

## IOT BASED INTELLIGENT GAS LEAKPOINT DETECTING AND LOCATING SYSTEM

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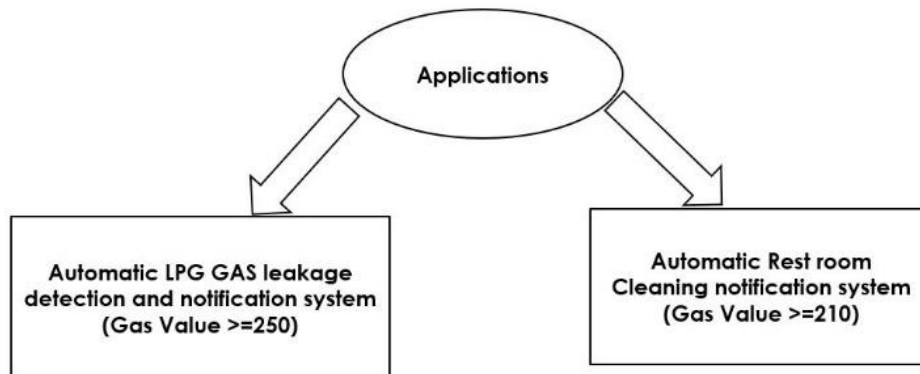
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### ABSTRACT

We need to enhance the safety measure by our system to notify the person like gas leakage detection and notification system and Automatic Restroom cleaning notification system. Gas leakages results a difficult issue in family unit and different regions, in this way the proposed gas spillage discovered. With the sensor is utilized to identify gas spillage at home. On the off chance that the gas spillage is detected naturally it will send SMS to the client. WIFI and GSM module is one of the most utilized systems over the world. Consequently, load cell has been utilized to screen the heaviness of the LPG gas normally. On the off chance that the gas in the chamber shows a worth where the rest of the rate level is crossed underneath the limit level(threshold) set for gas to be shown as getting discharged. Thus, answer warning will be sent to the client about the leakage. Simultaneously, application programming is created to find the gas leakage in the specific area. By our system it is also possible to clean the public restroom. If it is awful smell is exhaust, then the notification is send to their contractor and its cleaning agent.

**Keywords:** Arduino Uno, ESP8266, GSM Module, MQ2 sensor or MQ5 sensor, ESP-01 adaptor, IOT.

### I. INTRODUCTION



**Figure 1:** Need for our proposed method

From Figure 1, our system will detect both real time gases such as LPG and public Restroom exhaust awful gas. LPG is one in all the house wants in everyday life. It acts as an alternative to oil, that continues to decrease. With this transition, there square measure many issues caused by gas leak that may cause accidents. to stop this from happening, a device which will observe gas leak is critical. The previous devices solely observe gas leaks through the gas sensing element. This technique has some drawbacks. One example is that if there's a gas leak that causes the house occupants to lose consciousness, then the device becomes useless. what is more, it wants facilitate from different parties to prevent this from happening. Therefore, extra devices square measure needed like human detection sensors and fireplace detection sensors thus bar of accidents is often additional economical, fast and precise. Internet technology will build communication between devices quicker. By utilizing this property on an everyday basis, the device is ready to produce an answer of any existing problems. Therefore, we tend to propose a tool to beat the problem called the Gas Leak Detection device supported IoT (Internet of Things). it'll monitor the content of inflammable gas in the air, the presence of humans, and also the presence of fireside in the house unendingly. With this device, it's expected that the number of future accidents are often reduced and can not cause major losses. It is also used for real time notification system for public restroom and toilet cleaning system directly to respective cleaning person and their contractor. If gas is more then only we get notification system to that person.

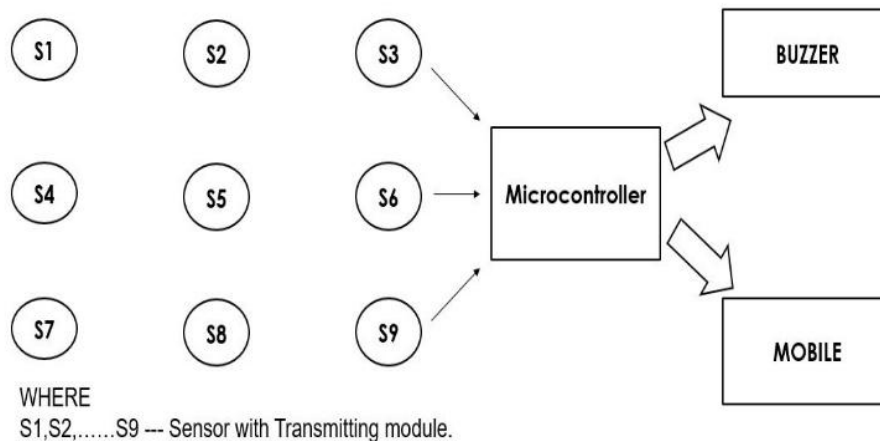
## II. METHODOLOGY

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### a) Gas Sensors

Different sensors were accustomed observe totally different dangerous gases. The MQ-5 is employed as alkane gas device, MQ-2 is employed as propane/butane gas device and MQ-8 is employed as gas sensor. Variable capacitors square measure enclosed on the circuit of each device to be ready to regulate the sensor's sensitivity. These sensors square measure placed close to the gas supply and observe concentration of gases. the knowledge is then passed to the Arduino.

### b) Sensor Arrangements



**Figure 2:** Sensor arrangements with transmitting module

From Figure 2, where S1, S2, S3, S4, S5, S6, S7, S8, S9 are sensors which contains separate transmitting module with user details. For example, if the gas leaks in some place which contains sensor transmitting module (S1), then it will send leakage notification to that loaded information of the specific user who have responsible of that area. Similarly, S2, S3, S4, S5, S6, S7, S8, S9 will works same as above sensor transmitting module.

### c) Arduino

From Figure 3, the Arduino is the controller of the system. It will control for triggering the GSM module, lamps, buzzer and ESP8266 supported the received signal from the sensors. The totally different sensors have different set points. The Arduino recognizes the best level of concentration of gas regardless of what number gases square measure gift within the space. It analyzes the extent of gas marking it with “safe level”, the condition wherever the gas being detected is taken into account tolerable that starts at zero elements per million (PPM) up to 299 PPM; “medium level”, the condition where the gas being detected is a smaller amount focused with a group point of not but three hundred PPM and less than 350 PPM; and “danger level”, the condition wherever the gas being detected has an excessive amount of concentration with a group purpose of not but 351 PPM. The Arduino recognizes the best level of concentration of gas regardless of what number gases square measure gift within the space. It analyzes the extent of gas marking it with “safe level”, the condition wherever the gas being detected is taken into account tolerable that starts at zero elements per million (PPM) up to 299 PPM; “medium level”, the condition where the gas being detected is a smaller amount focused with a group point of not but three hundred PPM and less than 350 PPM; and “danger level”, the condition wherever the gas being detected has an excessive amount of concentration with a group purpose of not but 351 PPM.

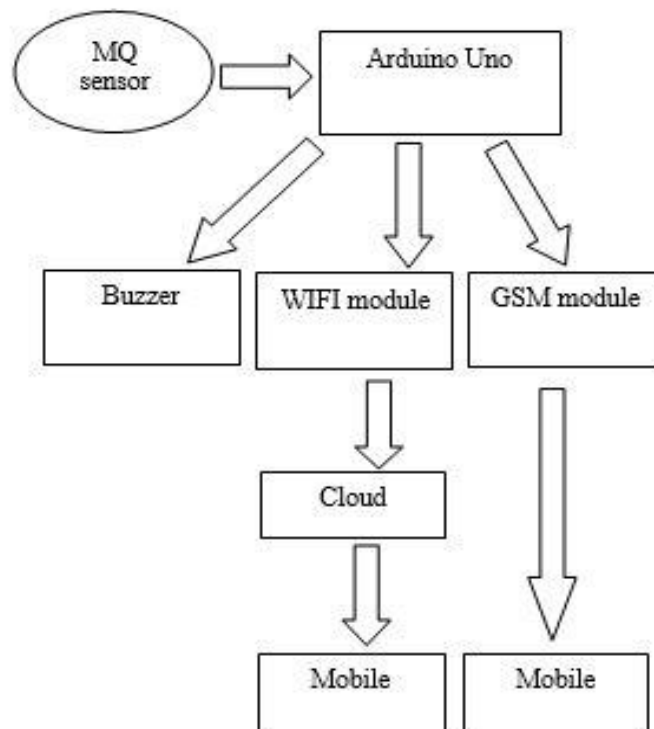


Figure 3: Block diagram and it's working

**d) GSM module**

The system conjointly includes a GSM module that sends Short Message Service (SMS) in each level of detected gas. However, mobile devices with text electronic messaging functions can receive the notifications. By the help of GSM module, we transmit the location of the particular device to its user and respective person who have in charge of it.

**e) WIFI module as NodeMCU**

NodeMCU is associate degree ASCII text file IoT platform. It consists of the hardware, within the type of ESP8266 System on Chip from ESP8366 created by Express if System, and also the microcode, which is Lua scripting artificial language. The NodeMCU is analogous to the Arduino micro-controller combined with the ESP8266 module. NodeMCU has blessings compared to other micro-controllers, namely:

- NodeMCU has the aptitude to access wireless local area network, for instance the ability to attach to wireless local area network that's inside shut proximity. This device also can produce associate degree access-point which will be utilized by different devices.
- Use USB for serial communication. Programming on this device are often performed by connecting the device to a laptop employing a USB cable that's sometimes used on smartphones, specifically USB cable with Micro-B kind. By ESP8266 we transmit data to cloud.

**f) LED**

The system includes indicator lamps that indicate the level of gases looking on concentration of gas. The lamps or LED are used to connected with parallel to buzzer they're controlled by the Arduino.

**g) Buzzer**

The system incorporates a 5V buzzer that solely functions once “danger level” is reached to alert individuals close of the high concentration of venturesome gas.

**III. PRODUCT TESTING AND ITS OUTPUT**

Our System will be developed as product to give the notification for Automatic Restroom cleaning notification system and Gas leakage system connected via IoT cloud.

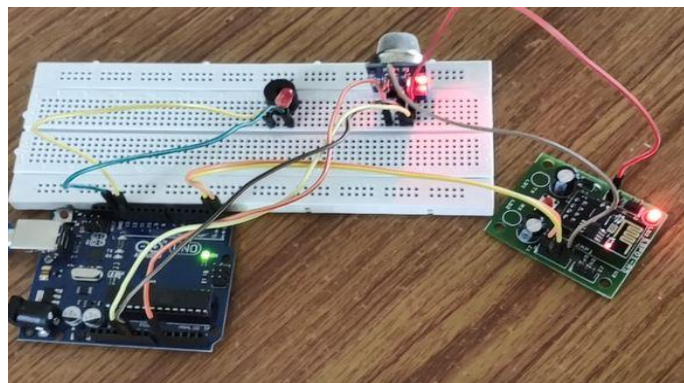
**a) With Serial monitor of Arduino IDE**



**Figure 4:** Connecting to cloud by IP address.

From Figure 4, it sends data to ThingSpeak cloud’s host IP address by write API where 250 is the threshold value. If it is” HIGH” then the output of sensor will have sent data to cloud, else it does not send data. Thus, data can be transmitted to cloud by the help of ESP8266 Wi-Fi module.

**b) Without Gas**

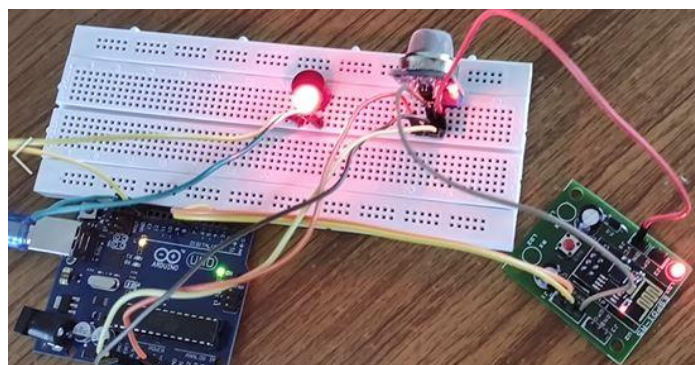


**Figure 5:** Initial stage of circuit

From this Figure 5, the Buzzer and the LED will be turn OFF when analog data will be low. If the analog value is high, then only the Buzzer and the LED will be turn ON. In this type we developed a product independent of any software and laptop. Once the code is uploaded, we run at anywhere with the supply of 5V adaptor is connected to Arduino Uno.

**c) With gas (Gas is Detected)**

From Figure 6, Gas is detected and output will be in the form of Buzzer sound and LED will on for one minute, at the same time we transmit the data to cloud. If the condition is true then SMS will be send by both Cloud and GSM module.



**Figure 6:** Final stage of circuit with output

d) By Thingspeak API

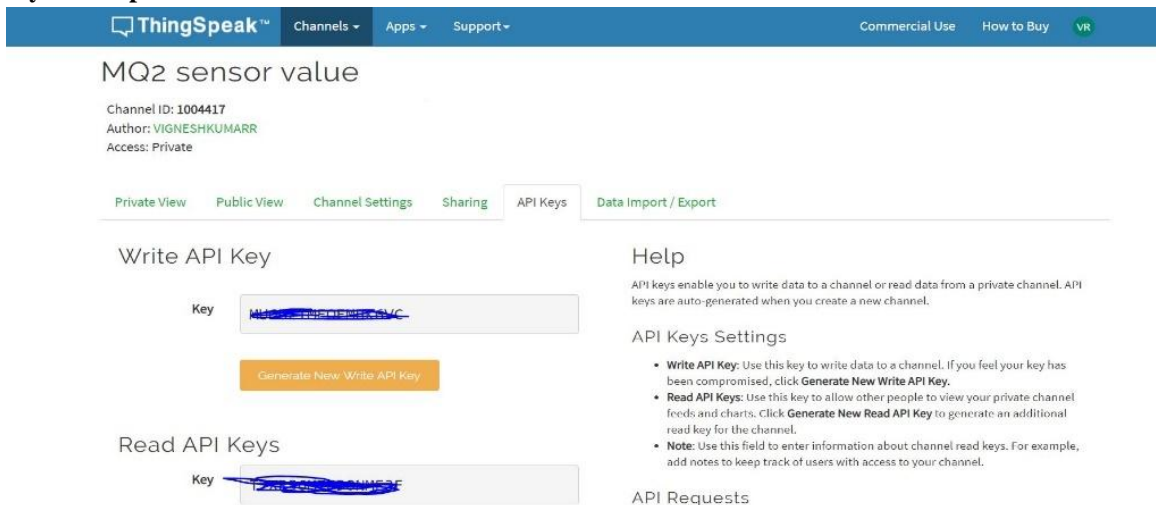


Figure 7: Think speak Read API and Write API

From Figure 7, we initially create an MathWorks accounts for Thingspeak IoT site Login, then we create a channel which is connected to sensor transmitting module by IP address (184.106.153.149) and port number (as 80) of the Thingspeak site, which is loaded in Arduino microcontroller board and ESP8266 board. If gas leaked, then message will send to cloud and next to mobile.

e) By PushBullet API

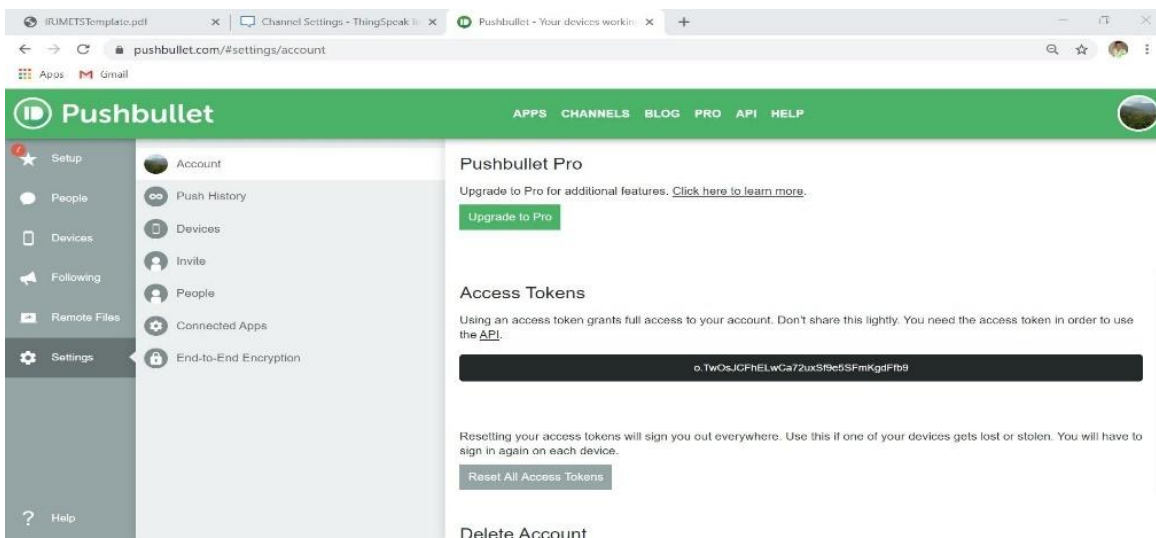


Figure 8: Push Bullet Access Token

From Figure 8, we initially create a google email ID for sign up PushBullet notification service, then we create a device for notification service which is connected to READ API of the Thingspeak site by the help of Access Tokens of PushBullet service. Then the notification will be received after we connected the device in PushBullet Service.

#### IV. ALGORITHM

From Figure 9, we design the program with threshold value as 250 for LPG gas and restroom which emitting gas as 150 (under bad condition) is uploaded to the Arduino Uno and ESP8266. If it crosses the Threshold value, then the output will be sent through GSM module and WIFI module to the User. Otherwise Sensor will continuously sense.

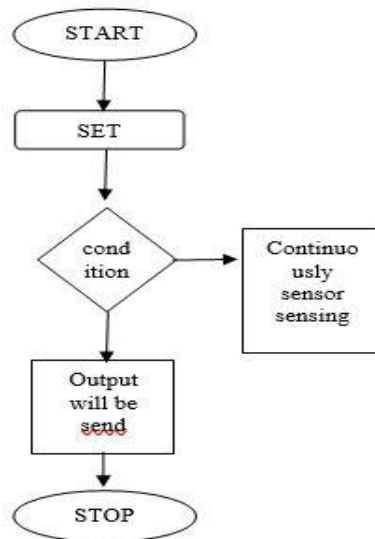


Figure 9: Flow Diagram

## V. CONCLUSION

Along these lines the venture will especially be utilized for entirely genuine time examination of Gas spillages either LPG or really different gases, for example, Bathroom which transmits essentially truly awful gas contrasted with decently truly clean condition of it in an inconspicuous manner in a major way. On the off chance that it unquestionably fundamentally crosses the edge esteem, at that point the notice will be for the most part basically send to the individual client sort of extremely, for example, home individuals, cleaning operator and its contactor by the assistance of microcontroller in reality, for example, Arduino Uno and ESP8266 to extremely simple our procedure in an inconspicuous manner. Thus, message can be from GSM module and ESP8266 module to user by AT(Attention) Commands. This Attention (AT) commands is also used to read the data from ThinkSpeak by READ API. From the above process, we conclude that if gas is detected, then Buzzer will give local output as sound, the data is sends through ESP8266 module and cloud to get notification from PushBullet Notification services and GSM module will be used to transmit data for Long Range Communication.

## VI. REFERENCES

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