**IOT BASED GAS LEAKAGE DETECTION SYSTEM USING RASPBERRY Pi**

**ABSTRACT:**

Gas leakage is a common problem in various places, including residential properties, industries, manufacturing facilities and gas stations. For example, LPG (Liquified Petroleum Gas) is a highly combustible gas which can lead to building fire, suffocation or an explosion. Methane explosions, which occur when a buildup of methane gas, a by-product of coal, comes into touch with a heat source, are highly prevalent in coal mines. This can lead to coal mine fire and severe life damage. One of the preventive methods to stop this kind of dangerous accidents associated with gas leakage is to install gas leakage detection systems at vulnerable places. The aim of this IoT project is to build a model that can automatically detect, alert and minimize the chances of calamity. The gas sensor which is used in the model detects any type of gas leakage. Once the sensor detects any leakage, it will send the data to the raspberry pi from there it will be uploaded to the cloud. On cloud the sensor data will be analyzed to determine the severity of the situation and actions will be performed accordingly. If the situation is detected as low (no leakage) no actions is performed and the device continuously collects the sensor data. If the situation is detected as high (leakage), then all the concerned persons are notified via alarm and a message is received to the number linked with the raspberry sensor.

**LITERATURE SURVEY:**

**Mukesh Mahajanand Vishal Date[1]** expressed the system which detects the gas leakage and can be **monitored on IoT. Ch. Manohar Raju[2]** describe **robot technology** here the mini robot finds the leakage in insecure places. Here author **developed** **android mobile app** which will receive information from many robot directly using Bluetooth. The disadvantage of the system is that before practically used in industrial are more setting and development is needed in detection and indication on mini robot simulation. **Mahalingam[3]** introduced design and implementation of economically suitable gas leakage detection system. The system ensures a **continuous monitoring and checking the** **gas level and detection**. This system is applicable only for restricted area where leakage is found or occurs. Beyond this system is not applicable. **Zhao Yang[4]**  researched on leakage detection in gas pipeline system. To obtain the data from pipeline **SCADA system** is used for communication.

**Aashish Srivasthava [5]** proposed a gas leakage detection system with the help of **MQ6 gas sensor** which detects LPG gas and sends the signal to microcontroller. The drawback here is that the microcontroller used is memory inefficient. **Sagar Shinde[6]** proposed the system real time detection of potential risk area, collect the data of leak accident and locate leakage point. This system is having protection circuitry consist of **exhaust fan and LPG safe solenoid valve**. MQ6 gas sensor is used to detect LPG gas leakage. The disadvantage of the system is that it can only detect leakage of LPG and propane gas.

**Madhura Ghul[7]** proposed a paper on LPG level monitoring, booking and gas leakage detector, the proposed system helps in recognition, checking and control arrangement of LPG spillage. The **gas sensor MQ6** is used which mainly detects LPG and **buzzer alert system** is used.

**Manaswi Sharma[8]**  proposed a system detects gas leakage using a sensor and immediately turn-off the regulator knob to stop further leakage. A **wifi module sends SMS or e-mail** using the cloud to the user. **Anandhakrishna[9]**  proposed an SMS based gas leakage alert system. Gas sensor are used to detect gas leakage in a kitchen. With the help of an **infrared sensor** the issue of gas wastage is also monitored. An alarm goes off whenever the sensor does not detect any vessel over the burner beyond a particular time period. **Sjeya Anusuya[10]** proposed an **innovative robot** that links on to the outer surface of the gas pipe and moves with the pipe to check for leakages. The kit consists of MQ2 gas sensor to detect the gas leakages. The robot will be moving continuously along the metal pipe, if there any presence of leakage the GPS sensor module will transmit the location to the cloud. **Dr. S.P. Rajaram[11]** expressed about **IoT** based gas pre booking and gas leakage detection using **IBM server**. Detection and transmission and receiving module are the two important modules in the proposed system. The outcome was security level of home can be increased by detecting gas leakage and sending an alert. **Ms. Fariha Aimen[12]** proposed a system based on **image processing** where SF6 gas leakage is detected. Since SF6 gas and air have different infrared absorption properties, it is easy to observe SF6 gas that leaks into the air through infrared imaging detection technique but this system could detect only one gas.

**Gokula Kaveeya S, Gomathi S, Kavipriya K, Kalai Selvi A,** **and Sivakumar** **S[13]** proposed automated unified systemof LPG using load sensor. In this approach gas leakage detection and gas refilling is done using the **MQ5 sensor,** **GSM, load sensor, raspberry pi, aurdino**. MQ5 detects the LPG frequently whether the flow of gas is normal or abnormal, if it is abnormal, sends notification to user via GSM. If there is no response, the system automatically turns off. The problem in this is, gas cannot be refilled without the intermediate.**Mr. Sahil Adsul, Mr. Ashok Kumar Sharma and Mr. R.G. Mevekari[14]**  proposed the Development of Leakage Detection System. In this approach the data such as humidity, temperature, pressure, gas detection, sound detection is acquired by using sensors. The sensors used are **DHT22/AM2302, TMP006, BMP180, MQ6, 20KHz microphone, 40KHz ultrasonic receiver, 40KHz ultrasonic module**. ZigBee is a wireless communication technology used to create small personal area network. This idea is to detect leakage with different parameters and test on different type leaks was achieved. This system can be designed by using low power microcontroller board and using more high quality sensors to detect accurate values at the output.

**L.P. Deshmukh, T.H. Mujawar, M.S. Kasbe S.S Mule, J.Akthar and N.N. Maldar[15]** proposed a lab VIEW based remote monitoring and controlling of wireless sensor node for LPG gas leakage detection. This approach gives a system for monitoring the LPG gas leaks the presence of air. The methods used here are **wireless sensor network, sensor** **node, remote monitoring and controlling**. In this paper gas leakage is detected and alerts the user via **alarm,** **sending SMS** on user mobile phone and turns off the gas regulator valve. **Jinhao Sun, Jinhao Sun Yezi Xiajin Yan[16]** proposed the design of automatic detection processing device of gas leakage based on the **MB95204K**. Gas leakage causes loss of energy, personal injury and property damage. To solve these problems paper designed a gas leakage automatic detection and processing device by using Fujitsu MB95204K. Gases such as methane and carbon monoxide will automatically detect and alarm. The chemical transducer MQ5 detects concentration of gas general signals and then does A/D conversion. **Vinayshri Nalk, Chaitali Bagwe, Neha Kunte, Vidya Ghadi[17]** proposed IoT based gas leakage detection system with database logging, prediction and smart alerting review. This approach makes use of **data analysis, IoT, MQ5 gas** **sensor and alarm**. Gas leakages in any areas can cause danger. Therefore we are using IoT technology to solve the proposed problem and make predictions which will be helpful in current and future use.

**Halavva Patil, Shreedhar Niradi, Jyothi D.T, Seema J.S, Swetha D.G[18]** proposed smart gas booking and LPG leakage detection system. This approach makes use of **Gas sensor** **MQ06, GSM DC motor, microcontroller and load cell**. Proposed system consists of gas leakage detection sensor which is interfaced with microcontroller. If leakage is detected microcontroller immediately starts the stepper motor to turn off the gas regulator and message will be displayed on the LCD displayed. **Ahmed Imteaj, Tanveer Rahman, Hosna Ara Begum, Mohammed Shamsul Alam[19]** proposed IoT based energy and gas economic home automation system using raspberry pi3. When gas leakage is detected by gas sensor it makes the **WeMOS** know about this, which transfers signal to raspberry pi and it apprises the user immediately through GSM module. **PIR sensors** that automatically perceives whether there is any weight over the burner through the button module and if no then the system will turn off the stove using the relay module considering input of button module. **Asmita Varma, Prabhakar S and Kayalvizhi Jayavel[20]** proposed gas leakage detection and smart alerting prediction using IoT. This approach makes use of the **IoT,** **sensor, alarm, prediction, data analytics**. IoT is a network which can be extended with the help of physical devices that are connected with different types of servers and with help of internet they will be exchanging the data. Here IoT is used for gas leakage detection consisting of smart alerting techniques which involves calling, sending text message and email to the user and helps to predict hazardous situation so that people will be safe. A dedicated mobile application could be made for system.