Monitoring Concentration of Alcohol Gas in Alcohol Generation Plant of Sugar Industry Using Wireless Sensor Network

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Abstract: **Wireless sensor network provides new paradigm for sensing and disseminating information from various environments with a great potential to serve many and diverse applications. To monitor environmental parameters, the wireless sensor network is established, wherein the sensor nodes play a commendable role. On the inspection of the sugar industry, it is found that, for monitoring of physico-chemical parameters, the traditional methods are employed. Moreover, these parameters are monitored at local level only. Presently, no any system is available, wherein centralized monitoring and control is emphasized. Therefore, the sugar industries depict wide scope for deployment of modern technologies such as Wireless Sensor Network. Along with indoor parameters, environmental as well as process parameters, the monitoring of outdoor parameters is also of great importance. The industries are releasing effluents either in the form of gases or liquids. These effluents adversely affect on the quality of the air and soil at large. Spreading of the gases such as alcohol, ammonia etc in to the air surrounded by the industry reveals site specific variability. To monitor unevenly distributed parameters the WSN is most suitable. With the greater reliability and flexibility the wireless sensors nodes are designed, wherein ARM processor, ARM LM4F120H5QR, is used as a core for computational task and RF transceiver module Xbee series-2, from DIGI International Inc, is used for Wireless Networking. Deploying embedded technology the sensor nodes have been designed for on-line monitoring of the concentration of the alcohol gas in indoor as well as outdoor environment of the sugar industry. The smart sensor based on MQ-135 family FC-22-I alcohol sensor is employed for measurement of concentration of alcohol gas. The results of implementation of WSN for monitoring of environmental concentration of alcohol gas in the alcohol generation plant of sugar industry are interpreted in present paper.**

Keywords- Wireless Sensor Node, Wireless Sensor Networks, Xbee-chip, ARM Processor, Base Station.

1.Introduction:

Recent advances in the electronics technologies results into revolutionary developments in fields of science and technology. Due to relentless efforts of scientists and technologists the fields such as Embedded Technology, Integration technology, communication technology, smart sensor design technology etc are pervasively growing and evolving innovative fields for research and developments [1-2]. During early days, the wired networks have been deployed for monitoring of such parameters. However, the wired networks are not only infeasible for typical environment but also shows high cost, hardware complexity, hard to debug and upgrade. The wireless sensor network provides suitable solution to overcome the limitations of the wired system. The WSN is the application specific establishment of smart sensor nodes. The sensor nodes are systematically distributed over a geographical area of interest. The sensor nodes are intelligent and have capabilities such as sensing of physical environment, signal processing and wireless communication. Recently, an embedded technology, wherein smart devices such as microcontrollers of promising features are deployed as computing unit, helps to enhance the intelligence of the sensor nodes. Deployment of advanced microcontrollers helps to design the sensor nodes of high preciseness and great reliability in assimilating and disseminating the data of spatio-temporal variance [10]. The ARM microcontrollers have promising on chip resources and it work with 32 bit processing capacity. Significant research work is going on to