

Vehicle Pollution Monitoring System Using IoT

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ABSTRACT:

Humankind, moving to a period centered upon improvement has overlooked the significance of supportability and has been the real guilty party behind the rising Pollution levels in the world's air among all other living life forms. The Pollution levels at certain spots have come to such high degrees that they have begun hurting our very own It will being. An IoT based Air Pollution observing framework incorporates a MQ Series sensor interfaced to a ARDUINO UNO outfitted with an ESP8266 WLAN connector to send the sensor perusing to a Thing Speak cloud. Further extent of this work incorporates an appropriate AI model to foresee the air Pollution level and an anticipating model, which is fundamentally a subset of prescient displaying. As age of poisonous gases from ventures, vehicles and different sources is immensely expanding step by step, it winds up hard controlling the dangerous gases from dirtying the unadulterated air. In this paper a practical air Pollution observing framework is proposed. This framework can be utilized for observing Pollutions in demeanor of specific territory and to discover the air peculiarity or property examination. The obligated framework will concentrate on the checking of air poisons concentrate with the assistance of mix of Internet of things with wireless sensor systems.

Keywords:MQ, ESP8266, ARDUINO UNO.

1. INTRODUCTION:

Continued exposure to environments with poor air quality is a major public health concern in developed and developing countries. It is estimated that the pollutants responsible for poor air quality cause nearly 2.5 million premature deaths per year world-wide. Significantly, around 1.5 million of these deaths are due to polluted

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indoor air, and it is suggested that poor indoor air quality may pose a significant health risk to more than half of the world's population. Due to its link with industrialization, societal health problems associated with poor air quality disproportionately affects developed and developing nations – it is estimated that air pollution is responsible for the premature deaths. Remedial action to improve air quality is often easy to implement once airborne pollutants have been detected [1]. Air pollution is the biggest problem of every nation, whether it is developed or developing. Health problems have been growing at faster rate especially in urban areas of developing countries where industrialization and growing number of vehicles leads to release of lot of gaseous pollutants [2]. Harmful effects of pollution include mild allergic reactions such as irritation of the throat, eyes and nose as well as some serious problems like bronchitis, heart diseases, pneumonia, lung and aggravated asthma. According to a survey, due to air pollution 50,000 to 100,000 premature deaths per year occur in the U.S. alone. Whereas in EU number reaches to 300,000 and over 3,000,000 worldwide. IOT Based Air Pollution Monitoring System monitors the Air quality over a web server using Internet and will trigger an alarm when the air quality goes down beyond a certain threshold level, means when there are sufficient amount of harmful gases present in the air like CO₂, smoke, alcohol, benzene, NH₃, LPG and NO_x. It will show the air quality in PPM on the LCD and as well as on webpage so that it can monitor it very easily. LPG sensor is added in this system which is used mostly in houses. The system will show temperature and humidity. The system can be installed anywhere but mostly in industries and houses where gases are mostly to be found and gives an alert message when the system crosses threshold limit.

OVERVIEW:

Air contamination can be characterized as nearness of moment particulars that bothers the working of common procedures and furthermore creates unfortunate wellbeing impacts. In another way contamination can influence the characteristic periodicity and furthermore can irritate the wellbeing of person. As modernization and automation is becoming in all respects widely Pollution is likewise getting presented everywhere way. It has been seen that in mechanically creating or created nations human wellbeing get significantly influenced due to Air Pollution, where there is no framework to screen it or monitor it [1]. In late explores it has been demonstrated that there is a high connection batten's climatic toxins and maladies like asthma and lung related ailments. Air Pollution is currently a noteworthy worry over the globe and WHO has built up specific rules to confine the cutoff points of specific gases like O₃, NO₂, SO₂ [2]. The Air Quality Index estimation and Pollution observing are mostly done AQM stations

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that are essentially exact and precise. They show ideal unwavering quality and viable in estimating a wide scope of air toxins. Be that as it may, even after every one of these stations slack fundamentally in three territories:

1) Infrastructure, essential for establishment as a result of the colossal size, 2) Operational necessities are basically mind boggling, 3) The common costs of setting up, day by day support and alignment. Thinking about the evil impacts of Pollution on people, in 2012, one out of eight of all out worldwide passings were brought about via air Pollution which was 7 million unexpected losses all around [3]. These passings were a consequence of various ailments, for example, ischemic coronary illness, interminable obstructive pneumonic sickness, stroke, lung malignant growth and intense lower respiratory diseases in youngsters [4]. The foundations for every one of those illnesses were related with outside and indoor air Pollution consolidated. Presently, in the event that one discussions about water Pollution, expending defiled water can prompt genuine medical problems in individuals and one may get influenced by hazardous waterborne ailments brought about by proto zoans, infections and microscopic organisms [5], for example, amoebiasis, hepatitis An, E coli and loose bowels. According to the WHO (world health association) these sicknesses have a portion of around 3.6% in the complete every day worldwide It right of ailments [4], and cause about 1.5 million human passings yearly. Additionally, commotion Pollution is likewise as unsafe as the other two sorts of Pollution as it might prompt hearing It takes, hypertension, ischemic coronary illness, irritation, and rest aggravation [5].

2. LITERATURE SURVEY

System Using Low Costand Energy Efficient Sensors. Air pollution is not only natural medical matters impact on creating nations alike [6][7]. The strong effect of air pollution on wellbeing are extremely mind blowing as there are a broad area of sources and their particular influence differ from one another. The synthetic substances reason an assortment of mankind and natural medical issues enlarge in air contamination impacts on condition also on human wellbeing [8]. To screen this contamination WSN framework is expressed. The proposed framework comprises of a Unit of Mobile-DAQ and a fixed Internet-Enabled contamination observation System [9][10]. The Mobile-DAQ unit incorporates a solitary chip microcontroller, air pollution sensors exhibit, and GPS Device. The Pollution-Server is a top of the line individual computer application server with Internet network [11]. The Mobile-DAQ unit assembles air toxins levels (CO, NO₂, andSO₂), and packs them in a casing with the GPS physic distribution, time, and date. The reason is to send the Pollution-Server by means of zig bee device [12].

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The pivotal-Server is interact to Google Maps to show the area of equipment. It can associate database server to the Pollution-Server for putting away the toxins range for future utilization by different user, for example, condition security offices, vehicles registration experts, and vacationer and insurance agencies [13]. 2.Pollution Monitoring System utilizing WSN in Visakhapatnam as the technology increases, the level of robotic work (cutting the labor) in the practically all parts are likewise increments. WSN are grabbing up the ground in all divisions of life; from homes to industrial facilities, from traffic control to natural checking. The air pollution monitoring system contains sensors to screen the intrigued pollution parameter with regards to condition. It reenacted the three air contaminations gases including CO,CO₂ and SO₂ in air in light of the fact that these gases chooses the level of pollution. It can additionally apply the methodology in dissimilar house hold activities like spilling culinary gas in our homes, to caution the labourers in oil and gas sedulity to recognize the spillage and so on [14]. This repetition makes the awareness in individuals in urban communities. 3. Wsn Based On Air Contamination Monitoring System In Metropolitan Cities The WSN based air contamination observing framework [3] depends on AVR ATmega-32 Microcontroller. The sensor network is utilized to distinguish the sensor esteems from various detectors as MQ5, MQ7, temperature and dampness particularity. ID3 calculation is utilized to ascertain the qualities contemptible on likelihood. Bluetooth device is utilized to interface the control with customer and the customer associates with the server by means of web administrations [15]. This framework not just computes the pollution present noticeable all around yet in addition can make a figure to stay away from future contamination in the specific dirtied zone. Here they consider essentially the substance Industry close Pune and the I.T. zone like Hinjewadi.

The drawbacks of the conventional monitoring instruments are their large size, heavy weight and extraordinary expensiveness [16]. These lead to sparse deployment of the monitoring stations. In order to be effective, the locations of the monitoring stations need careful placement because the air pollution situation in urban areas is highly related to human activities (e.g. construction activities) and location-dependent (e.g., the traffic choke-points have much worse air quality than average). IOT Based Air Pollution Monitoring System monitors the Air Quality over a web-server using internet and will trigger an alarm when the air quality goes down beyond a certain level, means when there are amount of harmful gases present in the air like CO₂, smoke, alcohol, benzene, NH₃, NO_x and LPG. The system will show the air quality in PPM on the LCD and as well as on webpage so that it can be monitored very easily [17]. Temperature and Humidity is detected and monitored in the system.

3. METHODOLOGY

In the existing system, alcohol detectors are not proposed in any of the public transport, along with there is no any kind of Smoke detectors in the bus, hence there is a chance for anyone to drink and drive. Traffic police uses alcohol detectors to avoid drunk and drive system. Also, women safety is not maintained properly.

PROPOSED SYSTEM:

In a country like India, air pollution is increasing day by day at the alarming rate. The main reason for increasing of pollution level are crop's remaining burning, emission from the motor vehicle, open defecation of smoke in atmosphere from the industries and burning of garbage openly. Internet of Things (IoT) based pollution system is used to detect the current level of hazardous gases in the atmosphere. In our daily lives the quality of air determines the most because every human being needs fresh air to live. The IoT based pollution system will help us to fetch the data from any location where device is installed. All the data is visible in the smart phone app. In this project we have used the TELNET app. By using the concept of IoT we can use multiple pollution devices at different locations and fetch the data to the smart phone app.

OPERATION:

Proposed Air Pollution Monitoring System is based on the block diagram as shown in Fig.1. The data of air is recognized by MQ135 gas sensor and MQ6 LPG gas sensor. The MQ135 sensor can sense NH₃, NO_x, alcohol, Benzene, smoke, CO₂. So it is dynamic gas sensed for our Air pollution Monitoring system. When it will be connected to Arduino then it will sense all gases, and it will give the Pollution level in PPM (parts per million). MQ135 gas sensor will give the output in form of voltage levels and we have to convert it into PPM. So for converting the output in PPM, we have used a library for MQ135 gas sensor and MQ6 sensor. Sensor is giving us value of 90 when there is no gas near it and the air quality safe level is 350 PPM and it should not exceed 1000 PPM. When it will exceed the limit of 1000 PPM, it will cause Headaches, sleepiness and stagnant, stuffy air. If it exceeds beyond 2000 PPM then it will cause increased heart rate and many different diseases. When the value will be less than 1000 PPM, then the LCD and webpage will display "Fresh Air". When the value will increase from 1000 PPM, then the buzzer will start beeping and the LCD and webpage will display "Poor Air, Open Windows".

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And when it will increase 2000, the buzzer will keep beeping and give an alert message on smartphone through WIFI. The LCD and webpage will display “Danger! Move to fresh Air”. It will contain temperature and humidity so it will possibly show the current temperature and humidity of the air. For temperature we have used LM35 sensor and for humidity SY-HS-220.

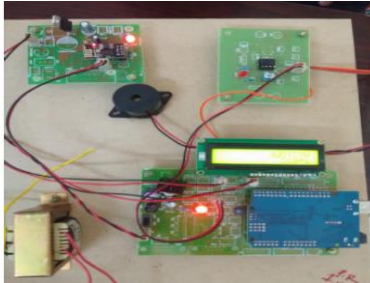


Fig.1. Hardware kit image



Fig.2. LCD display parameters



Fig.3. WIFI module

CONCLUSION

The proposed IoT based air pollution system is a good device to measure the air quality in outdoors and indoors. This device can be useful to measure the level of gases in a highly dense area like markets hospitals, railway station, bus stand etc from the remote-control room. If data is stored, we can use the data for further experiments which can conclude a significant result. This system is IoT based so it can be used in the smart home for the purpose of cooling, ventilation and other purposes. IoT will enhance

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the artificial intelligence in the world, so the system can be used in automated systems in factories and industries. This device can be used to understand the flow of wind in different condition and can be helpful to understand their effects on the environment and human life. These systems can become very helpful for the society as the respiratory health conditions are increasing day by day. Due to their high sensitivity these systems can be used in chemical industries. These can be also used by defence agencies to detect any chemical attack. The efficiency of these instruments can be increase by attaching the number of sensor to it. Due to the compatibility to multiple sensors the use of system will be also increased. In early stage meter is powered by the source, but it can be powered by the solar power. In metropolitan cities system can be fitted on the top of the traffic signals due to their compact design. A number of systems can be operated from one control room, without any special arrangement.

FUTURE SCOPE:

The system to monitor the air of environment using Arduino microcontroller, IOT Technology is proposed to improve quality of air. With the use of IOT technology enhances the process of monitoring various aspects of environment such as air quality monitoring issue proposed in this paper. Here the using of MQ135 gas sensor gives the sense of different type of dangerous gas and arduino is the heart of this project which controls the entire process. Wi-Fi module connects the whole process to internet and LCD is used for the visual Output. The Automatic Air & Sound management system is a step forward to contribute a solution to the biggest threat. The air & sound monitoring system overcomes the problem of the highly-polluted areas which is a major issue. It supports the new technology and effectively supports the healthy life concept. This system has features for the people to monitor the amount of pollution on their mobile phones using the application.

REFERENCES

- [1] Ghareeb, M., Bazzi, A., Raad, M., & AbdulNabi, S, "Wireless robo-Pi landmine detection. In Landmine: Detection, Clearance and Legislations (LDCL)," 2017 First International Conference on (pp. 1-5). IEEE, April 2017.
- [2] Craig, J. J., "Introduction to robotics: mechanics and control," Upper Saddle River, NJ, USA: Pearson/Prentice Hall, Vol. 3, pp. 48-70, 2005.
- [3] Olley, G. S., and Pakes, A., "The dynamics of productivity in the telecommunications equipment industry" (No. w3977). National Bureau of Economic Research, 1992.
- [4] Li, Shelei, Xueyong Ding, and Tingting Yang. "Analysis of Five Typical Localization Algorithms for Wireless Sensor Networks." Wireless Sensor Network 7.04: 27, 2015.

- [5] Magrabi F, Aarts J, Nohr C, et al., “A comparative review of patient safety initiatives for national Health information technology,” *Int J Med Inform*; 82:e139–48, 2013.
- [6] Rajesh Tiwari et. al., “An Artificial Intelligence-Based Reactive Health Care System for Emotion Detections”, *Computational Intelligence and Neuroscience*, Volume 2022, Article ID 8787023, <https://doi.org/10.1155/2022/8787023>.
- [7] Suriya Begum, Farooq Ahmed Siddique, Rajesh Tiwari, “A Study for Predicting Heart Disease using Machine Learning”, *Turkish Journal of Computer and Mathematics Education*, Vol. 12, Issue 10, 2021, pp 4584-4592, e-ISSN: 1309-4653.
- [8] Jaspal Bagga, Latika Pinjarkar, Sumit Srivastava, Omprakash Dewangan, Rajesh Tiwari, “Latest Advancement in Automotive Embedded System Using IoT Computerization”, *Green Computing and Its Applications* by Nova Publishers 2021, ISBN: 978-1-68507-357-2, pp 131 - 165. ,DOI: <https://doi.org/10.52305/ENYH6923>.
- [9] Rajesh Tiwari, Deevesh Chaudhary, Tarun Dhar Diwan, Prakash Chandra Sharma, “Privacy and Security Solution in Wireless Sensor Network for IoT in Healthcare System”, *Next Generation Healthcare Systems Using Soft Computing Techniques*, by CRC Boca Raton, FL 33487, U.S.A 2022, ISBN: 978-1-03210-797-4, pp 123 – 135, DOI: <https://doi.org/10.1201/9781003217091-9>.
- [10] Pugh, J., and Martinoli, A., “Inspiring and modeling multi-robot search with particle swarm optimization,” In *Swarm Intelligence Symposium*, 2007. SIS 2007. IEEE (pp. 332-339). IEEE, April 2007.
- [11] Rjeib, H. D., Ali, N. S., Al Farawn, A., Al-Sadawi, B., and Alsharqi, H., “Attendance and Information System using RFID and Web-Based Application for Academic Sector,” *International Journal of Advanced Computer Science and Applications (IJACSA)*, 9(1). 2018.
- [12] Suresh, K., Vidyasagar, K., and Basha, A. F., “Multi Directional Conductive Metal Detection Robot Control. *International Journal of Computer Applications*, 109(4), 2015.
- [13] Ambruš, D., Vasić, D., and Bilas, V., “Robust estimation of metal target shape using time-domain electromagnetic induction data,” *IEEE Transactions on Instrumentation and Measurement*, 65(4), 795-807, 2016.
- [14] Rajesh Tiwari, Manisha Sharma and Kamal K. Mehta “IoT based Parallel Framework for Measurement of Heat Distribution in Metallic Sheets”, *Solid State Technology*, Vol. 63, Issue 06, 2020, pp 7294 – 7302, ISSN: 0038-111X.
- [15] P. M. Awantika and Rajesh Tiwari, “A Novel Based AI approach for Real Time Driver Drowsiness Identification System using Viola Jones Algorithm in MATLAB platform”, *Solid State Technology*, Vol. 63, Issue 05, 2020, pp 3293 – 3303, ISSN: 0038-111X.
- [16] Rajesh Tiwari, Manisha Sharma, Kamal K. Mehta and Mohan Awasthy, “Dynamic Load Distribution to Improve Speedup of Multi-core System using MPI with Virtualization”, *International Journal of Advanced Science and Technology*, Vol. 29, Issue 12s, 2020, pp 931 – 940, ISSN: 2005 – 4238.
- [17] Albert, F. Y. C., Mason, C. H. S., Kiing, C. K. J., Ee, K. S., and Chan, K. W., “Remotely operated solar-powered mobile metal detector robot,” *Procedia computer science*, 42, 232-239, 2014.