Abstract

Gas leakage is a major problem for our country. Our device is intended for use i household safety, Industrial sector, residential premises and gas-powered vehicles lik CNG, buses cars where appliances and heaters that use natural gas and liquid petroleu gas (LPG) may be a source of risk. Nimtoli and Old Dhaka gas tragedy was an exampl of gas leakage accident in Bangladesh. Unfortunately, gas leakage detection device aren't that much available in our country. In our project, we focused on developin such a device. We made this device based on two main sectors: the transmission an detection module, and receiving module. The detection and transmitting module detect the gas leakage using a sensing circuit built for this purpose. If the sensor detects a ga leakage, it provides an alarm and sends a signal to another module. GSM module will send emergency SMS to fire service station, emergency contacts numbers and power line automatically cutoff. The device was tested using LPG gas and the alarm was activated as a result of gas leakage. However, the former gas leakage system cannot react in time. This project provides the design approach on both software and hardware.

Chapter 1

Introduction

More and more people are getting injured, burnt and a large portion of them eventually dying due to cylinder blasts that have been taking place in the country for the last couple of years. At least 50 were injured and 10 died in last one-year time in Bangladesh. In the last January alone, there were 4 huge cylinder blast incidents that took place in the city [4].

A gas pipe leaked during a road development work in the capital's Uttara on Oct 6 2018, causing suspension of traffic movement on the busy Dhaka-Mymensingh highway for about three and a half hours.Gas from the 10-inch pipe leaked near Mascot Plaza in Uttara around 9:00 pm [12].

The woman who was burnt in a fire at an apartment in Dhaka's Uttara has succumbed to her injuries. Afire had broken out at the Uttara apartment of US embassy staffer Md Shahnewaz on the morning of Feb 26, leaving five— the couple and their three sons—injured [13].

1 killed, 6 others injured in gas cylinder blast in Jatrabari. The accident occurred on Friday 16 November 2018. An eight-year-old child has been killed, and six people have sustained burn injuries, in a gas cylinder explosion in Dhalpur, Jatrabari [14].

In Bangladesh, CNG and LPG cylinders are mostly metallic having a lifespan of roughly 10 to 15 years. These cylinders must be destroyed after their expiry dates. But, in reality, the cylinders are not abandoned or even tested after elapsing the granted period thus, risking it to blow out at any time.

Moreover, the companies that are selling cylindered gas are also issuing the fitness certificate of the cylinders and unfortunately, the government has no rigid policy on the LPG and CNG. The most horrifying fact is that the state-owned Bangladesh Petroleum Corporation (BPC) has a total of 11 thousands of cylinders and 8 thousands of them are out of date! Directorate of the Explosive Detection has recently identified that almost 80% of the cylinders of BPC are unusable after an explosion that took place at a BPC depot in Bogra in last year that completely destroyed 300 cylinders and burnt 3 trucks and luckily no human was injured in that incident [15].

According to the reported incidents, cylinders are blowing out on a regular basis throughout the country. The frequency of the blast is almost one at least in a month. From the last June, there were at least 5-6 LPG and 2 CNG cylinders explosion incidents that are reported at various dailies. Those explosions cost at least 7 human lives and left 5 burnt and injured severely while the financial loss was above 30 to 35 million BDT.

Experts have urged on setting up policy by the government to maintain the safety standards in this sector. They are also encouraging the mass people to be cautious while buying and using the cylinders and to conduct regular health check-ups of the cylinders from a certified authority [3].

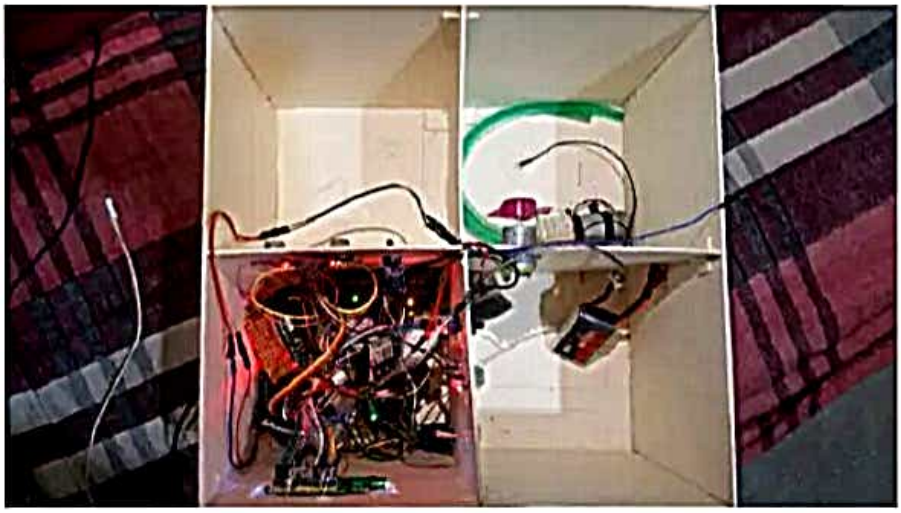

Figure 1.1: Gas Leakage Detector System

People had died on the gas or LPG blast.We are looking for the reasons-

- Gas Burner is open all time.
- Gas cylinder isn't test proper time.
- Proper alert system.

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To reduce the death rate of people we have to design a gas leakage detector which has to work on 5 stages of gas leakage, those are,

a. First flame sensor detects the gas leak.
b. The numbers start at 1 with every call to the enumerate environment.
c. When the last sensor has given alert, that time 3 message send to different numbers.

To develop this project, we have to use Arduino Mega board, LED, Brazzers, GSM module and five different five sensors.

1.1 Problem Statement

Here we have described about problem statement.

- Natural gases such as Liquefied Petroleum Gas (LPG) are widely used in the whole world. LPG is used for cooking in home or hotel. It is also used in certain gasbased industry. As for now, the use of natural gases instead of petroleum as the alternative fuel for mobile cars also has been increased. Although the procedure of installing LPG-based system is very tight, we could not give 100% guaranteed that the LPG-system will not having leakage.

- Even though human is a perfect creation of God, they still have certain weakness. Human cannot detect the presence of natural gases as fast as the sensor do. Thus, the use of gas sensing system is hugely needed to give real-time monitoring of the gas system.

- In certain cases, gas leakage can cause fire that will destroy human property. The large scale of fire also could contribute to serious injury or death. This is due to the fire station got delay information about the fire occurred.

Therefore, this project shall be able to resolve the problem stated. This is because this project is able to sense the presence of natural gases as well as fire. Besides that, it is also capable to send out an SMS alert automatically to the owner and also to the nearest fire station.

1.2 Motivations

In this section, we have to describe the motivation of our gas leakage detector system.

- In recent times many cases of gas leakage accident can be seen around us. Day by day people,s are increasing, people get injured or might be dead, one of the biggest reason is emergency contact with the nearest firefighter station and track the accident area.

- In our country, More than 500 hundred people have died in an accident for proper medical attention.

- Tracking the nearest firefighter station and know the vital information for the accidental place, given an important message to the house owner,

- Many people could save their life in accident case if we can take an immediate decision to send news to fire service.

Experts have urged on setting up policy by the government to maintain the safety standards in this sector. They are also encouraging the mass people to be cautious while