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A Review: IOT Based Environmental Monitoring System

Sudhanshu Prasad[1], Khushi Sharma[2], Aastha Karwasra[3], Devanshu Raj[3], Swati Gupta[4]

Department of Computer Sciences[1] , Vivekananda Global University, Jaipur

Department of Management[2] ,Vivekananda Global University, Jaipur

Department of Physiotherapy[3] ,Vivekananda Global University, Jaipur

Department of Life Sciences[4] , Vivekananda Global University, Jaipur

ABSTRACT

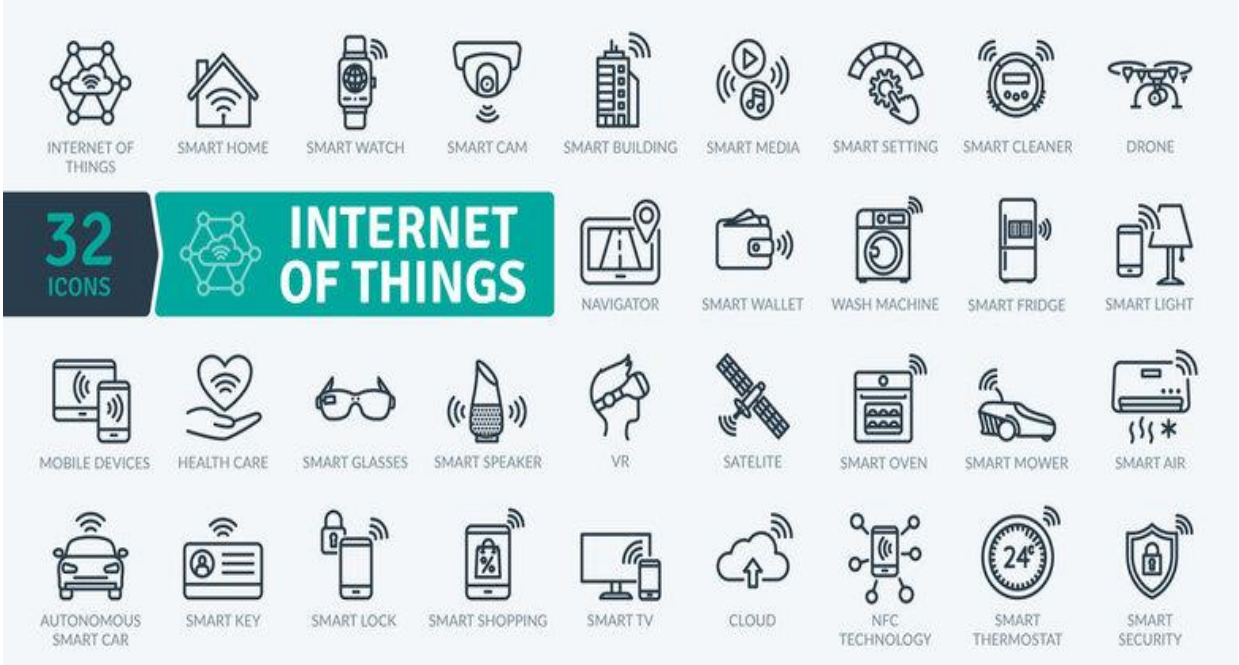
This project consists of the research and the final products Our team has been working on regarding the topic Internet over things environmental monitoring system. Internet of things is typically embedded in lots of many devices on the Internet It is a network of integrated devices that can exchange data with other Internet of thing's devices and the cloud. That means it's a provider of data from one access point to another access point We can transfer the data, or we can read the data, or we can update the data by using internet of things can be very beneficial in order to be used as environmental monitoring unit This unit consist of the internet of things that can exchange the information in real life data from the environment and post it on Internet or in the database that it is intended to do. We can use GPS (global positioning system) CAPP (constrained application protocol) for determining the risk quality and threads that can be lurking in the environment as we speak. In this internet of things. A human can remotely interact and control the object If the case is of any non-electric object, only the object's image and positional details with image description will be added to a map. The device is customarily portable with a remotely controlling option of connecting it with the relay circuitry-for controlling appliances and objects.

Keywords: IOT, Environment, Monitoring.

INTRODUCTION

The IOT Internet of things has gained a lot of popularity among the information technology experts and common users with this growing demand and the growing popularity of internet of things there are much more benefits we can gain, and we can harness with this thing It can be on an industrial level, individual or at a country level We can use the beneficiary things that the Internet of things has to offer Mainly the data exchange is one of the types. This system consists of three main modules, namely sensor nodes, wireless communication

and web server The sensor nodes in remote location collects the information from surrounding environmental condition and sends the data wirelessly using microprocessors and ESP826 Wi-fi module to the server.



This paper presents a system that can be used to measure the toxic gases in surrounding area, like the industrial area, by using various sensor nodes. All sensors are connected on the macro controller, and the status of the sensor is sent to the control section continuously. The data uploading is done by the Wi-fi module. The data is updated on Internet The values of sensors are displayed on lcd. the buzzer is used to make sound If the sensor Traces the threat level is beyond its threshold value for saving the people immediately. Now it's time to look at some of the things we can accomplish and the problems we will be facing while we discuss the solution and the equipment, we need in order to get the solution with the desired results we want.

The importance of weather monitoring is existed in many aspects. The weather conditions are required to be monitored to maintain the healthy growth in crops and to ensure the safe working environment in industries, etc. Due to technological growth, the process of reading the environmental parameters became easier compared to the past days. The sensors are the miniaturized electronic devices used to measure the physical and environmental parameters. By using the sensors for monitoring the weather conditions, the results will be accurate and the entire system will be faster and less power consuming. The importance of environmental monitoring is undoubted in our age. This is the field where wireless sensor networks (WSNs) have been first used, their primary purpose consisting in the observation of the physical world and the recording of physical quantities characterizing it. WSNs are large networks of resource-constrained sensors with processing and wireless communication capabilities, which implement different application objectives within a specific sensing field. The IEEE 802.11 standard has established itself as one of the most popular wireless technologies offering connectivity. As modern devices and sensors continue to grow in power and functionality and to reduce in their cost, internet of things (IoT) emerges as a common platform and service for consumer electronics. IoT enables to be connected to virtually unlimited devices over the internet. It thus has a great potential of communicating and interacting with them.

Environment monitoring is one of the major applications of wireless sensor network. WSN consist of different sensors which are widely distributed to monitor different environment parameters like temperature, humidity, gases, pressure, wind speed etc. The use of wireless ambient sensors can lead to more energy-efficient buildings.

WSN consists of sensor nodes which are low-cost devices with limited power. Energy efficiency is the biggest problem when these sensors are used for large scale environment monitoring.

LITERATURE SURVEY

Bluetooth wireless technology is inexpensive, short-range radio technologies that eliminates the need for proprietary cabling between devices such as notebook PCs, handheld PCs, PDAS, cameras, and printers and effective range of 10 100 meters and generally communicate at less than 1 Mbps. Bluetooth uses specification of IEEE 802.15.1 standard. ZigBee is one of the protocols developed for enhancing the features of wireless sensor networks. Characteristics of ZigBee are low cost, low data rate, relatively short transmission range, scalability, reliability, flexible protocol design. It is a low power wireless network protocol based on the IEEE 802.15.4 standard. ZigBee has range of around 100 meters and a bandwidth of 250 kbps. Traditionally ZigBee and other IEEE 802.15.4 based protocols have been considered for sensor network applications due to their energy-efficient design. However, recently developed power-efficient Wi-Fi components, with appropriate system design and usage model, have become a strong candidate in this domain. Other technologies like Bluetooth, ZigBee. RFID has limitations of transmission range. Radio Frequency Identification (RFID) is a system that transmits the identity of an object or person wirelessly using radio waves in the form of a serial number. RFID technology plays an important role in IoT for solving identification issues of objects around us in a cost-effective manner. The other communication technologies like ZigBee, RF Link can make the communication nearly in the same range of Wi-Fi but they can't broadcast the information as they can only communicate

Overview

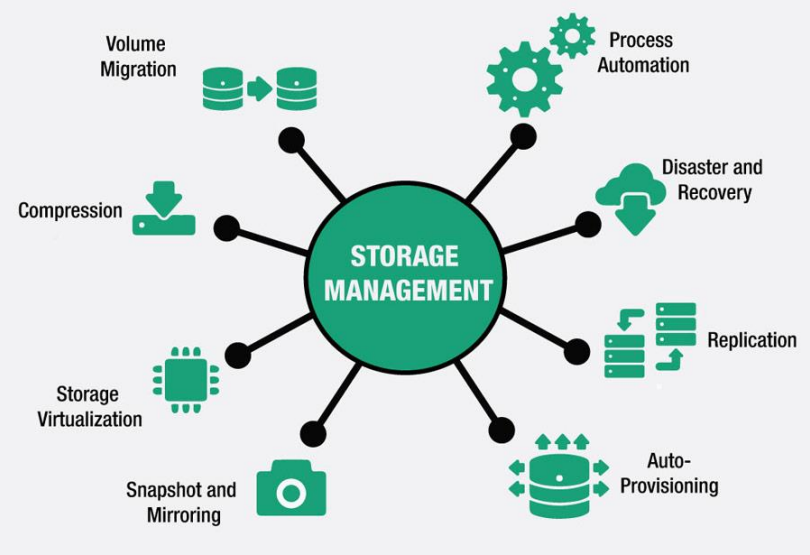
1.1 Identification of problem
1.2 Identification of task
1.3 Identification of equipment needed
1.4 Timeline needed
1.5 Literature background study
1.6 Summary
1.7 Goals

Data storage and management

Is a huge problem in India itself, because we can borrow the system from other countries, but we cannot develop a system of storage or secure storage in India itself, which can causeway multiple problems in the future. Use. We should either wait or we should either build a secure position in India so that there is no data

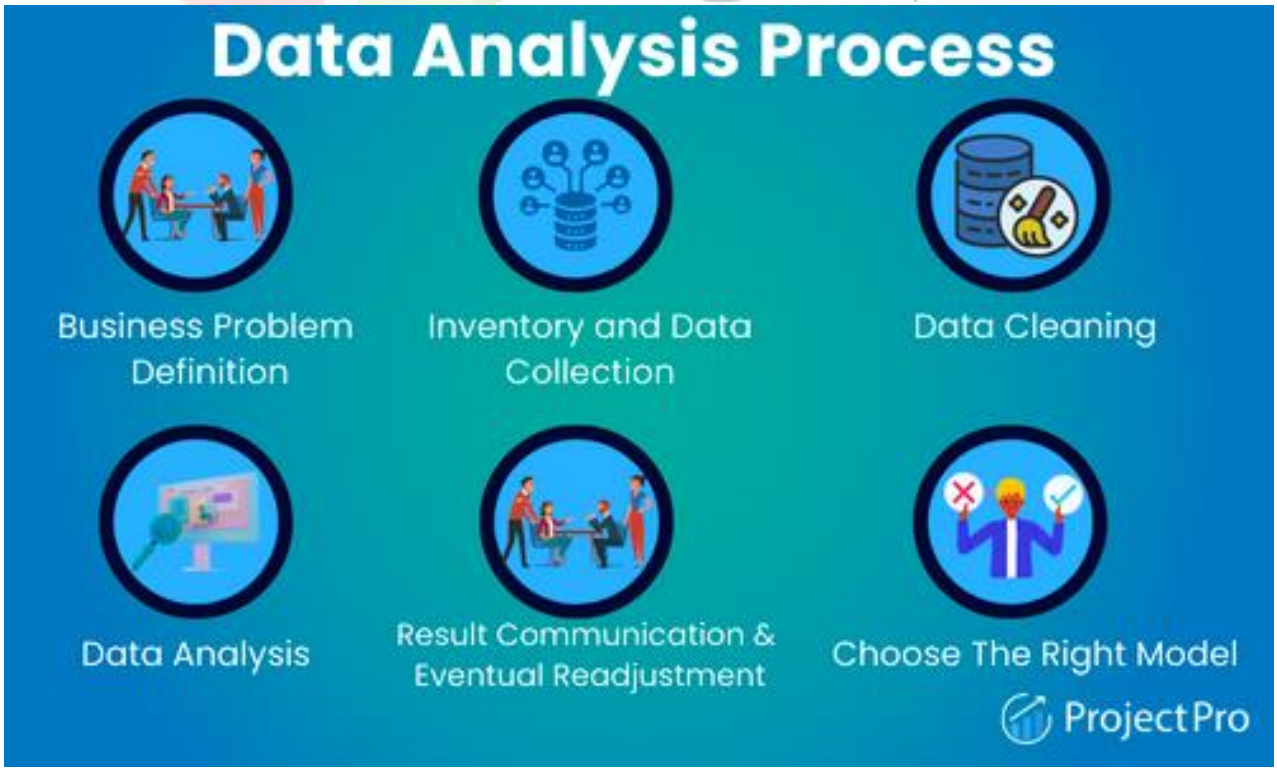
leakage or any kind of interference in the data storage sector, so that our data is safe and where did you use whenever we want

Status to age is one of the major problems as we may be able to store the data in the currently available storage area in India. But it might causeway the management issues as we don't face any potential feedbacks from the users regard All things they do over the Internet.



Data processing and analysis

Data processing is another big task after the management and storage of data. As we need to analyse the data for which we need multiple protocols and algorithms to be correctly set up so that there is no loop and flaws in the system. And everyone can be alerted immediately after the calculation of the terms and the 3rd levels. We need multiple data analyst so that the data analysis is a faster and more efficient job that can be done in these aspects, as it is a life Changing task where multiple life can depend on the final outcome of the sensory data.



Service provision

Let us first understand what service provision is Service provision refers to commercial activities where a service provider is obliged to provide a service to another party and receive payment And the service using party is obliged to pay to the service provider and use the service as agreed It is a type of contract between two or more parties that provides that at least one party will perform a service for another in exchange of products, services of financial compensation Service provisions can be a part of contractual agreement where a business agrees to provide certain services, as long as the customer agrees to the payment terms outlined in the contract As we might build some sensory works and do the job, but there is no guarantee of payment. And the usage of these things, which can be a highly demanding task in the service provision because we may use them in environmental things controlling system but they need some staff to do the monitoring analysis and storage of the data that we gather with the sensors This project comes under the social service provision That's why it needs to be undertaken by the government, because it will need a large funding as to maintain its team and the analytical team which will be working on the sensory data and the alarm system as well as initialising the data into usable form.

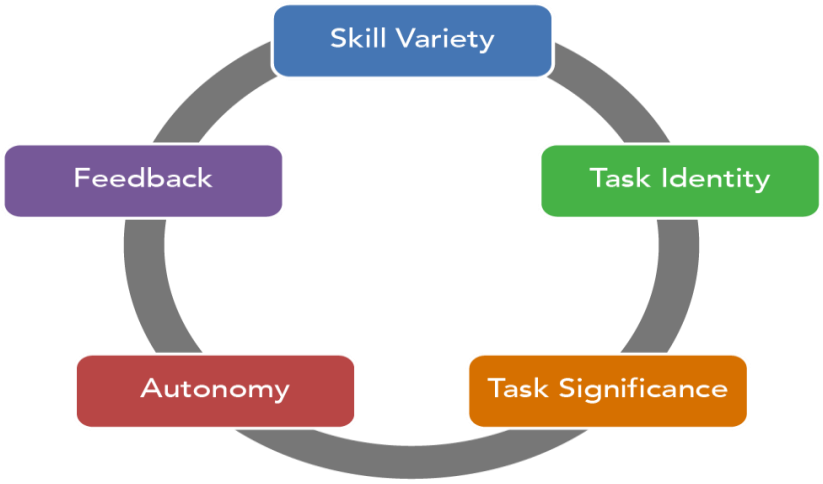
Identification of tasks

Designing and developing the hardware and software components of the system, such as the device sensor, microcontrollers, communication modules, cloud power platforms, web or mobile application and many much applications that we need in order to process the data analyse the data, study the data and to correctly use the data After analysing, we might need an information analyst so that we can simplify what the complex data says about the climate control And according to that, we can connect multiple routes of logical thinking into the system so that it can generate a useful outcome, or the result which we can use in order to protect others and control or monitor the environmental conditions.

Testing and debugging the system functionality performance, reliability, security and sustainability All these multiple things combined together to shows that whether the debugging or the equipment we are using is going to be useful or not.

Configuring and calibrating the system parameters in settings In this optimal use, we need the sensory data to be not that sensitive and not that insensitive, so that we miss the important information from the environment which can be critical for the analysis and can causeway multiple problems in the future So we need to calibrate the sensors, the data monitor and other thresholds too We can even configure the data transmission intervals, data processing, by using multiple algorithms which in turn can be formed into data visualisation so that it is easier for the user and for us to collaborate and use the information provided by the system.

Configuring and deploying the system in the target location environment To do this task, we need to apply the sensors and the data centres and receivers in multiple places of urban to the cities as well as industrial and agricultural sectors, so that there is easy and multiple places of environmental monitoring And we can have the maximum effect area which can be useful in multiple prospects for this nation We can even use multiple data types so that there is no variation or problem in identifying the Resources.



Timeline

We need for about four months of timeline for this in installing and initialising of the equipment as it is important to scatter it as much wide as possible so that we can get the most accurate results for our data.

Organisation of the report

And Internet of things based environmental monitoring system is a system that uses Internet connected devices and sensor to collect and transmit data about various environmental parameters such as temperature, humidity, air quality, water Soil moisture rainfall et cetera

The system can also provide alerts and notification when certain threshold or conditions are met and can trigger automated action or response to migrate an environmental risk or improve environmental performance.

The system can benefit from real time and remote monitoring. Data driven decisions making and enhancing communication and collaboration among different stakeholders the system can also address the increasing impact of climate change in human activities, environment and need of more efficient and effective environmental management and governance.

Literature review

Timeline of the reported problem. Internet of things-based system for monitoring and forecasting flashes, floods using deep learning and cloud computing techniques and deployed in a mountainous region. We can use multiple data sources and weed out the data using the data analyst and the algorithm provided by the system so that we can configure the useful information given in the graphical or in numerical method.

Existing solution an Internet of things-based system that can predict environmental conditions such as wage a major temperature humidity and pressure of CO gas. The system used wireless sensor mode, small wireless receivers and cloud architecture to provide data storage and delivery to remote clients, which can be beneficial and is a pre-existing solution of the things we are investigating right now.

Bibliometric analysis web of science, web of science is a comprehensive and multidisciplinary database of scientific literature covering over 21,000 generals and 1,90,000 confirms proceedings. It provides various

bibliometric indicators such as cetacean counts, H index, impact factors and general banking. It also allows users to perform advanced search analysis and visualisation of the data.

Review summary

The impact of internet of things based environmental monitoring system will be significant by providing visual information about environmental condition. Internet over things based environmental monitoring system will play a crucial role in the preservation of our planet and sharing sustainable management of natural resources and providing quality of life for people and animals. Problem definition, the Internet of things is a system of interfiled devices, sensor software that communicate with each other over our network. Internet of things based environmental monitoring system uses the technology to collect and transmit environmental data to help us make informed decision.

Goals

Environmental monitoring is a tricky activity as environmental conditions can easily change from point to point, even at small distances. This is especially true inside building wear temperature, humidity and pollutants can be different, not only in different rooms, but also within the different within the same room, especially when showcases the closed furniture are used. While several architectures have been proposed to can manage many sensing nodes, often there is low attention given to its flexibility. And also, they are quite costly. The components develop within the framework described in the work is designed flexible enough to adapt to the change in different parameters. It is simpler system with minimal cost, which uses battery operators, sensors, equipment, wireless transmission protocol, which ensure real time monitoring

The system is user friendly, as it has supported of Google assistant and an Android application is developed which act as graphical user interface, which enable it.

Evaluation and selection of specific features

Environmental monitoring system has been evolving dramatically and embrace more than Internet things, technology in the last decade, despite the progress. There are, however, continuing limitations and issues with some iot devices and designs. Thus, past tweet search and identified areas of concern in areas such as communication int ability, relative ability and scalability. Scalability has enabled technologies evolve in an accelerator manner. There will be no doubt be a plethora of environmental monitoring solutions under development. Such solutions need to be well evaluated so that the potential users are acknowledgeable in relation to the best solution for their specific application along these lines. This paper puts forward a framework to evaluate proposed anti designs relevant to smart environmental movement system. This framework is based on model standards software engineering requirement found in iso 2050 10 which is users as an A to develop business monitoring system.

Design constraints. I would like to thank my guide for this consistent guidance, inspiration and sympathetic attitude throughout the total work, which I am sure will go a long way in my life. I’m grateful for the many useful comments and suggestions provided by him which have resulted significant improvement in the paper

A bit About the future of Internet of things

As we speak about the Internet of things, trends and beyond for 2022 ignoring ML makes no sense. Machine learning. Are techniques that empower artificial intelligence with the ability to learn. Self-learning systems are being deployed in a wide range of fields. Involving the processing and heterogeneous or simply large data sets. For example, mill is the core of human speech Applications such as cv for Apple devices, Google voice or Alexa for Amazon.

This ability to learn helps app understand human beings and even appreciate future request. This is in turn affects marketing and Advertising market. As a result, we are already getting personalized products and offers even in such subjective areas as fashion and home décor.

Just as the conventional Internet providers with voice, the internet of things will give voice to all the devices we use. We are already slowly getting used to using voice control with assistance like Amazon's Alexa and Apple's CV. The rest of our devices will get their own voice interface very soon. Virtually every automaker is working on its own voice assistant to help drivers ride more conveniently and safely. By using voice control in our project, we can automate the function with voice. Which can be a great role in further development.

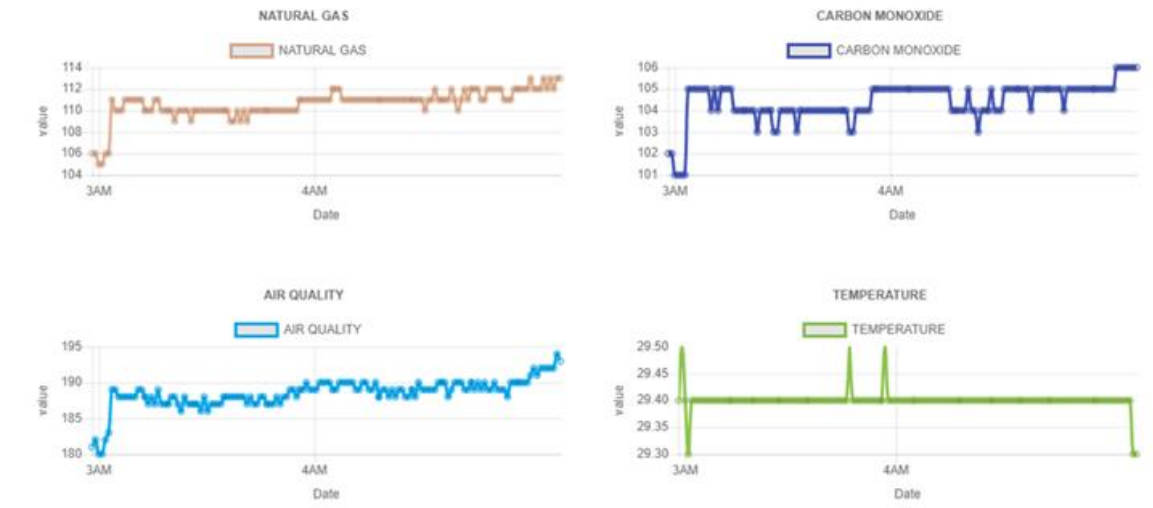
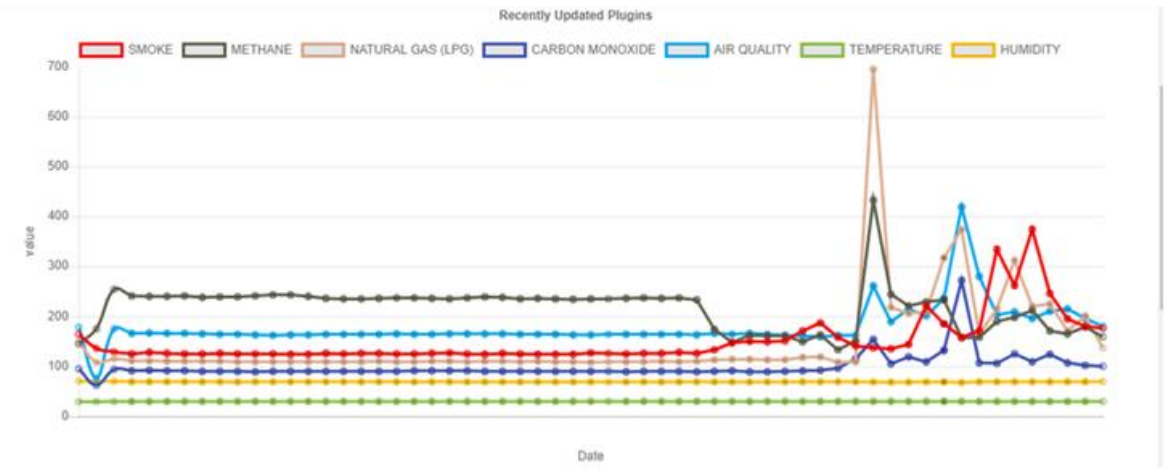


Fig. 5. Data to Graph Visualization Natural Gas & CO Gas Vs Air Quality & Temperature.



RESULT ANALYSIS

This section presents the results obtained from the indoor experiment that has been carried out. The sensor reads the indoor environment by its location. Changes in the artificial environment are made to play with the sensor data by leaking smoke, burning LPG fuel, etc. The values we derive from the sensors thus differ from the normal state and fluctuation of information and is shown in real-time using Fig. 5. When smoke is released, it is immediately detected and displayed by the MQ2 sensor. MQ4 sensor detected the Methane as it was released in the lab. This value is particularly important as it can ensure the safety of the furnace gas tank of factories. Another common poisonous gas is NOx gases. In the lab test, MQ135 immediately detected NOx gases and showed the PPM value in real-time. The sensor DHT22 is effective in measuring temperature and humidity. In the thingspeak dashboard, all these data are shown in a real-time graph. With this information, we can understand the gas activity depending on the relative humidity and temperature. The dust sensor is used in micrograms per meter cube of air to measure the dust density. GPS sensor detects latitude and longitude when the system works outside so that the exact location makes the environmental status understandable All the sensors, microcontrollers, Vero board and everything is linked together in the boxed-shaped unit. It has battery and circuit board compartments and sensors. The battery and the circuit board and sensors are housed in the lower compartment. The battery is in the lower compartment and the boards and controls are right above the compartment which can easily slide in and out. Gas detectors are serially positioned on one side and the other side are the dust and humidity sensors. In this way, a lot of components are put in a standard size box that makes it compact. The most challenging part is this project's complex power supply. Because of 24 processes and information collection. If there are any bugs, the entire system will completely collapse. So we have made sure that there are alternate ways of power. Three types of power supplies are arranged for our project. 12V power supply adapter from AC outlet, battery backup and solar panel to supply power to the device all the time.

CONCLUSION

This Environment Monitoring System is made from low cost components that are easily available and can be used to monitor several environmental parameters. This system can be easily be adapted for both indoor or outdoor use. The proposed system has been tested several times with different parameters, and have been successful throughout. Last but not least, this device can connect to the gateway via Bluetooth, Infrared or WiFi without much design changes thus making it suitable for different scenarios. This system is therefore flexible and scalable. In future we intend to introduce several machine learning techniques that will give more insight to the user. Besides, to manage changes efficiently, the records can be kept in a secure immutable digital ledger using technologies like Blockchain

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