas for accuracy and efficiency measurements.

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