Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	15 October 2022
Team ID	PNT2022TMID14187
Project Name	Project - Gas Leakage Monitoring and Alerting System for Industries.
Maximum Marks	4 Marks

Technical Architecture:

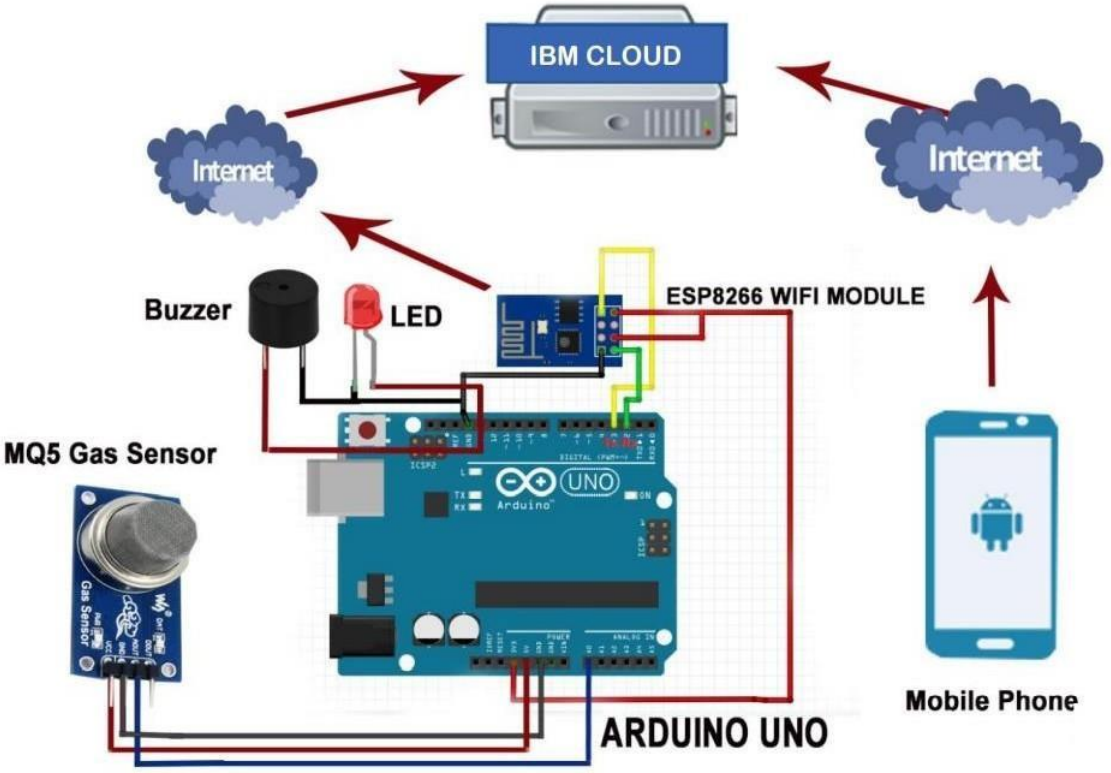

Table-1: Components & Technologies:

S.No	Component	Description	Technology
1.	Arduino UNO	Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button.	Basically, the processor of the Arduino board uses the Harvard architecture where the program code and program data have separate memory. It consists of two memories such as program memory and data memory. Wherein the data is stored in data memory and the code is stored in the flash program memory.
2.	LED	LED, in full light-emitting diode, in electronics, a semiconductor device that emits infrared or visible light when charged with an electric current.	LEDs operate by electroluminescence, a phenomenon in which the emission of photons is caused by electronic excitation of a material.
3.	ESP8266 WiFi Module	The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor.	The ESP8266 is a low-cost Wi-Fi microchip, with built-in TCP/IP networking software, and microcontroller capability
4.	Buzzer	A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short).	The two most common technologies used in buzzer designs are magnetic and piezo.
5.	MQ5 gas sensor	The Grove - Gas Sensor (MQ5) module is useful for gas leakage detection (in home and industry).	It is suitable for detecting H2, LPG, CH4, CO, Alcohol. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible.
6.	IBM Cloud	The IBM Cloud platform combines platform as a service (PaaS) with infrastructure as a service (IaaS) to provide an integrated experience. The platform scales and supports both small development teams and organizations, and large enterprise businesses.	Platform as a Service (PaaS) is a cloud computing solution that provides developers with an easy-to-use platform to create their own software, web applications, or other programming projects.

7.	Mobile Phone	Whenever the excess gas is detected SMS will be sent to a particular phone number. Smoke and gas leakage detectors are very useful in detecting smoke or fire in buildings, and so are the important safety parameters in order to prevent disasters.	The system alerts notifications to the end-user - who responds accordingly with the help of connected devices such as a smartphone on the go.

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Harmful Gas Detection	The sensing of toxic gases such as H2S, Methane, and CO is of great importance in any industry to avoid unwanted leakage and consequences like poisoning or explosions. The presence of these gases can be easily detected in the industrial facilities and commercial buildings with the help of IoT-powered gas monitoring solution	Sensors are used, it is suitable for detecting H2, LPG, CH4, CO, Alcohol. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible.
2.	Fire Hazard Prevention	The gas sensors help detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts. Also, it is an imperative solution to keep the plant workers and equipment safe from fire hazards.	Technology are used The purpose of this system is to detect gas leakage, neutralize it, and prevent the explosion.
3.	Oxygen Level Measurement	Sensing the presence of gases is a necessity to conduct industrial operations as several pitmen had lost their lives due to lack of oxygen in the process of mining explorations. A sudden decrease in the oxygen levels can result in dizziness, brain damage, or even death among the workers working in mines or close-packed industrial premises.	Sensors are used, it is suitable for detecting Oxygen. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible.