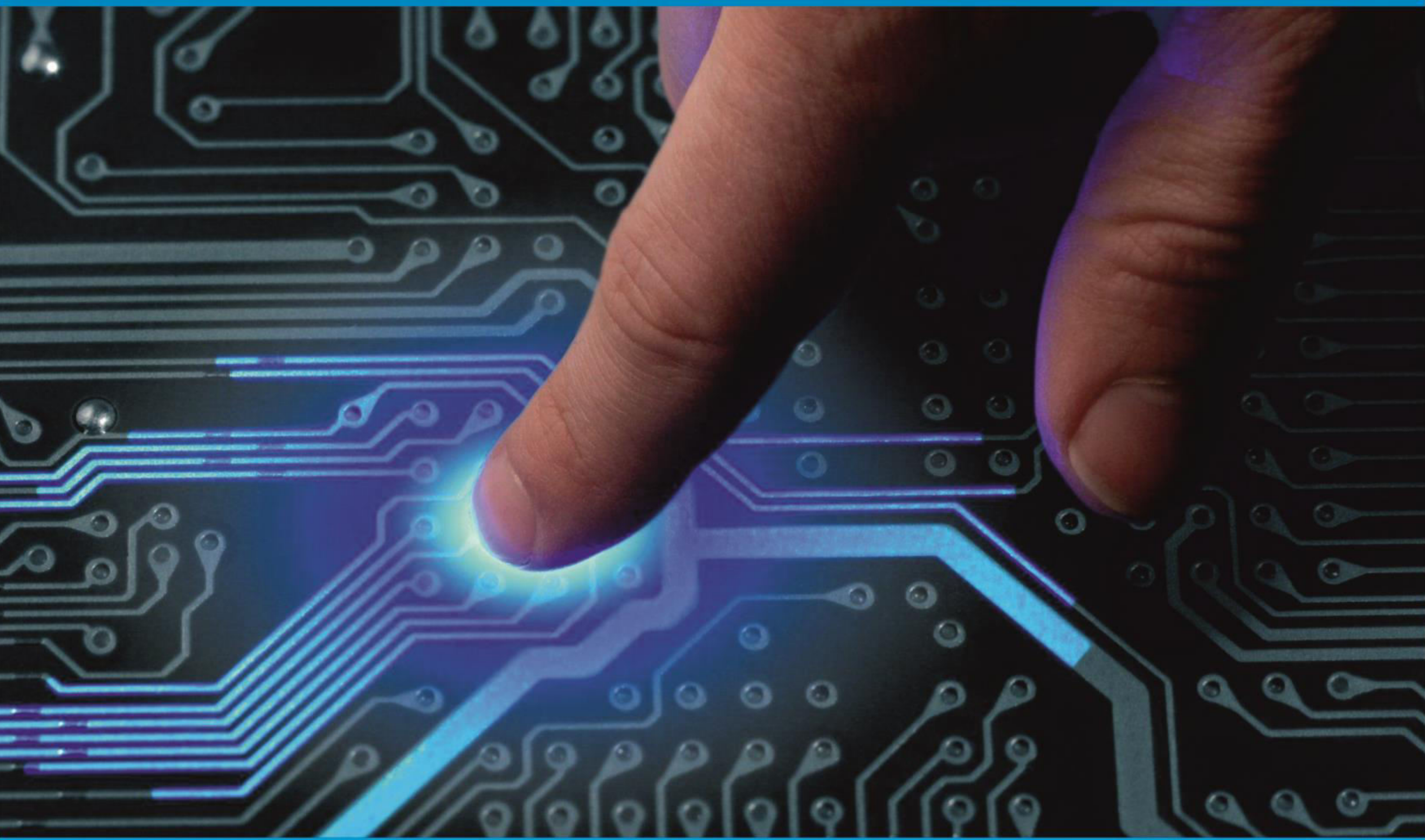
IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 9, Issue 3, March 2021

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 7.488 |

|| Volume 9, Issue 3, March 2021 ||

| DOI: 10.15680/IJIRCCE.2021.0903090 |

Smart Factory using IOT

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ABSTRACT: The growth of industries and other human activities have led to ever increasing amounts of pollutants in both outdoor and indoor spaces. These pollutants have hazardous effects on humans and the wider ecology. Hence, air quality monitoring (AQM) is essential and involves the robust monitoring of various toxic gases and volatile organic compounds (VOCs)—in case, the concentration of any pollutant exceeds the safe limit in a given location. This paper describes the different sources of indoor and outdoor pollutants, reviews the current status of gas sensors, and discusses the role of new two dimensional (2-D) materials in detecting these hazardous gases at low power, i.e., close to the ambient temperature. Here, we review different synthesis techniques of 2-D materials and discuss the sensing performances of pristine and factionalized nanomaterials for some of the important pollutants such as NOx, NH3, SOx, CO, formaldehyde, toluene, and so on. The review concludes with some proposed methods to help in reducing air pollution today.

I. INTRODUCTION

THERE has been an increasing interest to develop the new low-cost and low-power gas sensors for various application-specific areas. This includes air pollution monitoring of both indoor and outdoor spaces, detection of toxic gases in and near industrial premises and also sensors for biomedical applications [1]. In recent years, there has been a rapid rise in levels of toxic gases and volatile organic compounds (VOCs) in air, particularly in urban spaces. This is mostly true for many cities in under-developed or developing countries. For example, a recent report from the World Health Organization (WHO) in 2018 shows that 15 Indian cities and 21 Chinese cities are among'st the 50 most polluted cities in the world [2]. In 2019, air pollution is considered as the greatest environmental risk to health [3]. The major sources of polluted air are fuel wood and biomass burning, burning of large-scale crop residue, fuel adulteration, uncontrolled emission from vehicles and factories, traffic congestion, and rapid construction

II. PROPOSED SYSTEM

In existing method GSM method is used. Hence the data can be sent to only one.It cannot be accessed by others.In the proposed method IOT method is used.The advantage of using IOT method is that we can access the drawbacks. The data can be stored in cloud. By using IOT method we can access data by many users.This system is made to fulfil the purpose and need of the society to monitor and check the live air quality and sound pollution in an area through IOT. The system uses air sensors to check the presence of harmful and hazardous gases/compounds [such as Methane, propane, Butane, alcohol, noxious gases, carbon monoxide etc.] in the air and also uses the sound sensor to keep measuring sound level in the surroundings.

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III. METHODOLOGY

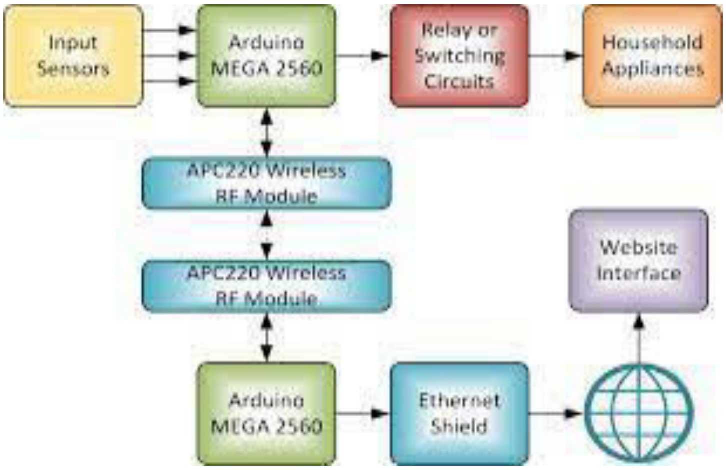

Fig 1: Block Diagram

The block diagram shows System testing is the stage before system implementation where the system is made error free and all the needed modifications are made. The system was tested with test data and necessary corrections to the system were carried out. All the reports were checked by the user and approved. The system was very user friendly with online help to assist the user wherever necessary.

IV. HARDWARE COMPONENTS

In our paper, IoT Based Smart Industry, we have developed a setup for continuous process with IoT enabled solution. The following are the hardware components used,

Temperature sensor
Fire sensor
Gas sensor
Ph sensor
LCD
Microcontroller

(1) Temperature Sensor:

The amount of heat energy in the source is detected using Temperature sensors, allowing them to detect temperature changes and convert these changes to data. Machinery used in manufacturing requires environmental and device temperatures to be at specific levels.

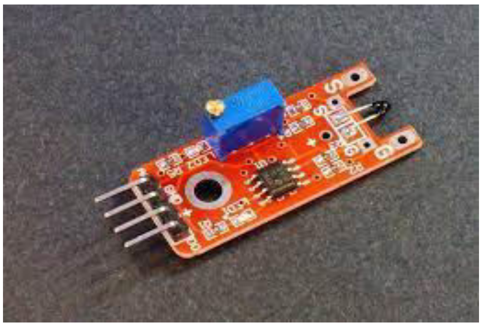

Fig 2: Temperature sensor

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(2)Fire Sensor:

The smoke and/or heat is detected using fire detector. In presence of smoke or extremely high temperatures, sensor gets activated. However, other sensors are multi-function, and they will detect the presence of both smoke and high temperatures

Fig 3: Fire sensor

(3) Gas Sensor:

The sensors that are used to measure the concentration of gases by detecting the inimitable breakdown voltage (ionization potential), which is a unique property of gases is detected using Gas sensor.

Fig 4: Gas Sensor

(4)Ph Sensor:

The sensor that helps to measure the acidity or alkalinity of the water with a value between 0-14 is detected using pH sensr. When the pH value decreases below seven, the water starts to become more acidic. Any number above seven equates to more alkaline. Each type of pH sensor works differently to measure the quality of the water

Fig 5: Ph sensor

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(5) LCD:

LCD display will accept two types of signals from Arduino Uno such as data and control signal. These two signals are fetched by the LCD module from its RS pin.

Now the data can also be read from the LCD display, by pulling the R/W pin high. As soon as the E pin is enabled high, LCD display will read the data at the falling edge of the pulse and executes it. It is same for the transmission case also.

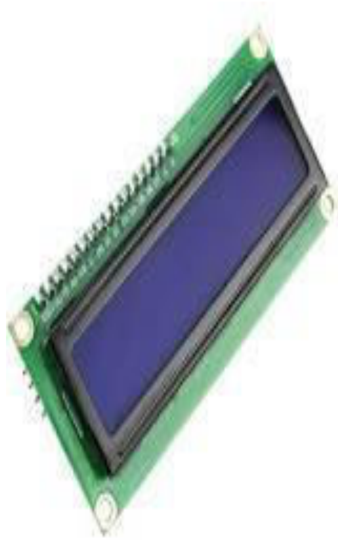

Fig 6: LCD

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V. SYSTEM DESIGN

System design is the process of planning a new system or to replace the existing system. Simply, system design is like the blueprint for building, it specifies all the features that are to be in the finished product. System design phase follows system analysis phase. Design is concerned with identifying functions, data streams among those functions, maintaining a record of the design decisions and providing a blueprint the implementation phase.

Design is the bridge between system analysis and system implementation. Some of the essential fundamental concepts involved in the design of application software are:

• Abstraction

• Modularity

• Verification

A data flow diagram is graphical tool used to describe and analyze movement of data through a system. These are the central tool and the basis from which the other components are developed. The transformation of data from input to output, through processed, may be described logically and independently of physical components associated with the system. These are known as the logical data flow diagrams. The physical data flow diagrams show the actual implements and movement of data between people, departments and workstations. A full description of a system actually consists of a set of data flow diagrams. The development of DFD'S is done in several levels.

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VI .SYSTEM IMPLEMENTATION

A test plan is a general document for the entire project, which defines the scope, approach to be taken, and schedule of testing, as well as identifying the test item for the entire testing process, and the personal responsible for the different activities of testing. This document describes the plan for testing, the knowledge management tool.

Major testing activities are:

- Test units
- Features to be tested
- Approach for testing
- Test deliverables
- Schedule
- Personal allocation

TEST UNITS

Test Case specification is major activity in the testing process. In this paper, we have performed two levels of testing.

- Unit testing
- System testing
- The basic units in Unit testing are
- Validating the user request
- Validating the input given by the user
- Exception handling
- The basic units in System testing are
- Integration of all programs is correct or not
- Checking whether the entire system after integrating is working as expected.
- The system is tested as whole after the unit testing.

VII. CONCLUSION

Our review describes the different sources of indoor and outdoor pollutants and the methods in which these pollutants can be detected presently. This study reviewed different synthesis techniques of new 2-D layered materials for gas sensor applications, the study that has been carried out so far on gas sensors based on intrinsic 2-D materials and explained
the limitations of such 2-D gas sensors. The advantages of fictionalization of carbon nanomaterials and TMDs are also presented. Different ways of fictionalizing these sensing layers are described and the performances of different composite sensors reported so far are presented. The final section of this review discussed some of the possible ways to minimize air pollution. It is believed that more focused study in developing gas sensors based on these new 2-D materials could lead to the development of much more efficient AQM systems, which can reduce the 7 million deaths annually associated with polluted air as well as improve well-being for less polluted spaces.

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