LITERATURE SURVEY & INFORMATION GATHERING FOR IOT BASED HAZARDOUS AREA MONITORING FOR INDUSTRIAL PLANT

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LITERATURE SURVEY & INFORMATION GATHERING

Literature Survey

1. A Cloud Based Condition Monitoring System for Industrial Machinery with Application to Power Plants

Authors:-Eslam Elazab & Hassan Elgamal

Novelty

The cloud based condition monitoring application gives early warning signs before critical

Machine failure occurs. The vibration level is the main sign of the machine's health, the machines are monitored for these signs and the required maintenance is planned before the risk of failure is too high, then the greatest life is realized from the machine, and the maintenance cost is reduced.

Pros

- Predict the failure, and act ahead of time.
- The applied cloud based condition monitoring system for industrial machinery proves high performance and flexibility where the total elapsed time directly after the offline measurements didn't exceed a few minutes.

Cons

- The speed of data transfer depends only on the internet speed of the power station LAN (Local area Network) and the size of the transferred files.

2. Bluetooth based Sensor Monitoring in Industrial IoT Plants (IEEE-2019)

Authors: - Rahul N. Gore, Himashri Kour, Mihit Gandhi, Deepaknath Tandur & Anita Varghese

Novelty

This paper presented Bluetooth based autonomous sensor device monitoring systems for Industrial plants. Bluetooth was used as local communication for sensor data capturing. The performance of BLE as local communication technology for sensor data capture was measured using a test bed.

Pros

- The analysis indicated that the Bluetooth fares well the industrial plant sensing application up to 20 meters range with minimal or acceptable deviation in performance.
- Bluetooth also performs well in other performance indicators due to low communication Latency and low power consumption.

Cons

- Various other parameters such as bandwidth, node density, effective usage of Zone/backbone, storage etc. are not considered for this study.
- Security is becoming increasingly important and so also for industrial plant IoT.
- The performance was satisfactory in an environment where they typically found few tens Of external devices that can interfere with Bluetooth communication performance.

3. Mobile-Cloud Driven Conditional Monitoring System (IEEE-2015)

Authors: - Manasvi Jain, Seshu Babu Tolety, Hemadri Pavan Kumar, Pinku Hazarika & Sanath Shenoy

Novelty

Conventionally the critical parameters of the plant are available to the users within the premise in the standalone computers. A better solution is to have the conditional monitoring system be migrated to the cloud so that the monitoring of the industrial plant can be done from any part of the world with the help of cloud services and the smart mobile phones available in the consumer market. This concept would revolutionize the perspective of industrial conditional monitoring.

Pros

- The rapid advancements in mobile hardware and platform have enabled creation of rich And powerful mobile applications.
- The mobile device can be leveraged for innovative means of visualizing the plant data Like graphical representation, 3D visualization of the different plants and plant states, Replay of plant error scenarios in an animated model etc.
- The applications derived from this mobile cloud collaboration have certainly brought Industry much closer to our everyday life with increased accessibility.

Cons

- Being a critical mobile solution, the application should be robust, responsive, and fast and

Should possess accurate plant data.

• The application has been tested under various extreme conditions.

4. IoT Based Intelligent Industry Monitoring System (IEEE-2015)

Authors: - Kavitha.B.C & Vallikannu.R

Novelty

This paper deals with the development of pollution monitoring systems with deployment of intelligent sensors. Monitoring the gas leakage level from any part of the globe can be achieved by integration of big data to the Google Cloud via web servers. Analysis of the data is simplified thereby enabling ease of monitoring. Alerts can be triggered in case of drastic deterioration of air quality. The proposed method finds application in industry and also in monitoring of pollution caused by vehicles.

Pros

• The proposed design can help to prevent industry related accidents due to gas and fuel Leakage by proper identification and alerting the people around.

• The proposed design can also be made suitable for detecting the pollution level from Vehicles and to keep a check on the smoke outlet from factories.

• The design can be modified to detect the level of gases inside pit holes so that precious Lives can be saved.

• The light weight system can be embedded in Jacket, Helmet and Wrist watches which Can be worn by workers to explore the features of Wearable Technology.

Cons

• Predictive maintenance is an upcoming industrial need, for which the proposed model Can be improvised.

• In case of gas leakage the concentration of gas varies from point to point which has to be Analyzed further.

• The gases diffusing out during leakage may also combine among themselves producing Other byproducts
• Which have to be dealt in detail.

5. Toxic environment monitoring using sensors based on IoT (IJRTE-2019)

Authors- R.Rajalakshmi, J.Vidhya

Novelty

Four gas sensors (CO, CH4, H, flammable gas) are used to monitor the pollutants in toxic places. Collected sensors data are to be given to the Arduino analog inputs. The Arduino converts the analog values into digital values. The Arduino board functions are controlled by the set of instructions through the Arduino IDE software. The data is sent to the cloud through Wi-Fi modules.

Pros

• The Data upgraded from the enforced system is accessible within the web from anyplace In the world

Cons

• In this system there are no alerts or notifications to the concerned authorities or users.
• There is no prediction for increase or decrease in levels based on current data.
• Wireless sensor networks are not used. The sensors are connected to pins of the Microcontroller.

6. Sensing Harmful Gases in industries using IOT and WSN (IEEE-2017)

Authors- Ajitkumar Khachane, Anam Mir

Novelty

IOT and WSN technology are used to achieve better connectivity and to create good sensing areas. Switching actions shall be incorporated in order to achieve multiple observations of different sensors used. Different harmful gases CO2, NH3, Benzene, and

Sulphur Dioxide etc. shall be taken into consideration for obtaining optimized data for visualization.

Pros

- The small rugged, inexpensive and low powered WSN node consisting of sensors and ARM-7 will bring the IOT to even the smallest objects installed in any kind of Environment.
- Use of both IOT and WSN technology reduces complexity of devices and also reduces Overall cost of the system.

Cons

- In this system there are no alerts or notifications to the concerned authorities or users.
- There is no prediction for increase or decrease in levels based on current data.

7. IOT based Hazardous Gas Detection system using AVR Microcontroller (IRJET-2017)

Authors- Akship Agrawal, Lalit Kumar, Pavneet Kumar, Vikas Kumar Jha

Novelty-

The hazardous gases like LPG and combustible gas were sensed by the MQ-6 sensor and are monitored by the microcontroller and displayed in the LCD.

In critical situation, that is when the LPG exceeds from normal level i.e., above 1000ppm and in the same way when the propane exceeds the normal level of 1000ppm the alarm is generated and a SMS is sent to the authorized user as an alerting system, which helps in faster diffusion of the critical situation.

Pros-

- GSM (Global System for Mobile) wireless module is most popular and fastest growing Wireless platform in wireless communication.

• The inspection is performed without any interruption of plant operation or any personnel Responsibilities.
• The time required to carry out the inspection is reduced, reducing the cost.
• This project is easy to use and it gives remote indication to user.

Cons-

• The detection of gas is viable only when the gas is in the close proximity to the detector or within a pre-defined area. Due to changing wind conditions and faster dispersion of gas the detector fails to efficiently detect the gas.

8. **The development of remote wireless radiation dose monitoring system (IEEE-2015)**

Authors:- Jin-Woo Lee, Kya-Hwan Jeong, Jong-Il Kim, Chae-Wan Im

Novelty

The system uses three main components namely a smart phone, Beacon and a radiation survey meter. The communication between the components uses Wi-Fi or Bluetooth technology. The information gathered by the radiation survey meter is automatically transferred through the beacon module to the private APP i.e., an application program in a cellular phone in real time at the radiation zone. Additionally, it is sent back to the server administrator to accumulate the personal dose to provide radiation protection administration.

Pros

• It provides an efficient analysis over the real-time data sent through to the administrator
• Using beacon messaging, real time monitoring of the workers to radiation exposure can be monitored

Cons

• The data communicated should be accurate for analysis and raising alert without any loss and inconsistency.

IoT Environment Monitoring Use Cases

1. **Monitoring air** for quality, carbon dioxide and smog-like gasses, carbon monoxide in confined areas, and indoor ozone levels.
2. **Monitoring water** for quality, pollutants, thermal contaminants, chemical leakages, the presence of lead, and flood water levels.
3. **Monitoring soil** for moisture and vibration levels in order to detect and prevent landslides.
4. **Monitoring forests** and protected land for forest fires.
5. **Monitoring for natural disasters** like earthquake and tsunami warnings.
6. **Monitoring fisheries** for both animal health and poaching.
7. **Monitoring snowfall levels** at ski resorts and in national forests for weather tracking and avalanche prevention.
8. **Monitoring data centers** for air temperature and humidity.