

Title:

## **Distributed IoT system to enhance worker safety in large open areas**

Publisher: IEEE

Authors: Marco Tani, Lorezo parri, Ada fort.

Abstract:

This paper describes a distributed system for workers' safety enhancement, designed for operation in large working site and based on the LoRa network technology. The proposed system consists of a two-level network architecture. The first level consists of Body Area Networks (BAN) and Wireless Body Area Networks (WBAN) embedding specific and different wearable sensors and smart wearable devices which can gather signals related to the individual worker conditions. The information gathered by the sensors is managed and processed locally through devices belonging to the local body network itself (concentrators), in order to extract synthetic parameters. These latter are combined with information related to environmental monitoring such as presence of toxic gases and temperature, the fused information is finally transmitted with low rates through the LoRa network.

Published in: [2021 IEEE International Instrumentation and Measurement Technology Conference \(I2MTC\)](#) May 2021  
<https://doi.org/10.1109/I2MTC50364.2021.9459935>

**Title:** Smart Monitoring and Auto-Neutralization of pH of Alkaline Liquids in Process Industries

**Publisher:** IEEE

**Published in:** 2018 2nd International Conference on Smart Sensors and Application (ICSSA)

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**Abstract:**

In recent years, the use of wireless technology is widely encouraged in many industrial applications. The use of wireless technology has quite a few benefits when it is used in industries. In some of these industries, critical processes and hazardous environment are now physically managed by the employees. Especially in Nuclear power plants where presence of employees is required at the specific sites. This is seen as a threat for human life due to the hazardous environment like nuclear radiation. Even-though safety precautions are followed by the concerned employees, the threat remains same. This paper proposes a wireless smart monitoring and automatic neutralization process of liquid pH in process industries. This eliminates the need of physical presence of employees in the hazardous process area, thus reducing the occupational health and safety related issues.

**Title:** Sleep Scheduling in Industrial Wireless Sensor Networks for Toxic Gas Monitoring

**Publisher:** IEEE

**Published in:** [IEEE Wireless Communications](#) ( Volume: 24, [Issue: 4](#), August 2017)

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## **Abstract:**

Toxic gas leakage that leads to equipment damage, environmental effects, and injuries to humans is the key concern in large-scale industries, particularly in petrochemical plants. Industrial wireless sensor networks (IWSNs) are specially designed for industrial applications with improved efficiency, and remote sensing for toxic gas leakage. Sleep scheduling is a common approach in IWSNs to overcome the network lifetime problem due to energy constrained nodes. In this article, we propose a sleep scheduling scheme that ensures a coverage degree requirement based on the dangerous levels of the toxic gas leakage area, while maintaining global network connectivity with minimal awake nodes.

**Title:** Safety Risk Control System based on UWB and 3D Visualization in Metallurgical Operation

**Publisher:** IEEE

**Published in:** [2018 IEEE 4th Information Technology and Mechatronics Engineering Conference \(ITOEC\)](#)

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**Abstract:**

Accidents caused by the workers who entering the hazardous areas are still occurring frequently because of complex metallurgical operation environment. This paper proposed a safety risk control system based on UWB and 3D visualization in metallurgical operation. The real-time indoor positioning in 3D digital scene and alerting the dangerous states for the workers play a significant role in achieving digital personnel management in the metallurgical plant. This paper studied the application of Ultra-Wide Band (UWB) in personnel positioning and the combinational utilization with three-dimensional visualization technology used to display three-dimensional scenes of the operation area. This system can achieve the metallurgical safety risk identification and grade assessment, precise positioning and dynamic control of field workers and 3D dynamic monitoring of converter operating area. Meanwhile, these functions can be targeted to update by security information statistical feedback after a period. It can be highly adaptable to complex environments and would be of practical values to improve the safety of metallurgical personnel, reliability of security check and man-machine orderly cooperation in working area of metallurgical plant if it would be built and put into application.

# Development of Surveillance Robot to Monitor the Work Performance in Hazardous Area

## Authors:

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**Published in:** 2020 International Conference on Communication and Signal Processing (ICCSP)

**Publisher:** IEEE

## Abstract:

The paper focuses on the idea of providing surveillance using a robot with the techniques of IOT. Surveillance is a major issue in public restricted areas. The robot is hired here to monitor throughout the day. This robotic vehicle has ability to substitute the human in hazardous area to provide surveillance. The robot is operated manually by connecting it to Wi-Fi and consists of sensors for identifying any obstacles and identifying humans and give live streaming to respective admin. This is operated over Wi-fi using blynk app software. Arduino IDE is used in programming the robot. ICs like L293D (motor driver) and sensors like PIR, ultrasonic helps in movement of the mechanical body and detection of obstacles respectively. A camera is equipped for capturing the image of the person identified. A face recognition algorithm can help in spotting the intruder. The gas sensor provided can sense the presence of toxic chemicals in its surroundings. Thus the robot continuously provides data in remote location in addition to the advantages of reduced human loss and detection of threats.

# Implementation of hazardous chemical gas monitoring system using unmanned aerial vehicle (UAV)

## Authors:

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**Published in:** 2016 6th International Conference on System Engineering and Technology (ICSET)

**Publisher:** IEEE

## Abstract:

Unmanned aerial vehicle (UAV) with hexacopter platform is an effective tool to monitor the level of hazardous chemical gas. The ability to fly at low speed autonomously allows this system to map the hazardous chemical gas level and the hazardous chemical gas distribution in each section of an area. To be able to do this task, an on-board data acquisition system is needed on the UAV to be able to measure the hazardous chemical gas level based on the GPS position of the measurement. In this paper, the data was stored on on-board memory storage and sent to Ground Control Station (GCS) through the Flight Controller (Pixhawk PX4) using MAVLink Protocol. Afterward, the data was processed and visualized on the graphical user interface on GCS. In addition, user can also interact with UAV to specify the scanning scenario. Implementation of this system was successfully conducted to visualize measurement data of hazardous chemical gas level in both scenario based area as well as an area that has been define first by user.

# Monitoring Of Industrial Electrical Equipments

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**Published in:** 2022 International Conference on Electronics and Renewable Systems (ICEARS)

**Publisher:** IEEE

## **Abstract:**

There is a considerable chance of fire breakouts in industries such as petroleum, chemical, oils, & gas, resulting in massive devastation, destruction of livelihood, and the great majority of all, the loss of life. When an event happens, it's essential to have a mechanism in place that can alert authorized personnel and ensure that the premises are safe. In order to detect fires (via smoke as well as temperature sensors) and LPG leaks, an IOT-based industrial problem detection project was created. Data is sent to a remote location through the Internet of Things (IoT). 'Things' can communicate with sensors, circuits, programs, and accessibility through the Internet of Things (IoT). Human interaction is unnecessary for these technologies.

Monitoring voltage and current consumption by industry is also a feature of this system. Use this tool to locate the hottest area, which may be assessed by determining the most hazardous area for people or production. A current sensor measures the overall amount of current consumed by the industrial sector. ' If the power exceeds the threshold and the load is tripped, the IOT cloud app will notify the appropriate person.

# To design and develop LoRa-based system for remote safety monitoring

**Authors:**

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**Published in:** 2022 10th International Conference on Emerging Trends in Engineering and Technology - Signal and Information Processing (ICETET-SIP-22)

**Publisher:** IEEE

**Abstract:**

Hazardous area, such as coal mines are below the earth surface. Below certain level there are dangerous and flammable gases. Unavailability of any mobile Network makes such area black spot for communication. In this paper, describe the using of LoRa that provide an wireless network upto certain range in this range using an another LoRa that receive and again retransmit the same data resulting in doubling the range of communication. Adding Lora repeaters multiply the range of communication. In such way routing sensor data till area where GPRS Packets are available and then upload the data to cloud. This can turn any black spot for communication reach to cloud storage.



**Title:**

Research on Monitoring Networking and Information Collection Technology of Hazardous Chemicals Based on Converged Communication

**Publisher:** IEEE

**Author:**

Jixing Yang, Nan Zhao and Yudong Fang Communication Information Center of Ministry of Emergency Management Beijing, China .

**Abstract:**

The ability to prevent and mitigate the main safety concerns posed by hazardous chemicals will be improved, and the dynamic monitoring of hazardous chemicals will be strengthened, in order to do this. The combination of the OPC protocol and Modbus various multi-mode and multiprotocol information collection techniques, and communication protocol enterprise manufacture of hazardous chemicals. The Internet of Things was completely utilized . This piece mixes video intelligent analysis and information security features to accomplish precise, immediate, dynamic, and secure gathering of video, IoT, and abnormal alarm data from systems, Collecting statistics on violations throughout the hazardous chemical production process finalize wide-area perception and intelligent production monitoring. This article understands the essential elements of enterprise risk and employs cutting-edge information technology techniques like the Internet of Things and intelligent analysis to develop Internet of Things hosts based on converged communication in order to effectively prevent accidents and respond to them. It concentrates on gathering crucial safety parameters, alarm data, and video monitoring data from key hazardous chemical industries and completely understands the situation on-site, highlighting the improvement of safety risk monitoring networking, real-time monitoring, and early warning.

Published in: [2020 IEEE 11th International Conference on Software Engineering and Service Science \(ICSESS\)](#)

**Title:**

IoT and ML based Smart System for Efficient Garbage Monitoring. Real Time AQI monitoring and Fire Detection for dump yards and Garbage Management System

**Publisher:** IEEE

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**Abstract:**

Waste and its disposal are always accompanied by number of difficulties that can, in theory, be lessened via the application of technology. The volume of rubbish being disposed of in metropolitan areas is rising at an unprecedented rate as well. The improper disposal of this garbage poses number of risks, including the possibility of dump yard fires, which increase the amount of toxic smoke in the atmosphere and jeopardise the safety of neighbouring residential areas. It is difficult to manually monitor the incidence of fire in sizable dump sites; as a result, the development of an autonomous fire extinguishing system is crucial. By removing such dangerous dangers, the use of new technology can assure the protection and safety of individuals and the index of air quality. The unpredictable dangers of fires in the dump yards that occur with garbage disposal dump sites. The problem gets worse until it is dealt with by the authorities. As a result, some hazardous substances are released into the atmosphere. Because of this, there are significant respiratory issues. when a person inhales these poisons from the air body. The proposed garbage level sensor can be installed in the trash cans to track the levels of the bins. Users can also alert the authorities to rubbish that is left outside in public areas. The device will soon be put to autonomous cars that can navigate around the dumping site. The requirement for numerous permanent monitoring stations can be replaced by such vehicles.

**Published in :** [2020 Third International Conference on Smart Systems and Inventive Technology \(ICSSIT\)](#)

**Title:**

Smart Landfill Monitoring System using IOT “An approach to safeguard public”

**Publisher:** IEEE

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**Abstract:**

With the Internet of Things (IoT) playing a significant role, the "Namma Coimbatore - Swachh Coimbatore" programme has been adopted in smart city projects to improve the most recent technology. The Internet of Things is employed in many different ways, including waste disposal and garbage monitoring systems. To prevent diseases and pollution brought on by hazardous gases, the suggested system explains the necessity for a smart landfill monitoring system using sensor, pi-camera, and smoke detector technology. When a hazardous gas discharge occurs, the sensors positioned around the dump will detect it and send a warning to the local municipal office. GSM and GPRS are used to transmit messages. The cost of this method is low, and the data are kept in the cloud. Smart landfill monitoring systems are primarily concerned with smoke detection and the prevention of toxic smoke leaks that can harm adjacent residents' lungs and cause cancer and respiratory problems. Hazardous situations can be avoided by delivering alert messages via alarm. Future development could involve using sensors to detect dangerous materials in trucks and only allowing approved trucks into landfills. The use of sensors helps prevent the inhalation of toxic gases and odours. Internet of Things is utilised in this case to safeguard the population from diseases caused by the proliferation of bacteria and viruses.

Published in: : [2018 International Conference on Soft-computing and Network Security \(ICSNS\)](#)