GAS LEAKAGE DETECTION WITH BUZZER SYSTEM USING ATMEGA

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Abstarct:
The gas leakage detection system is designed to ensure safety in residential and industrial environments. The system uses an ATmega microcontroller to monitor gas concentrations through a gas sensor. When leakage is detected, an alert mechanism comprising a buzzer and an LCD display is triggered, and a gsm module transmits a warning message remotely. The system provides a reliable and real-time safety solution to prevent hazardous situations.

Keywords: Arduino uno, IOT (Internet Of Things), Leakage Monitoring, Hardware Sensors.

I. INTRODUCTION

Air and water pollutants is a major problem in all international locations, whether advanced or no longer. Health troubles.

It is growing unexpectedly, specially in urban regions of growing nations. Harmful outcomes of pollution consist of moderate hypersensitive reactions which includes irritation of the throat, eyes and nostril.

Some critical headaches include bronchitis, coronary heart disease, pneumonia, pulmonary asthma and exacerbations. According to the survey, sixteen,seven hundred human beings die every 12 months due to air pollutants in India alone. While there are 6.5 million deaths global each 12 months. This large water pollution threatens our fitness. Without movement, the problems will worsen with the aid of 2050, while worldwide call for for clean water is anticipated to be a 3rd higher than it is now.

Air and Water Pollution Monitoring System video display units air and water first-rate during the year. Triggers an alarm when air, water and air/water samples are present..

II. LITERATURE SURVEY

Shyam Siddharth, Debabrata Das (2021) In cold international locations, rooms are less ventilated in iciness. CO 2 is produced while people breathe and is a major supply of indoor environmental pollution. An common person's breath incorporates between 35,000 and 50,000 parts according to million (ppm) CO 2 per breath, 100 instances greater than regular out of doors air (SOA), and this varies by activity. Rising CO 2 ranges have toxic outcomes on human beings. Some of the facet effects include headache, elevated blood pressure, multiplied coronary heart charge, and shortness of breath. Therefore, tracking indoor air exceptional (IAQ) is essential to make certain occupant fitness, productivity and comfort. Theoretically, we are able to calculate the CO2 degree inner an apartment or room based totally at the variety of different people in the room, room length, time of day, ventilation, human beings's hobby level, and so on. Wearable devices which include smart watches can be used. Accurately calculate someone's contemporary status. Example: jogging, slumbering, enjoyable, watching TV and many others. Using a smart watch, the CO 2 stage in an condominium may be calculated and air emissions may be automatically monitored thru an Internet of Things (IoT) device, including an air conditioner. , the hood. Like a fan that uses built-in wireless communications like Bluetooth or Wi-Fi.

Kagan Parmar, Sagar Lakhani, Manju K. Chotapadhyay (October 2017) A Model Air Pollution Monitoring System Developed for Monitoring Concentrations of Major Air Pollutant Gases. The device makes use of

low-fee air best tracking nodes with low-fee stable-state gas sensors with Wi-Fi modules. This gadget uses semiconductor sensors to degree gasoline concentrations which includes CO, CO 2 , SO 2 and NO 2 . The sensors accumulate facts on numerous environmental parameters and ship it to a Raspberry Pi that acts as a base station. Data processing gathered by using the sensors is accomplished on a web server based totally on

Raspberry Pi three. A imply stack is designed to show statistics on a internet site. A essential component of the proposed work is to create a low-cost infrastructure that enables statistics collection and dissemination to all stakeholders.

Sarita Jial, Rakesh Kumar Saini (Nov 2020) In all developing countries like India, air pollution is a major motive of premature deaths, which additionally impacts the u . S . A .'s economic system. When urbanization begins, many issues arise like pollution, transportation device and many others. In densely populated cities, many resources are wasted due to urbanization. The concept of clever and sustainable metropolis may be used to balance sources. If we waste extra resources, we can surely create troubles for our future generations and overuse of resources will motive air pollutants. Timely assessment is essential to control air pollution. Using IoT to monitor air pollutants is critical to protect our environment from all dangerous pollution. Vehicles are the primary purpose of air pollution. Electric cars and bicycles may be used in preference to other motors to combat air pollutants. This take a look at indicates that predicting air pollution tiers is crucial for humans to exchange their journey routes.

Mohammed Faeik Ruzai A.I.-Okbi, S. Neubert, T. Roddelkopf K. Thurow (November 2021) Chemical laboratories, factories and warehouses incorporate risky gases and toxic or noxious vapors that require speedy leak detection. . . This paper proposes the mixing and validation of novel metal oxide (MOX) gas sensors for applications in IoT-based totally air first-rate monitoring and alarm structures. The sensors are associated with the WeMos D1 Mini IoT microcontroller to technique and transmit statistics via Wi-Fi communique protocol.

The computer layout takes into consideration elements collectively with low charge, slight weight, small length and low electricity intake. The system come to be tested with numerous unstable natural compounds (VOCs). The acquired air fantastic records is despatched to the IoT cloud, wherein the information is stored in a database for in addition evaluation and studies. Additionally, records can be monitored right now on a PC, tablet and mobile phone. System test outcomes verify that the device may be efficaciously utilized in a laboratory surroundings.

M. Thu, Wunna Htun, Y. Aung, Pyone Ei Ei Shwe, N. Tun (November 2018) Cities round the world in the intervening time are turning into smart cities. Smart city tasks want to address environmental troubles which incorporates air pollutants to make certain easy air. A scalable and price-effective air monitoring machine to display screen and manage air pollution is important for the improvement of smart towns. Air pollution has a sizeable effect at the well-being of normal human beings, the worldwide weather and the worldwide monetary gadget. This paper affords a scalable intelligent air terrific tracking device with low-charge sensors and an extended-variety communication protocol. The sensors gather four parameters: temperature, humidity, dust and carbon dioxide inside the air. The proposed incorporated machine has been applied and used in Yangon, the commercial capital of Myanmar, as a case check whilst you take into account that June 2018. This allows users to log into an online dashboard to screen system fame in real time. True. Additionally, based on the air high-quality parameters accumulated during the last two months, a system studying model become trained to estimate parameters to take proactive measures to reduce air pollution impacts.

Deeksha Singh Katiyar, Rahul Raj, Anil Kumar Dahiya (July 2022) The air we breathe has emerge as critically polluted because of multiplied urbanization and industrialization, deforestation and other human sports. Breathing unhealthy air can have an effect on human health and cause acute and chronic illnesses which include allergies, coronary heart failure and breathing infections. Accordingly, the degrees of numerous air pollution inclusive of PM10, PM2.Five and CO2 are monitored and evaluated. , CO, SO2, NO2 and Ozone are important to be aware about the air super that residents breathe. This article gives AirHealth, an IoT-enabled clever device which can find out and degree first-rate tiers of air pollution, providing geographic

pollutants data with the aid of calculating a internet site's Air Quality Index in addition to temperature and humidity tiers. The prototype consists of a microcontroller with electrochemical sensors, GPS, GSM module and real time clock. The accumulated statistics can be monitored remotely on the ThingSpeak website and cellphone app, just so people can understand the first-rate of the air they breathe and the precautions they're capable of take to guard themselves from excessive illnesses.

S. I. Lopez, P. M. Moreira, A. Cruz, Pedro M. N. Martins, F. Pereira, A. Curado (October 2019) Internet of Things (i.E. Smart surveillance) based surveillance technologies have these days been used for on-line monitoring in several applications. Monitoring of home, environmental and commercial approaches. People spend as a minimum half of their lives indoors, which is why indoor air satisfactory (IAQ) performs an vital function in building human health and sustainability. Radon is one of the maximum critical parameters for assessing IAQ and is considered via the World Health Organization (WHO) as the second one principal hazard issue associated with lung cancer. The motive of this newsletter is to introduce RnMonitor, a webGIS-primarily based platform designed to efficiently manipulate radon dangers and boost up IoT-primarily based sensors within the discipline. Considering that spatial context is crucial for visible analysis and records mining, the proposed framework leverages the hierarchy of geographically specified spatially associated items (homes/rooms/gadget) inside the pc. And different relevant measurements using a easy, flexible and intuitive net utility.

Anumandala Kiran Kumar, A. Sri Lakshmi, B. Janaki Niwas Rao (December 2020) Air pollution kills almost seven million people global every yr, studies suggests. According to the World Health Organization, nine out of 10 people breathe air that includes widespread stages of toxins. Monitoring enables evaluation of pollutants degrees in opposition to ambient air first-rate requirements. In this work, an IoT-based air first-class tracking device is developed the usage of Raspberry Pi, an Internet of Things (IoT) platform. MQ135 sensor is used to detect gases like CO, Ammonia, Smoke, Alcohol and so on. And the applicable facts is processed the use of shifting common technique to keep away from redundant records samples saved in the database for further evaluation and future prediction. . Air pollutants. This will assist future generations to take care and stay safe.

Evariste Twahirwa, Kambombo Mtonga, Desiree Ngabo, S. Kumaran (May 2021) Keeping air pollution levels below WHO-encouraged limits is important to fight growing deaths from sick friends. This is specially authentic in indoor environments where negative air flow can exacerbate the consequences of air pollution.

Knowing the extent of air pollutants can accelerate mitigation measures. This work proposes a LoRa-enabled IoT-based household air pollutants monitoring gadget. Two CO2 and PM2.5 sensors had to display air pleasant with offset weather tracking abilities have been set up in the cafeteria kitchen and laboratory vicinity of the College of Science and Technology, University of Rwanda. The measured parameters are despatched to the cloud thru a gateway assisting the LoRaWAN protocol, which connects the sensors and the cloud part of the network. End customers can question the device and get admission to statistics containing analytical records via a evolved internet consumer interface panel. The statistics changed into analyzed over a period of 11 (eleven) months and the results confirmed that CO2 concentrations above 800 ppm and PM2.Five concentrations above 100 ppm in the kitchen environment. In the laboratory chamber, concentrations of 500 ppm for CO2 and zero ppm for PM2.Five had been located. Basic algorithms are proposed and implemented to facilitate the configuration of triggers for each sensor node and to ship notifications if the measured parameter exceeds a certain threshold cost..

N. Kularatna, B. Saudanta (March 2008) An Air Pollution Monitoring System (EAPMS) has been developed to reveal concentrations of most important air pollutant gases consistent with IEEE 1451.2. The device uses semiconductor sensors to degree concentrations of gases inclusive of CO, NO2, SO2 and O3. A Smart Converter Interface Module (STIM) is applied using the ADuC812 analog device microconverter. A network utility processor (NCAP) is developed the usage of a private laptop and connected to the STIM thru a converter-unbiased interface. All 3 gas sensors were calibrated using widespread calibration techniques. Gas awareness ranges and STIM statistics can be located in the NCAP GUI. In addition, EAPMS warns when

pollution tiers exceed pre-defined thresholds and could be evolved right into a low-value version of the system for growing countries.

Dr. Umar Farooq, Inzamamul Hoque Emu, Dr. Nazmul Haque, Jor Maitri, N.K. Das, Mirunmoi Dey (December 2017) Implementation of price-powerful and fairly effective water first-rate monitoring device is crucial for humans residing in faraway areas. Immunizing water isn't always complete blood. This paper provides a microcontroller-based water best tracking gadget with a excessive degree of accuracy, able to detecting a couple of water parameters which include temperature, turbidity and hydrogen capability (pH). Determining these water parameters is very essential and necessary for healthful residing as diverse water sources are being degraded due to overpopulation. There are numerous checking out structures for determining water first-rate, some of that are time-eating and others are used for industrial applications that aren't suitable for a standard water pleasant tracking gadget. Therefore, there may be no need to model a easy device that as it should be video display units numerous water parameters. In this undertaking primarily based research paintings, a easy microcontroller consists of a crucial processing unit (CPU) and numerous sensors which stumble on various parameters and send the records to the microcontroller and finally an LCD display gives the consequences.

Ela Khalid Walid, B. Kusuma, K. Sedianingsih (July 2019) Modern technology improvement, speedy improvement of technology and the need for good sized increase in demand, additionally in water area, especially water pollution rivers. As the first-rate of water deteriorates, it turns into polluted and the water can't be used by the human frame or for other functions. Some superior systems can technique existing records consisting of water degrees, chemical observations or bodily information. This is due to the fact water is an unsustainable need, so this look at is conducted to cope with or provide a silent warning about water first-class. With the improvement of the Internet of Things (IoT), the monitoring system will evolve, technologies inclusive of Low Power Wide Area Network (LPWAN) can be as precise as possible and might transmit brief records using low intake. This have a look at verified that the author has the ability to develop a river water pollutants tracking and type device. Using fuzzy good judgment method with the assist of synthetic intelligence. The laptop take a look at consequences display that the average accuracy of the monitoring gadget consequences is 99.7%, and the effects of the corresponding category values are primarily based at the computer test outcomes.

III. EXISTING SYSTEM

Much work is being accomplished on air first-rate tracking systems. There are many proposals that meet a huge form of use instances. Based on the Internet of Things idea, there are scalable and sustainable air great monitoring structures. They connect with smartphones and in a few cases use the telephone as a gateway to talk with the cloud. There are small devices with displays that display air pollutants tiers and send them to the cloud.

IV. PROPOSED SYSTEM

A gas sensor, ATmega microcontroller, buzzer, LCD, power supply, module, and additional integrating parts make up the suggested system. When a gas leak is detected, the ATmega microcontroller receives the data, interprets it, sounds the buzzer, and shows the status on an LCD screen. To ensure that risks can be avoided as soon as possible, the module also sends an alert notification to a distant device.

SYSTEM ARCHITECTURE

The description of the overall traits of the software is linked to the definition of the requirements and the established order of a high degree of the gadget. During architectural design, numerous web pages and their relationships are described and designed. Key software components are defined and decomposed into processing modules and conceptual records systems, and relationships between modules are described. The proposed system defines the following modules
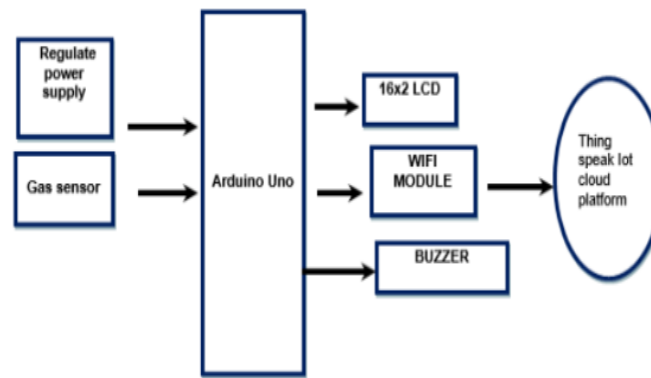
Fig 1. Block Diagram

VI. Hardware Required:
• Arduino uno
• Air Quality Sensor MQ135
• Flammable Gas Sensor MQ9
• Buzzer
• LCD Display
• Regulator

Arduino UNO

The Arduino UNO is a standard board that was developed by Arduino.cc and is based on an ATmega328P microcontroller. It is easy to use compared to other boards, like the Arduino Mega board, etc. It is made up of digital and analog input/output pins (I/O), shields, and other circuits. The name UNO means "one" in Italian. It was also the first Arduino USB board that was released by Arduino.

Fig 2. Arduino uno

IOT (Internet of Things)

IoT stands for Internet of Things, which means that getting access to and the use of the devices and home home equipment you use every day on line.

Our IoT guide covers all IoT topics consisting of get entry to, functions, pros and cons, surroundings, framework of desire, architecture and domains, biometrics, CCTV cameras and security systems. Opening doors, gadget.
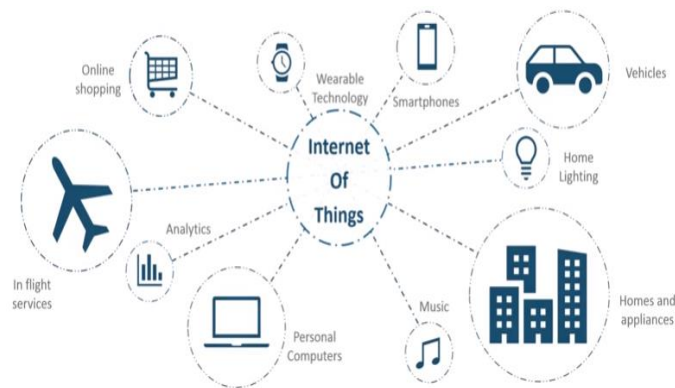
Fig 3. IOT Internet of Things

MQ2 Gas Sensor:

The MQ2 fuel sensor is a Metal Oxide Semiconductor (MOS) gas sensor, in particular used to hit upon gases which include methane, butane, LPG, smoke, and many others. Also known as chemiresistors because the sensor detects gasoline based totally on changes in resistance. Matter in contact with gas. The MQ-2 fuel sensor is very touchy to propane and smoke and is splendid at detecting natural gas and other flammable vapors. It is inexpensive and appropriate for numerous flammable gasoline detection packages.

Fig 5. MQ2 Sensor.

LCD Display

A liquid crystal show (LCD) panel is designed to challenge information on a microcomputer display screen onto a big display the usage of a popular overhead projector in order that a extensive target audience can view the statistics at the display without crowding around the tv screen. . In LCD screens, two layers of glass are separated by way of a thin liquid crystal ("LC" in LCD). This liquid crystal layer, in conjunction with different optical additives, is liable for producing the photo with the aid of encoding the image within the orientation of the liquid crystal material.

Fig 6. Lcd display

Air Qulity Sensor

The sensor is product of a ceramic detail lined with SnO_2 and when this detail comes in touch with a certain gasoline, the conductivity of the sensor modifications. This exchange in conductivity is then transformed into an electrical sign that may be measured and interpreted. Ammonia (NH_3), Sulfur (S), Benzene (C_6H_6), CO_2 and different dangerous gases and fumes. Like different MQ collection gasoline sensors, this sensor has a

virtual and analog output pin. If the quantity of these gases inside the air exceeds a threshold, the virtual pin will become greater seen.

Fig 7. Air Qulity Sensor.

Buzzer

There are many procedures to the connection between someone and art work. A preferred manner to degree volume is to apply a buzzer. Therefore, in layout method, some clever technologies are frequently related to configurations. So this text appears on the pinnacle view of a big sound device with photos of a defender or goalscorer and their percent. An audible alarm device may be electromechanical, piezoelectric, or mechanical, along with a watchdog or buzzer.

The main objective of this provider is to transform the audio signal into sound. It works well with direct modern-day and is used in timers, alarm devices, printers, alarm clocks, computers, and many others. Depending on the configuration, it can generate a ramification of sounds, consisting of alarms, song, bells and sirens.

Fig 8. Buzzer

VII. CONCLUSION

An ATmega microcontroller-based gas leak detection system offers a reliable and effective way to address gas-related risks. The device improves safety standards in homes and businesses by combining a buzzer, LCD, and GSM module to provide real-time detection and remote alerts. This device is a better option than conventional gas detection techniques because of its automation and precision. This technology guarantees a safer environment for users by drastically lowering the danger of gas-related mishaps.

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