

IOT BASED AIR AND SOUND POLLUTION MONITORING SYSTEM

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Abstract— Our current generation and future generations have to resolve three crucial problems, that is population, poverty and pollution if they have to survive. Pollution is one of the most threatening problems just like heart disease, stroke and road accidents in which death is certain but slow. Our environment pollution is having dangerous proportions all through the globe and India is not free from this deadly disease. In this paper, we are monitoring the air and sound pollution in our environment. We are using Arduino, Nodemcu, MQ-2 sensor, MQ-135 sensor and noise detection sensor. In our proposed work, we are implementing the air quality monitor and noise pollution detector. This entire system monitors the fatal gases or excessive decibels of acoustic signals present in the environment. If there are any such gases or such noise signals present in the environment, then the system will give the alert to the user and will also send mail to the user so that he can able to easily protect our environment.

Keywords – *Pollution, Arduino, Nodemcu, decibels*

I. INTRODUCTION

In this era of reconstruction, technologies are growing swiftly. Every day we are observing some new technologies which are arriving in the market to make our lives simpler than ever. In earlier days monitoring of pollution in a particular area was a very tedious task which was not at all very efficient too. With the increase in population, pollution is also increasing and various advance technologies and various new methods were introduced to keep a check on the swift increases in pollution more efficiently. The 'Thing' in the IoT can be any device with any kind of built-in sensor which is capable of collecting and transferring data without manual intervention over a network. The embedded software in the device helps them to communicate with internal states and also the external environment, which in turn helps them to make decisions.

II. LITERATURE REVIEW

Gagan Parmar, Sagar Lakhani, Manju K. Chattopadhyay: Ecological Air Pollution Monitoring System is been created to screen convergences of significant air poison gases. This framework utilizes minimal effort air-quality control hubs that incorporates ease semiconductor gas sensors with Wi-Fi modules. This framework utilizes semiconductor indicators to evaluate convergences of gases such as, CO, CO₂, SO₂ and NO₂. The sensors should gather information from different ecological parameters and provide the gathered information to the base station Raspberry Pi. Acceptance of gathered information by sensors is shown on the Web server which is dependent on Raspberry Pi 3. To view information on the site, a MEAN stack is created.

Saeed Malky ; Ivica Kostanic ; Khalid Altheiab ; Waleed Alharbai: The request to fill the current hole to dynamic air contamination observing, sensor apparatuses that are minimum and short in surrounding air estimation are required. The point in this work was to comprehend and investigate by continuously checking moderately financially savvy, marketable and complex sensors that can work satisfactorily in current situations and areas. Out of gases, such as, nitrogen dioxide (NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), particulate matter (PM 2.5, PM 10) and ozone (O₃), the relevance of these new age sensors was evaluated. The area of consideration was urban towns.

Arindam Ghosh ; Prithviraj Pramanik ; Kartick Das Banerjee ; Ashutosh Roy ;

Subrata Nandi ; Sujoy Saha: Air and commotion contamination are two notable variables that decide the personal satisfaction of urban inhabitants. On account of imbalanced urbanization, un – assessed increment in rush hour gridlock and inorganic industrialization, the important explanations behind expanding air and clamour contamination. These have brought about the residents' prosperity being undeterred. In this specific circumstance, the idea of keen urban communities has been created.

Arnab Kumar Saha; Sachet Sircar ; Priyasha Chatterjee ; Souvik Dutta ; Anwesha Mitra ; Aiswarya Chatterjee: An IOT based strategy was proposed to screen a district's Air Quality Index and Noise Intensity. The programming comprises of four modules in particular, the air quality list observing framework, the sound power recognition module, the cloud based checking module, and the ready module for abnormalities. Considering the ordinance of the five parameters air poisons, the air quality file is determined. At this point the sensor identifies the sound power. From that point forward, the cloud based checking framework guarantees the way towards acquiring the information with the help of Raspberry Pi's Wi-Fi unit, which satisfies the capacity of intermittently breaking down the subtleties.

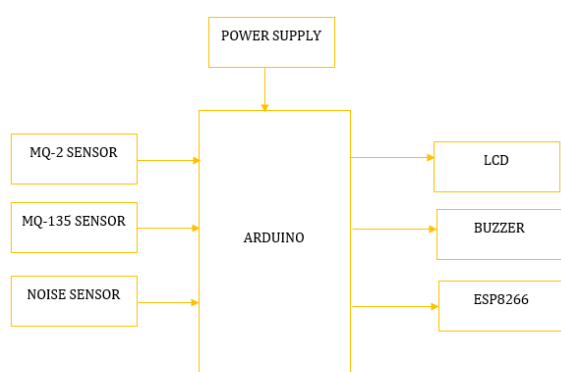
Yang daheng: In one grocery store in upper east China, the air and acoustics contaminations depends on the abstract evaluation approach and target examination. The CO₂ creation and the sound pace of the discussion sound source is unusually fundamental for the store

constructed condition. The after effects of this paper will add to the advancement of the assembled condition and grocery store structure.

III. PROPOSED WORK

In our Proposed work, the air and noise pollution monitoring system is presented using Arduino microcontroller, Nodemcu (ESP8266) and sensors. MQ-2 gas sensor, MQ-135 sensor, and noise detection sensor are connected to the Arduino microcontroller. The MQ-2 and MQ-135 are the air sensors which are used to collect air pollutants and a sound sensor module mic is used to capture sound. These sensors are interconnected with Arduino microcontroller where Arduino is computing the sensor data and then transmit it over through the Internet. Whenever the air pollution or sound pollution is detected, the buzzer gets enabled and also shows the pop – up message in IoT page and is also displayed in LCD.

A. BLOCK DIAGRAM



B. SYSTEM DESCRIPTION

MQ – 2 SENSOR(Gas Sensor): MQ – 2 gas sensor's sensitive material is SnO_2 , which in clean air has lower conductivity. When there is the target combustible gas, the conductivity of the sensor is higher

along with the rise in gas concentration. Using easy electrical circuit, transform conductivity switch to suite the gas concentration output signal. The MQ – 2 gas sensor is highly sensitive to LPG, Propane and Hydrogen, it can also be used for methane and other fuel vapour. I is low cost and is suitable for various applications.



LCD: A liquid crystal display (LCD) is a display technology that uses liquid crystals which gets on or off when it is re – established by an electric current. These liquid crystals are the premises for the LCD technology. Liquid crystals are placed in a matrix form which creates groups of three crystals of the colours red, green and blue. These groups form a segment which is known as a pixel. These groups of pixels can form numbers, letters or shapes and are arranged in columns or rows.

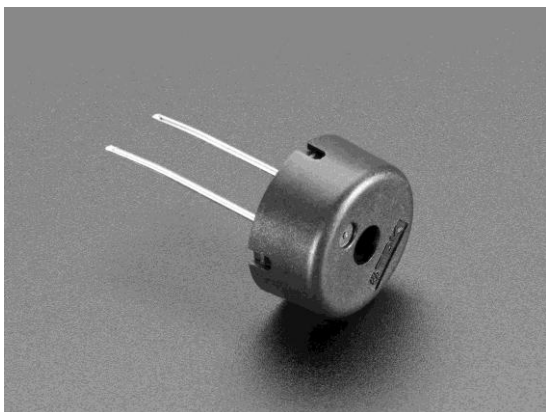


Wi – Fi module: SP8266 Wi – Fi module comes with an integrated firmware that supports serial interface and can be managed with AT commands. Although we can use this module to provide Wi – Fi connectivity from another microcontroller, this module is not just a simple serial for Wi – Fi transceiver. It consists of a 32 –

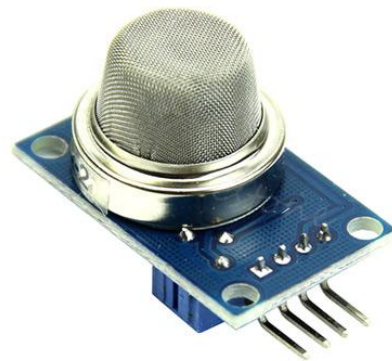
Bit (80MHz) processor, 512 KB SPI FLASH, 64 KB SRAM, 96 KB DRAM, GPIO Pins & Wi – Fi Transceiver.

Arduino: Arduino processor uses the architecture of Harvard. There is a separate memory for the program code and program data. There are two memories present: program memory and data memory. The code is stored in the flash program's memory and the data is stored in the data memory. Atmega 328 is having 32 KB of flash memory which stores code (bootloader uses 0.5 KB), 2 KB of SRAM and 1 KB of EEPROM and it operates at 16 MHz clock speed. Arduino Uno is a microcontroller board. It is based on the ATmega328. It has 14 digital input/output pins and 5 analog input/output pins. It also have few PWM pins. Near to the AREF pin are SDA and SCL pins. Near to the RESET pin are two other new pins. The board provides the IOREF that allows the shields to adapt to the voltage.

Buzzer: Buzzer is an integrated electronic transducer structure, DC power supply, which is commonly used for sound devices in computers, printers, alarms, electronic toys, telephones, timers, etc. Active buzzers have 5V rated power which can be connected directly to a continuous tone.



MQ-135 Sensor: MQ-135's resistance value is the difference between different forms and different concentration gases. Sensitivity adjustment is very important when using these components. It is recommended to calibrate the detector for an air concentration of 100 ppm NH₃ or 50 ppm alcohol and a load resistant value of around 20K (10K to 47K). After the consideration of the influence of temperature and humidity, the correct alarm point for the gas detector should be determined when measuring accurately.



IV. RESULT

The hardware implementation of the IoT Based Coal Mining safety for Workers Using Arduino is shown below.

CONCLUSION

In our proposed system, air pollution and noise pollution monitoring device is a great step towards our healthy life and environment. Our proposed system is more flexible and less cost. It will sense real time data so we can get perfect output for the device. So in this device when the air or noise pollution is detected, then automatically the buzzer will be on and

then in IoT page a warning pop – up message will be displayed.

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