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Survey of Industry Air Pollution Monitoring System Using WSN

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***Abstract:*-- The paper presents Wireless sensor network system used monitor and control the air quality in Industry. Pollution has been exaggerated by developments that typically occur as countries become industrialized: growing cities, increasing traffic, rapid economic development and industrialization, and higher levels of energy consumption. Air pollution has majoreffect on the awareness of citizens in the air leading to effects like global warming and acid rains. To avoid such contrarydifferences in the real life, an air pollution monitoring system is utmost essential.Wireless Sensor Network is a fast growing technology using in various areasof reallife, such as fundamental and ecological monitoring, Health care, medicine, military surveillance etc.WSN is excellent technologies that can sense, measure, and gather information from Industry transmit the sensed data to the user control station. These sensor devicespermit the physical atmosphere to be measured at high determinations, and greatly increase the quality and quantity of real life data and information for applications like pollution monitoring. In this paper, a survey on Industry air pollution monitoring systems using wireless sensor networks.**

Keywords – Industry air pollution monitoring system, Wireless sensor networks.

1. INTRODUCTION

Wireless sensor networks (WSN) are growing the view in all sectors of life; from homes to factories, from traffic control to environmental and habitat monitoring. Monitoring seems to be the key word.WSN consists of nodes. A node in the sensor network includes a microcontroller, data storage, sensor, and analogue-to-digital converters (ADC), a data transceiver, controllers that tie the pieces together, and an energy source. The nodes connect to each other using different structural design depending on the applications and nearby environment. Energy is the limiting store in Wireless Sensor Networks. The amount of energy needed to communicate wireless technology increases fast with remoteness and barrier further attenuate the signal. The Wireless Sensor Networks reduces the energy consumption by reducing connections or turning off the radio, when communications do not occur. Recently, the use of WSN in industrial automation has increased attention.

Researchers have investigated the various aspects on applications of WSNs in process industry and also, there have been incredible efforts toward the invention research and development in industry. In addition to reviewing the recent research and development achievements, this paper will also analyze special issues for apply WSN technology on industrial process monitoring system. In particular we report the happenings in scholarly research and the progress in industry in concerning to resolution this concern. Finally, further research and development in this field is introduced. In this paper we discuss the categorization of industrial systems, applications of WSN in such systems, provide important industrial design requirements applications.

II. INDUSTRIAL APPLICATIONS

WSN are used in wide range of applications in the industrial domain [36] and do away with the requirement of human presence in various places including dangerous areas to obtain sensory information and actuation control. Wiring also could incur additional costs of using insulation to be protected from various harmful physical effects such as high temperature. It is also a problem when existing system solution setting up have to be substituted or removed, the wiring placements also have to be substituted or moved around. Here, movable objects create a immense challenge to apply wiring around it, as it restricts its travelling.

Wireless devices are advantageous in all these cases where the only requirement is for the device to be insulated for withstanding extreme conditions. The classes of systems defined previously can also be seen as three categories: safety systems, control systems, and monitoring systems. Below we discuss some of the applications, in each of these categories. Various other applications for which WSN is used can be found in [3], [4]. Safety systems. Fire safety is one of the important safety systems WSN has been applied. WSN ensures its applicability to safety systems by providing various features like real life monitoring, close monitoring of fire fighters (or early responders like police, medic etc) and web-enabled service to provide real-time information to staff standby outside the disaster site. The real-time monitoring assists in keeping the fire-fighters informed. On the industrial perspective, WSN is used in safety systems in potentially

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dangerous applications like nuclear power plants . Mainly, the problems imposed are due to period of the mechanism used in these plant lives, which goes hidden without proper monitoring. Control systems. One of the main categories of the industrial application of wireless sensor networks is the control systems. Firstly, the closed loop control systems which are mainly used to monitor various devices in the system and act accordingly when changes are observed. These closed loop control systems can be further classified into: process control systems and factory automation systems.

However, applications of wireless technologies will grow especially in following areas:

- Rare event detection
- Periodic data collection
- Real-time data acquisition
- Control
- Industrial mobile robots

Wireless Sensor Networks applies for example to bearings of motors, oil pumps, engines, vibration sensors on packing crates, or to many inaccessible or hazardous environments. For these environments, the wired solution may be impractical due to e.g. isolation required for cables running near to high humidity, magnetic field or high vibration environment. Wireless solutions are feasible for mobile applications.

III. CLASSIFICATION OF INDUSTRIAL AIR POLLITUION SECTOR IN WSN

The metropolitan gets a higher economic development; the extreme resident's absorption will cause ecological damage and pollution like air pollution, noise pollution, water pollution etc. Due to leakage of gas in the industries, leakage in pipelines of transfer of LPG gas and experience to pollutants etc need to be noticed and may results in the injury to human structure like nervous, cardiovascular systems. Thus in our research, a real time monitoring of three gases are simulated in real environment. Gases that are monitored in our implementation are Carbon monoxide(CO) ,carbon dioxide(CO2) and sulphur dioxide(SO2). to the industries for monitoring carbon monoxide (CO), sulfur dioxide (SO2) and dust concentration caused by industrial emissions due to process.

(A)Sensor Nodes:

Sensor nodes are systems of low cost, small size, and low use, able of catching information from the atmosphere, processing it, and sending it to the Central Control Information Base System. They include the following fundamentals:[1]

(1)Microcontroller system:

(computer of low cost, low consumption, and small chip) that is the core of the node. Unfortunately, these characteristics imply certain limitations, especially for memory and computing power.

(2) Power supply unit:

Although there are nodes that can be connected to the main power supply, WSNs usually require autonomous functioning, so this system often comprises batteries or even energy- harvesting systems. Unlike most computer systems (where power supply is a secondary aspect), WSNs heavily depend on this aspect.

(3) WSN:

i) Signal conditioning the time gap between amounts of gas concentration deposited on the sensing plates in heater and time requires to clear the gas concentration on the sensing plates.

ii) Sense the changes in air Sensor nodes are used to detect the changes in gas concentration of various pollutions such as Carbon monoxide, carbon dioxide and sulphur concentration in air. As the output of the sensors are analog signals, strength and correctness of signals need to assured.

(4) Transducers:

It allows the node to obtain data from the surroundings for later processing and transmission. These devices are the cornerstone of the different types of sensor node. Obviously, they should be compatible with WSN features.

(B)Gas sensor

A gas detector is a device which detects the presence of various gases within an area, usually as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. A gas detector can also sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave the area. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals. Gas detectors can be used to detect combustible, flammable, and toxic gases, and oxygen depletion. This type of device is used widely in industry and can found in a variety of locations such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic. They may also be used in firefighting

(C)Temperature sensor:

The LM35 series are precision integrated-circuit 2temperature sensors, with an output voltage linearly proportional to the Centigrade temperature. Thus theLM35

has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The low output impedance, linear output, and precise inherent calibration of the LM35 make interfacing to readout or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies. As the LM35 draws only 60 µA from the supply, it has very low self-heating of less than 0.1°C in still air. The LM35 is rated to operate over a −55°Cto +150°C International Journal of Science and Engineering Research (IJ0SER), Vol 3 Issue 3 March -2015 3221 5687, (P) 3221 568X Kalaimani . (IJ0SER) March -2015 temperature range, while the LM35C is rated for a −40°C to +110°C range (−10° with improved accuracy). E. Humidity sensor In general, humidity sensors are used in home, office and industrial HVAC(heating, ventilating, and air conditioning) systems, meteorology station, museum and specific places where humidity plays a role crucially, such as green house, humidors, wine cellars, and hospitals. For example, for the patient with a respiratory illness or certain allergies, the humidity sensor is necessary because low humidity might cause breathing problem or joint pain, on the other hand, high humidity can result in growth of bacteria or fungus F.GSM 300 Cellular communications are becoming increasingly popular in industrial process applications where traditional wired and wireless communications are not possible. The cellular network provides access to devices anywhere a cellular connection exists.

(IV) CONCLUSION & FUTURE WORK

In this paper we have designed an air pollution monitoring system based on wireless networks by using in ecological monitoring because most of industries are using wired and traditional systems. Since, there is no sincerity relating to air pollution in industries. Industry Air Pollution Monitoring System to the limit and have attained huge progresses. Also there are some facilities or characteristics of these existing systems that we want to carry forward or enhance when building the future systems.

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