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TOPIC: NOISE POLLUTION MONITORING

 INTRODUCTION:

Noise pollution is considered to be any unwanted or disturbing sound that affects the health and well-being of humans and other organisms. Exposure to loud noise can also cause high blood pressure, heart disease, sleep disturbances, and stress. These health problems can affect all age groups, especially children. Noise pollution are caused due to traffic noise. It is caused due to industrial noises, also caused due to drillers etc used on construction site. Noise pollution is also caused due to air trafficking noise.

Problem statement understanding:

An efficient noise monitoring system is required to monitor and assess the conditions in case of exceeding the prescribed level of noise. Human needs demands different types of monitoring systems these are depending on the type of data gathered by the sensor devices. Due to the effects of noise pollution on human life we have come up with this project of noise pollution monitoring using IoT.

 Event Detection based and Spatial Process Estimation are the two categories to which applications are classified. Initially the sensor devices are deployed in environment to detect the parameters (noise) while the data acquisition, computation and controlling action (e.g., the variations in the noise). Sensor devices are placed at different locations to collect the data to predict the behavior of a particular area of interest.

LITERATURE REVIEW:

The motive of making a smart city can be fulfilled by using technology, thus making the life better and also enhancing the quality of services, therefore meeting every individual's needs. With modern technology in fields of information and communication, it has become easy to interact with the authorized people of city to tell the where about of the area or city, how well the city is developing and how to make it possible to achieve a better life quality. In this system, an application was created to make one more step in the fulfillment of the goal. An area is analyzed for evaluating how much pollution is affecting the area. The components of gases and their amounts are calculated and checked. If the amount is higher than normal, then the officials are reported about it. After that the people are made to clear the area and taken to a safe place. The combined network architecture and the interconnecting mechanisms for the accurate estimation of parameters by sensors is being explained and delivery of data through internet is presented. [1]

Some of the research work made for monitoring the pollution parameters in a particular location in order to make the environment safe and that area smart. Different methods were used in the past and are described in this section . This work is based on the use of reliable, efficient, real-time and economical sensor networks for making smart homes. In this, the sensor nodes are fitted into the different areas of home. These nodes produce data of the movement done in the home or any usage of an object. Further, these homes are extended to smart buildings [2].

The longitudinal learning system could provide a self-control mechanism for better operation of the devices in monitoring stage. The framework of the monitoring system was based on a combination of pervasive distributed sensing units, information system for data aggregation, and reasoning and context awareness. Results are encouraging as the reliability of sensing information transmission through the proposed integrated network architecture is 97%. The prototype was tested to generate real-time graphical information rather than a test bed scenario [3].

METHODOLOGY:

Noise Pollution Monitoring System consists of the Arduino Uno which is based on ATmega328 microcontroller. Everything in this system is controlled by the Arduino. Initially, the Arduino is provided with a 5 V DC supply. Sound sensors provide the data to the Arduino that is displayed on the LCD display continuously, LCD Display is connected to pins in the Arduino board and when the sound pollution exceeds the set limit (90dB in this case as sounds above 90 dB can lead to chronic hearing damage if people are exposed to them every day or all the time) Led will blink and 1 will be displayed as output on the output panel.

Now the data which is retrieved from sound sensor will be provided to the Wifi module which is connected to the 3.3 V pin on the Arduino board. This Wifi module (nRF24L01 module) will then provide this data to the web application.

This data is stored in a database i.e "Firebase". In order to read the values from the sensor we will be writing a program in Arduino IDE. To display the output UI web app is designed. The values are in graphical format so it the user will note down the values with the help of the graph (output).

SOFTWARE AND HARDWARE:

- **We will be using Proteus and Arduino IDE.**
- **Firebase to store and sync data**

COMPONENT	FEATURE
ARDUINO UNO	**ATMega328p**
SOUND SENSOR	**Upto 90 dB**
LCD DISPLAY	**16*2cm**
POWER SUPPLY	**5V DC**
WIFI MODULE	**nRF24L01 module**

Components (hardware):

```
        (RESET) PC6  [1]  ⃝              [28]  PC5 (ADC5/SCL)
          (RXD) PD0  [2]                 [27]  PC4 (ADC4/SDA)
          (TXD) PD1  [3]                 [26]  PC3 (ADC3)
         (INT0) PD2  [4]                 [25]  PC2 (ADC2)
         (INT1) PD3  [5]                 [24]  PC1 (ADC1)
      (XCK/T0) PD4  [6]                 [23]  PC0 (ADC0)
                VCC  [7]   ATMEGA 328P  [22]  GND
                GND  [8]                 [21]  AREF
  (XTAL1/TOSC1) PB6  [9]                 [20]  AVCC
  (XTAL2/TOSC2) PB7  [10]                [19]  PB5 (SCK)
           (T1) PD5  [11]                [18]  PB4 (MISO)
        (AIN0) PD6  [12]                [17]  PB3 (MOSI/OC2)
        (AIN1) PD7  [13]                [16]  PB2 (SS/OC1B)
        (ICP1) PB0  [14]                [15]  PB1 (OC1A)
```
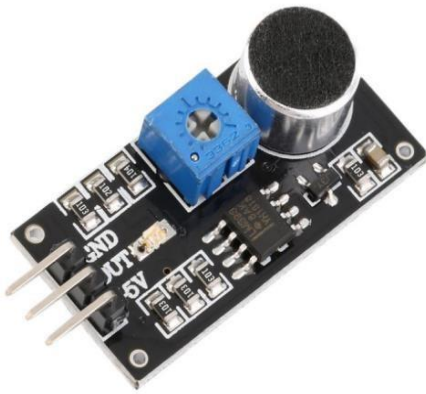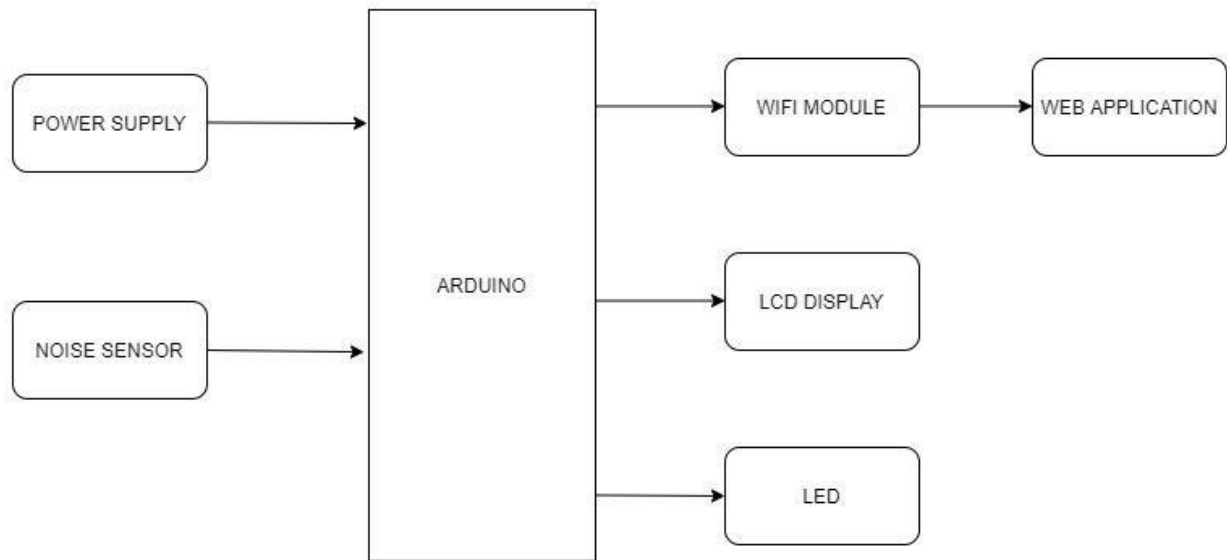

(sound sensor)
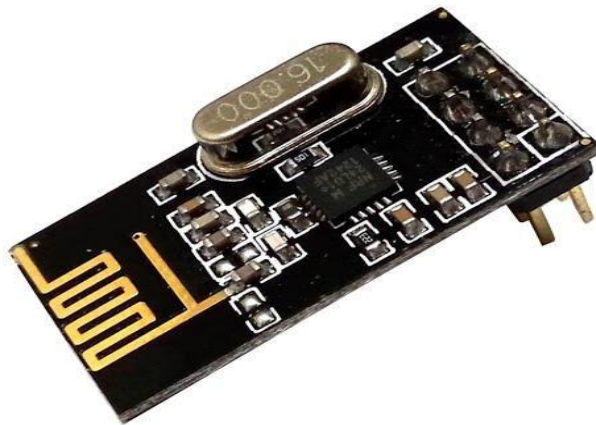
(Wifi- module)

BLOCK DIAGRAM:

ADVANTAGES, APPLICATIONS AND UPDATE:

Advantages:

- IoT based noise pollution monitoring system is a machine to machine communication system so data to be recorded will have great accuracy.
- Devices are wirelessly connected so automation and controlling of it becomes an easy task for a user.
- This system saves good amount of time because once it is installed, it works automatically as we have to read the data and analyze it.
- Less man power is required and it is cost effective.

Applications:

- We can use this on roads as it detects traffic noise and effective measures can be taken.
- We can use it at industrial area as there is lot of noise pollution.
- Municipal authorities can use this while doing inspection for noise pollution.
- It can be used on construction sites to keep the noise pollution in check.

Updates:

- We can add air sensor to check for air pollution

RESULT:

The inputs are sensed by the sensors and then given to the Arduino atmega328 microcontroller board. In this board the microcontroller process the data and then the output can be shown in LCD display and WI-FI module. It shows the digital value noise pollution and user can analyze it with a graph. User will note down the readings that appear at that moment. It becomes easy for user to rectify the levels of noise thus taking a step towards a healthy living and a noise less environment.

CONCLUSION:

Nosie Pollution monitoring system is a further step to contribute a solution to the biggest warning. The noise monitoring system solves the problem of the highly polluted areas which is a main issue. It supports the new technology and effectively supports the healthy life concept. This system has features for the user to monitor the pollution level on their cell phones using the application. So, it becomes very dependent and efficient for the Municipal Corporation officials along with the Civilians to monitor habitat. It allows civilians to get involved in this process adds more value to it. As civilians are now equally aware and curious about their environment, this concept is beneficial for the welfare of the society. And it is implemented using the latest technology.

REFERENCES:

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[3] Hsing-I Wang Lin Tuing, —Toward a Green Campus with the Internet of Things – the Application of Lab Management,‖ Proceedings of the World Congress on Engineering 2013 Vol II, WCE 2013, July 3 - 5, 2013, London, U.K

[4] Kaushik, Vipul & Dabade, Tanaji & Patil, Vijay. (2019). IOT BASED AIR AND SOUND POLLUTION MONITORING SYSTEM-A REVIEW. 6. 543-548.