Design and development of Smart Gas Level Monitoring & Leakage Detection System

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Abstract

Liquid Petroleum Gas (LPG) is one of the primary energy sources used in industry and households for cooking and other applications. The LPG comes in a sealed metal container and the user faces difficulty not knowing when the gas may finish as the daily consumption rate or the remaining gas volume in the container is unknown to the user. Unexpected fire or explosion due to gas leaks from the container is another disaster due to poor maintenance. A system is developed to overcome above difficulties. Gas level detection and leakage detection system with an IoT-based platform integrated into the mobile application is presented here. LPG level in the cylinder is determined using the time lag between the time of flight of an excite ultrasound signal and its echo after passing through the height of LPG in the container. If the gas level is below the threshold limit (For example: below 5% of the cylinder), it places an alert using the IoT system. The system can automatically book a new LPG cylinder when the gas cylinder is empty through the mobile application to avoid delay in the process of receiving a new LPG container. When a gas sensor detects gas leakage, it alerts the user via mobile application through Wi-Fi and an in-built buzzer as a safety feature. The system will significantly reduce the need of continuous human intervention through monitoring the consumption level of the LPG, in booking the LPG cylinder from the re-filling station, in monitoring gas leakages and thus ensuring the consumer safety.

Keywords: *Gas level detection, Gas leakage detection, Internet of Things (IoT), Metal penetrating ultrasonic sensor*