

IOT BASED SMART HEALTH MONITORING SYSTEM: EMPLOYABILITY OF WIRELESS SENSOR NETWORKS, RADIO FREQUENCY IDENTIFICATION IN DEVELOPING ELECTROCHEMICAL TOXIC GAS SENSOR MODELS TO MONITOR AIR QUALITY IN URBAN NETWORKS USING IOT

Rahul Garg

Bachelor of Engineering (B.E.), ECE

Thapar Institute of Engineering & Technology, Patiala- 147004 (Punjab), India

ABSTRACT

The Deterioration of air quality in urban networks is the result of a many-sided correspondence among ordinary and anthropogenic biological conditions. With the extension in urbanization and industrialization and due to poor control on surges and little usage of exhaust systems, noxious gases are made. The objective of this paper is to screen air sullyng on roads and track vehicles which cause tainting over a predefined limit. Extending number of cars is a noteworthy issue that has been around for a long time. This paper proposes use of Internet of Things(IoT) to address this issue. Here, Wireless Sensor Network (WSN) and Electrochemical Toxic Gas Sensors and the use of a Radio Frequency Identification (RFID) naming structure to screen vehicle defilement record at whatever point wherever.

I. INTRODUCTION

The natural issues are developing quickly. Air poisons from autos, transports, and trucks, especially ground-level ozone and the particulate issue can intensify respiratory maladies and trigger asthma problems. Transportation can be in charge of in excess of 50 percent of carbon monoxide noticeable all around. This carbon monoxide can play devastation on human wellbeing as in Figure 1. The air contamination may prompt Chronic Obstructive Pulmonary Disease (COPD) and heightens danger of cancer. The general wellbeing is influenced because of contamination from vehicles and trucks can likewise be high in the vast metropolitan urban areas. One of the significant reasons of air contamination is emanation of dirtyng gases from vehicles which is in charge of 70% of the complete air contamination. So as to control the air contamination, the measure of air contamination should be observed and vehicles in charge of dirtyng ought to be recognized. The Internet of Things (IoT) is another idea which have pulled in the consideration of both scholarly community and industry. Internet of Things (IoT) is actualized as a system of interconnected modules, every one of which can be utilized one of a kind ID and imparts dependent on standard correspondence conventions. This paper proposes IoT-based air contamination monitoring through identification of vehicles causing contamination by discharging smoke in a particular district.

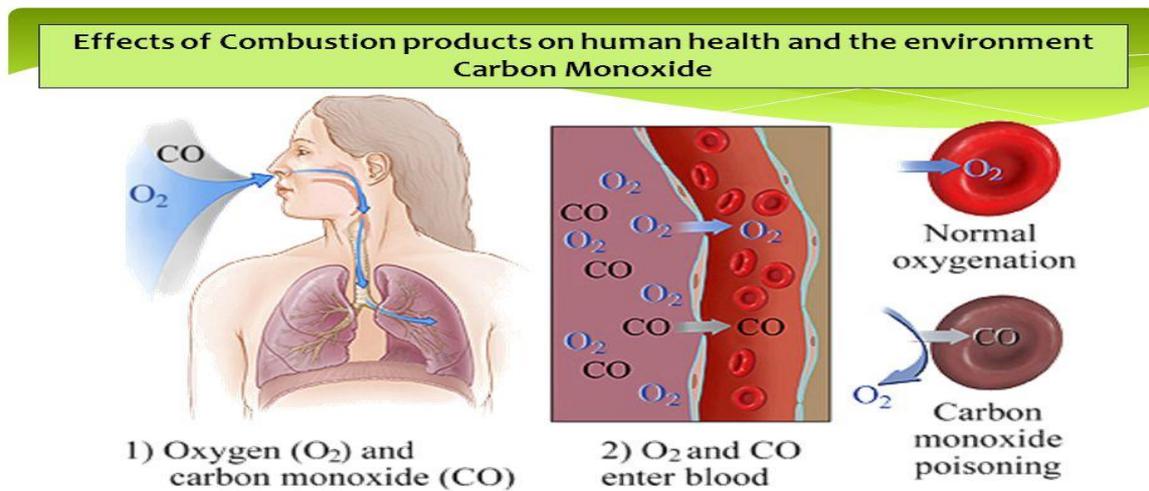


Fig:1 Effect of Carbon monoxide; Courtesy: Internet

We propose to utilize WSN and RFID innovation for this reason. The sensor hubs are furnished with gas sensors and they convey remotely. RFID innovation has been used for quite a long time. Recently, bring down expense and expanded capacities made RFID innovation to be an industrially vi-capable one. RFID develops as one of the merging advancements and key impetus assuming a massive job in this practical work. This paper means to comprehend the convenience of RFID innovation to distinguish vehicles causing air contamination. Gas sensor innovations are as yet creating and presently can't seem to achieve their maximum capacity in abilities and utilization. A few advances are exceptionally precise yet in addition over the top expensive for expansive scale arrangement. Then again, with the utilization of sensor arrange, minimal effort advances can be utilized and the issue of false positives can possibly be diminished with the assistance of variety in information. Extensive number of yields gathered from individual sensors can be looked at for a progressively precise investigation. In this way, remote sensor systems offer amazing better approaches to screen air quality. This paper displays a system for whenever anyplace permeability of sensor information from a remote sensor arrange dependent on our prior work.

Dynamic RFID labels, joined with sensors and actuators, frame the proposed remote sensor organize dependent on IEEE 802.15.4. Rest of the paper is composed as pursues. Related work is examined in area. A concise dialog about Internet of Things is placed in segment III.

II. RELATED WORK

Studies in different countries concluded that transportation is a noteworthy supporter of air contamination. Urban communities with high air contamination must address their issues, particularly for wellbeing worries from fine particulate issues, and make significant strides, especially in the metro zones with unfortunate air. The examinations recommended that the job of different offices ought to be reinforced to lessen transportation-related air contamination. Wireless Sensor Networks (WSN) can be used for air contamination checking. The star displayed structure,

to be explicit Wireless Sensor Network Air Pollution Monitoring System (WAPMS) will screen air tainting in Mauritius utilizing remote sensors sent in huge numbers around the island.[It will make utilization of an Air Quality Index (AQI) and will actualize new information total calculation to combine information to dispense with copies, sift through invalid readings and abridge them into a square shape. A different levelled steering convention is likewise proposed in WAPMS which makes the bits rest amid idle time. Mobile Discovery Net (MoDisNet) is produced to screen and examine ongoing air contamination based on traffic conditions, outflows, encompassing poison focus and personal introduction.

A progressive system engineering is shaped with the stationary sensors and versatile sensors to accumulate continuous information. Versatile sensors are conveyed by the vehicles while stationary sensors are settled on the roadside gadgets. The assessment of MoDisNet has been completed in East London utilizing GUSTO sensor innovation. It has been executed on a versatile sensor framework design and circulated information mining calculations have been utilized for examination. Contamination information is arranged at various contamination levels and is featured on the guide in an ordered way utilizing distinctive hues.It is recommended that RFID innovation can be viably used to take care of transport related issues, for example, mishap hazard the board, condition alert, traffic rule infringement control, vehicle robbery ID and traffic flag the board and so on. One RFID Tag is put on every vehicle to send recognizable vehicle proof to traffic data database. RFID peruser is set with the installed controller at Toll Gates, Parking zones and furthermore in rush hour gridlock flag regions.

III. INTERNET OF THINGS

There are several meanings of an Internet of Things (IoT) that additionally immediately what are the primary functionalities and qualities of it and furthermore desires for the clients when they interface Things with one another through the Internet. Web of Things may be considered as a traditional framework establishment where physical and virtual spaces are associated using scattered processing like distributed computing, and different data amassing and framework headways. Bundle empowers devices to talk with each other, to get to information on the web, to store and recuperate data, and to connect with customers, as such making intense, unavoidable and related constantly conditions. To secure such understanding inside the figuring circumstances, huge mechanical progressions and upgrades are required. The analysts expect that it will be conceivable to distinguish a recently framed shape for IoT, together with the impact of Ubiquitous devices within the near future. The vision of the Internet of Things is that solitary objects of ordinary everyday presence, for instance, automobiles, roadways in transport structures, pacemakers, remotely related pill-formed cameras in stomach related tracks for social protection applications, coolers, or other family things including cows can be outfitted with sensors, which can pursue accommodating information about these things. Web of Things ought to contain especially addressable articles and their virtual depictions on a web-like structure. Such things may connect with information about them or may transmit constant sensor data about their state or other important properties identified with the article. The especially addressable articles are related with the Internet, and the information about them can travel through a comparative tradition that interfaces PCs to the Internet. Since the things can identify nature and confer, they can grasp

complex practices in the earth, and may frequently empower autonomic responses to testing situations without human intervention. The gigantic number of devices in the meantime make data from the earth mechanized and enable unavoidable and all-inclusive enlisting. Internet of Things (IoT) is imagined as a planned bit of Future Internet. Along these lines, to enable speedy progress in advancements related to IoT, ask about must target key issues like ID, interoperability and assurance and security. The coordination of extraordinary data, cloud progressions and future frameworks like 5G with IoT ought to in like manner be considered.

IV. PROPOSED FRAMEWORK

In this segment, we might want to display powerful utilization of Internet of Things to address the issue of vehicular contamination. Nonstop observing of air quality is essential to find out the dimension of contamination and nearness of certain hurtful poisons. Different gas sensors (viz. Carbon monoxide, sulphur dioxide, Nitrogen dioxide, Methane and so on.) might be squeezed into administration for this reason. Contaminating vehicles ought to be recognized to make fitting strides. Scarcely any areas, with a typically high volume of traffic, might be recognized to be checked. In this system, for each checked area, the RFID perusers are set on either side of a street with a short-settled separation in the middle of them. Every vehicle going through the street is outfitted with an aloof RFID tag. Sensor hubs, made out of gas sensors, are set on the roadside. The sensor hubs might be recognized and tended to by one of a kind IP address or an impressive 10. These hubs assemble sensor information ceaselessly and send it remotely to the server. At whatever point the sensor hubs sense sudden ascent in contamination, the look is started for concerned RFID labels, for example, vehicles causing contamination are recognized utilizing the RFID label connected on them. The RFID perusers distinguish a vehicle going by it as delineated in Figure 2.

How does RFID work?

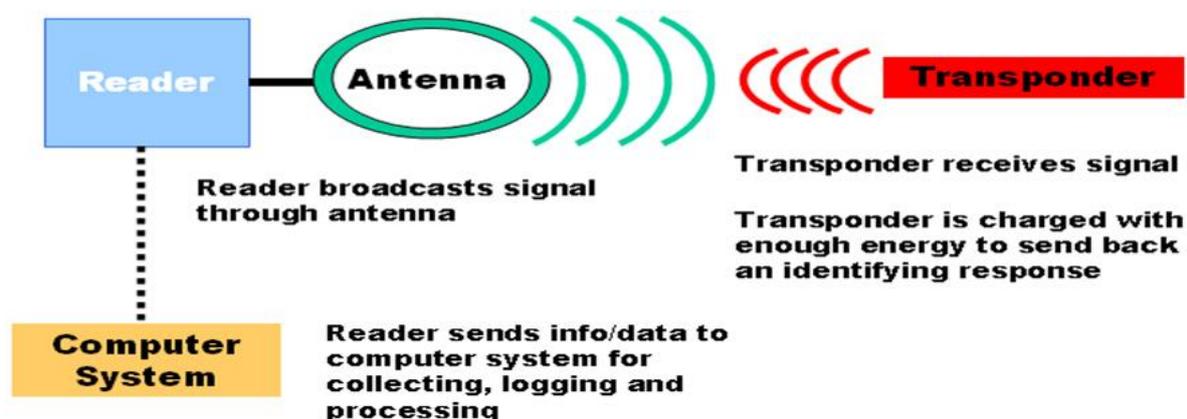


Fig2: How RFID Works

The RFID perusers recognize comparing label number and transmit the equivalent through the GPRS modem to the server. This structure additionally produces ready when contamination level

increments. Experts may take appropriate activities in like manner. All the accumulated information might be checked and broke down by specialists worried, as appeared in Figure3.

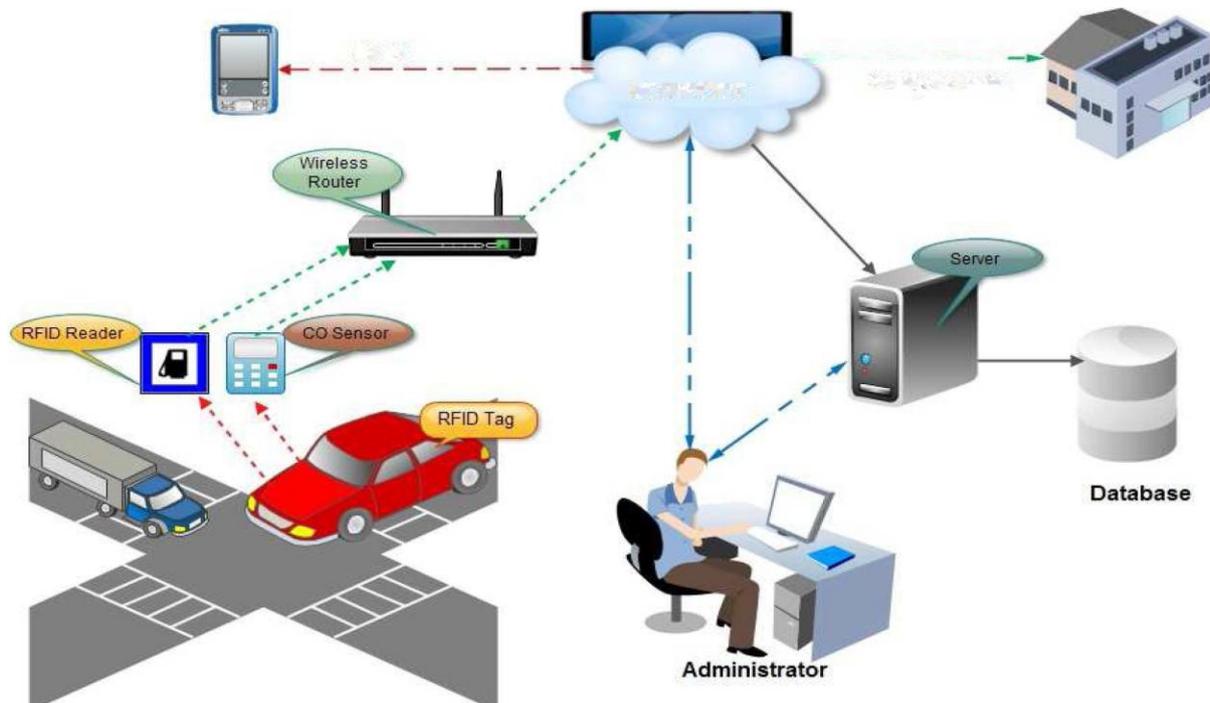


Fig 3: Proposed Work

V. IMPLEMENTATION OF THE FRAMEWORK

Despite the fact that Internet of Things is a relatively new concept, there are already a few open platforms available which are able to perform remote and seamless management and experimentation with sensor data. The technologies are used to implement the monitoring system:

- A. Arduino
- B. RFID
- C. Gas Sensors

VI. EXPERIMENTAL RESULTS

To test the model, we have conveyed the RFID readers at a convergence of streets. We likewise empower the gas sensors which are conveyed at the roadside to assemble information. Maybe a couple of RFID labels are fitted onto the vehicles which generally go by the convergence. The sensor information is at the same time perused with information from RFID readers and contamination levels from individual vehicles might be estimated continuously, the information has been gathered through five days. These sensors accumulate crude information.

Crude information may run between 0-1000. To acquire the real contamination level, some alignment is required for every sensor gadget. This information arrives at the midpoint of more than 5 days for each RFID tag. a chart for general poison information for various vehicles appears. This work introduces the structure of a framework to answer identifying vehicles causing environmental contamination. Because of the exploratory outcomes we acquired, this work looks encouraging to address the issue. The framework has exceptional importance as far as expense and adequacy in contrast with other non-RFID based vehicle identification framework. The picture handling arrangement, GPS and satellites arrangement requires many and ground-breaking gears for preparing. It is proposed as a minimal effort arrangement utilizing RFID and gas sensors. Contrasted with the other RFID based arrangements, this paper demonstrates to yield specific outcomes while chopping down the expenses. We emphatically trust that actual usage of the framework on a bigger scale would work as expected and advantage of an expansive number of individuals. When the contamination level surpasses admissible dimension, drivers might be encouraged to maintain a strategic distance from that specific region. It might be finished utilizing a similar Internet of Things. It might empower to lessen the contamination level over a specific range of time. This structure might be incorporated as an empowering device to plan keen transportation framework for Smart City. At a bustling crossing point where some vehicles hang loose, contamination level may increment because of the outflow of gasses from any of the vehicles. Outflow is relied upon to be high. Here yields up the test to distinguish the specific vehicle which contaminates as various vehicles shake for space there. Our future work will focus on these issues.