PROJECT NAME	**GAS LEAKAGE MONITORING & ALERTING SYSTEM FOR INDUSTRIES**
TEAM ID	**PNT2022TMID14187**
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Abstract :-

Leakage of any kind of gas has been a concern in recent years, whether it is in a residential setting, a business, a cafe, or a canteen. In this paper development of an IoT based gas wastage monitoring, leakage detecting and alerting system is proposed. This paper elaborates design such an intelligent system that will help save gas and smartly prevent accidents. This system can be integrated to industries so it could help with the excess gas leakage in industries. The moment gas leakage will probably be recognized, users will be informed via cloud through Node red, and so that user can solve the issue as soon as possible. The system will monitor methane gas using MQ5 sensor. When a methane gas is detected, the buzzer begins to sound and led lights up. Aside from that, the system also has a cloud storage capability. The usage of gas for each user each day may be tracked with the aid of this cloud storage solution. At the end of the day, this procedure will assist in detecting natural gas usage by individual users. The system has been tested and it is able to monitor gas wastage, leakage and send a alert the user. The resulting performance indicated its effectiveness toward saving a significant portion of the gas wasted in industries.

Introduction :-

Now a days the industry safety detection system plays the important role for the security of people. Since all the people from the industry goes to work on daily basis, it makes impossible to check on the appliances available at industry daily. Since methene has been widely used as a fuel to height it is a needed resource. To meet this access amount of demand for energy and replace oil or coal due to their environmental disadvantage, natural gas is preferred. These gases are mostly used on large scale in industry, heating, home appliances and motor fuel. So as to track this leakage gas, the system includes MQ5 gas sensor. This sensor senses the amount of gas leakage present in the surrounding atmosphere. Through this, explosion or getting affected by the leakage of gas could be avoided.

Objective :-

The design of a sensor-based automatic gas leakage detector with an alert and control system has been proposed. This is an affordable, less power using, lightweight, portable, safe, user friendly, efficient, multi featured and simple system device for detecting gas. Gas leakage detection will not only provide us with significance in the health department but it will also lead to raise our economy, because when gas leaks it not only contaminates the atmosphere, but also wastage of gases will hurt our economy. The need for ensuring safety in workplaces is expected to be the key driving force for the market over the coming years.

Problem Formulation:-

Gas leakage is nothing but the leak of any gaseous molecule from a stove, or a pipeline, or cylinder etc. This can occur either purposefully or even unintendedly. As we are aware that these kinds of leaks are dangerous to our health, and when it becomes explosive it could cause great danger to the people, home, workplace, industry and the environment.

Few of the major incidents that took place due to gas leakage include the Bhopal Disaster and the Vizag Gas leak. The Bhopal disaster is known to be the worst industrial accident ever. Approximately 45 tons of Methyl Isocyanate was leaked from this insecticide plant. Methyl Isocyanate is an organic compound and a chemical that could come from the carbamate pesticides. This colorless, poisonous and flammable liquid is something that human beings have to be away from.

Vizag Gas leak was a resultant of the escape of styrene that were unattended for a long period. This colorless oily liquid can spread in fumes. So, a detector must be made in such a way that could detect any kind of gas, fume, leak, smoke etc. However harmful and dangerous it can be, the detector could be attached with certain parameters that could help to prevent the issue.

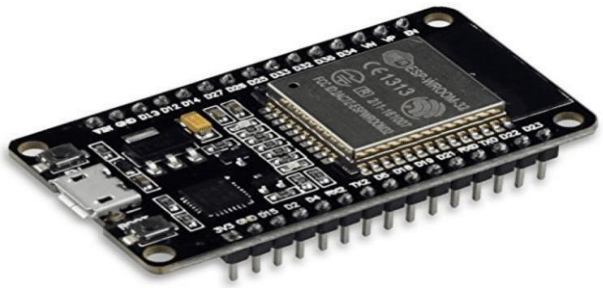
List of Components :-

S.No.	Name of the Component	Quantity
1.	ESP 32	1
2.	LED	1
3.	PIR Sensor	1
4.	Servo Sensor	1

5.	Resistor	1
6.	buzzer	1

Here the sensor values are generated randomly.

ESP 32:-



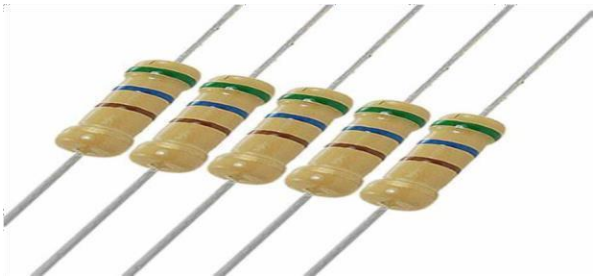
ESP32 is a series of low-cost, low-power system on a chip microcontrollers integrated Wi-fi and dual-mode bluetooth. The ESP32 series employs either a Tenicilica Xtensa LX6 microprocessor in both dual-core and single-core variations, Xtensa LX7 dual-core microprocessor or a single-core RISC-V microprocessor and includes built-in antenna switches, RF-bulan, power amplifier, low-noise receive amplifier, filters, and power-management modules. ESP32 is created and developed by Espressif System, a Shanghai-based
Chinese company, and is manufactured by TSMC using their 40 nm process.[1]

LED :-

LED (Light Emitting Diode) is an optoelectronic device which works on the principle of electro-luminance. Electro-luminance is the property of the

material to convert electrical energy into light energy and later it radiates this light energy. In the same way, the semiconductor in LED emits light under the influence of electric field. The symbol of LED is formed by merging the symbol of P-N Junction diode and outward arrows. These outward arrows symbolise the light radiated by the light emitting diode.

Resistor :-

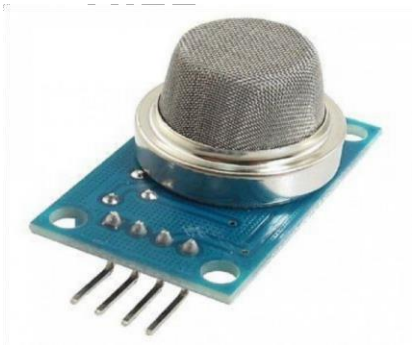


A passive electrical component with two terminals that are used for either limiting or regulating the flow of electric current in electrical circuits.

Buzzer:-

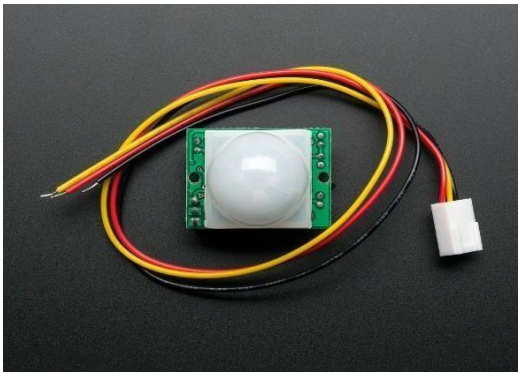
A buzzer or beeper in an audio signaling device, which may be mechanical, electrochemical, orpiezelentric (piezo for short).Typical uses of buzzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke

Gas Sensor :-



A gas sensor is a device which detects the presence or concentration of gases in the atmosphere. Based on the concentration of the gas the sensor produces a corresponding potential difference by changing the resistance of the material inside the sensor, which can be measured as output voltage. Based on this voltage value the type and concentration of the gas can be estimated.

PIR Sensor:-



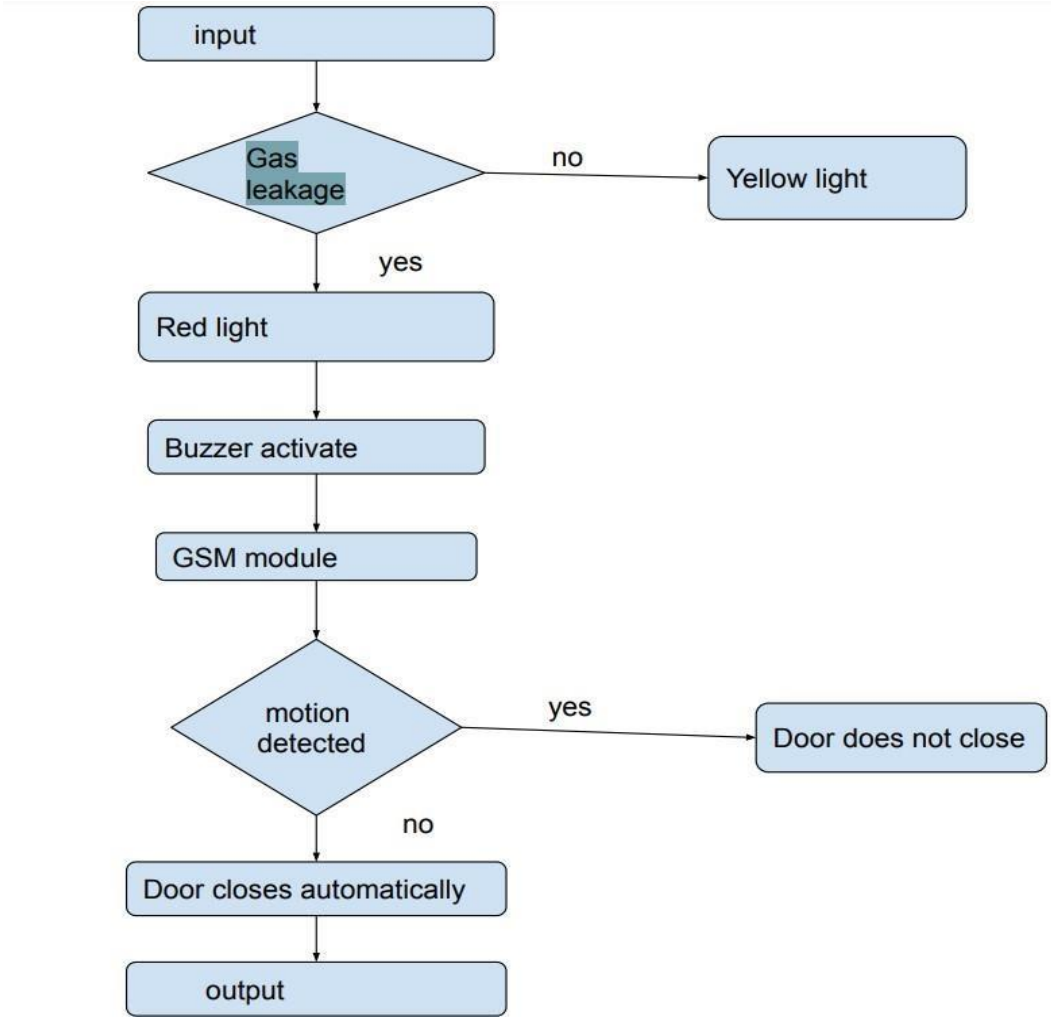
A passive infrared sensor (PIR Sensor) is an electronic sensor that measure infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved.

Servo Sensor:-

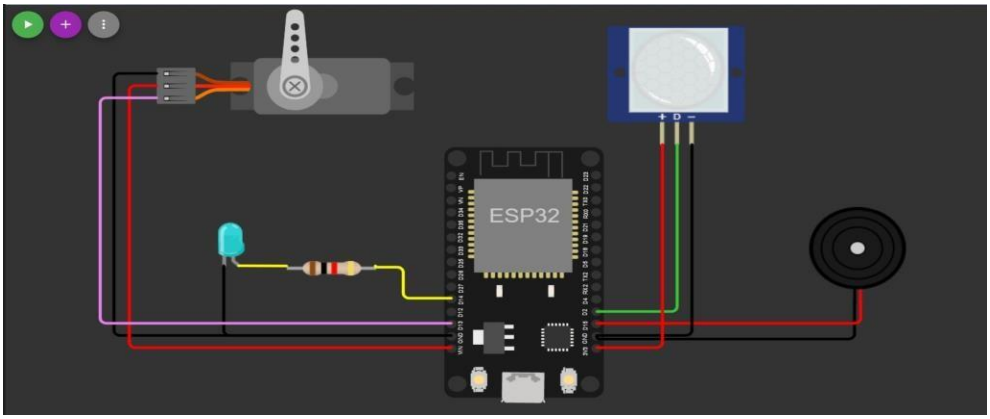
A **servomotor** (or **servo motor**) is a rotary acuator or linear acuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a specific class of motor, although the term *servomotor* is often used to refer to a motor suitable for use in a closed loop control system.

Proposed Method :-

Esp32 is the main unit of the system which performs the following tasks. A signal conditioning of the random values is done by output signal of the sensor, provided by Esp32 in wokwi . The detection results displayed on LED according the high and low levels of methene which Indicates the people of danger in work place, factory, home. Buzzer activity with beep(siren) sound is made. Also send alert SMS to the in charge of the person whose number is saved in SIM card by using GSM modem. The SMS received depends upon the leak of gas in the detection area of the sensor. If the is no motion detected then the servo closes the door which stops the spreading of methane.



CIRCUIT DAIGRAM:



Solution Statement :-

The system can be taken as a small attempt in connecting the existing primary gas detection methods to a mobile platform integrated with IoT platforms. The gases are sensed in an area of 1m radius of the cover and the sensor outputs data which are continuously transmitted to the local server. The accuracy of sensors are not up to standard thus stray gases are also detected which creates an amount of error in the outputs of the sensors, especially in case of methane. Further the availability and storage of toxic gases like hydrogen sulphide also creates problems for testing the assembled hardware. As the system operates outside the pipeline, the complication of system maintenance and material selection of the system in case of corrosive gases is reduced. Thus the system at this stage can only be used as a primary indicator of leakage inside a plant.

Conclusion :-

After this project performance, can conclude that detection of the methene gas leakage is incredible in the project system. Applicable usefully in the industrial and domestic purpose. In danger situations we are able to save the life by using this system. An alert is indicated by the GSM module. A sensor node senses gas like CO2, oxygen, propane. The estimated range of transmission and consumption of power is obtained. The simple procedures and Esp32 used to build the sensor.