



Design and Implementation of Wireless Sensor Network

Mr. Sambhaji Janardhan Nawale, Prof. Mrs. Joshi. Sareeka. G

Department of E&TC. Pune University ,
Vishwabharati Academy's College of Engg.
Ahmednagar (MS), India

Abstract— *Wireless sensor networks nothing but monitoring the parameters for the oil field by observing the sensor parameter values. Also monitoring means measure the sensor parameters and send to the control station by using the wireless sensor network. If we want to lift the oil from the oil well most of the parameters effect on the behaviour of the systems. Most important factors like voltage required for the pump & The power rating required. Also it needs to measure the pressure, smoke detection, oil tank level, temperature & the other parameters also. This system based on the Atmega16 AVR microcontroller. ATmega16 it having on board ADC modules so it is very easy part to interface any sensors modules to the AVR microcontrollers. All the measured values are sends by using RF 434MHz bands with the proper data transmission over the wireless network.*

Keywords— *Wireless Sensor Network, intelligent.*

I. INTRODUCTION

In this project, a wireless sensor network based intelligent system is used and applied for remote oil well health monitoring and automatic oil-pumping control. The motivation of developing this system is that due to the special nature of oil exploration and oil drilling, the majority of oil pumping units (OPU) are spread over barren hills, mountains and deserts, and the existing oil-pumping systems still adopt manual control. The OPU administrators have to frequently go to the oilfield to check the OPU status and collect its data for analysis. For the sake of the harsh oilfield environment, especially in the winter when it is chilly and snowing over spreading the whole oilfield, it is quite difficult to effectively manage and maintain all OPU manually. Power consumption for OPU is huge during the oil-pumping process. Especially in barren oil wells, power wastage is extremely high because each oil-pumping is not filled under such condition and thus oil production greatly drops even though the OPU pumping stroke remains high. and, since an administrator has to take charge of a number of oil wells, an OPU malfunction is difficult to locate and repair in a reasonable time, which causes an oil production drop. In this project is used to monitor the parameters of the oilfield. When we are filling the oil tank at that time different parameters affect on the control system. Also oil pressure means oil flowing through the pipe. Also it is important to monitor the oil level of the tank. All information it need to send to control station because we want to monitor the parameters.

II. IMPLEMENTAION OF SYSTEM

Fig.1 shows the proposed wireless sensor network topology, i.e. the whole system, which includes the FLSs, the second level sensors, i.e. developed intelligent sensors (ISs) and the network centre. This proposed network can guarantee that one network centre can simultaneously manage and maintain hundreds. In Fig.1, FLSs are utilized for data sensing from an OPU, which convert all measurements into electrical signals and transmit them into the IS through rf module. When IS received sensing data, on one hand, IS may relay sensing data to network centre by wireless communication; on the other hand, IS may elementarily process sensing data, report significant malfunction and output typical information, such as the maximal, minimal and average sensing data and so on. A group of FLS in our proposed system consists of a pressure sensor, an temperature sensor, a voltage sensor, a gas sensor and an oil level sensor. while the IS mainly contains two components: the designed control board and the parameter converter. The IS usually transmits oil well static parameters (At the initial stage), significant malfunction reports, dynamic sensing data and elementary processing data directly to the TLS.

2.1 System Description

In the FLSs in our system contain pressure sensor, level sensor, voltage sensor, current sensor and oil pressure sensor while IS includes control board and frequency converter. Sensing data via FLSs are input into IS. IS automatically transmits sensing data, OPU parameters and the detected malfunction to network minimum time unless certain significant malfunction occurs so that the power is cut off. On the other hand, when IS acquires the command from network center by wireless communication.

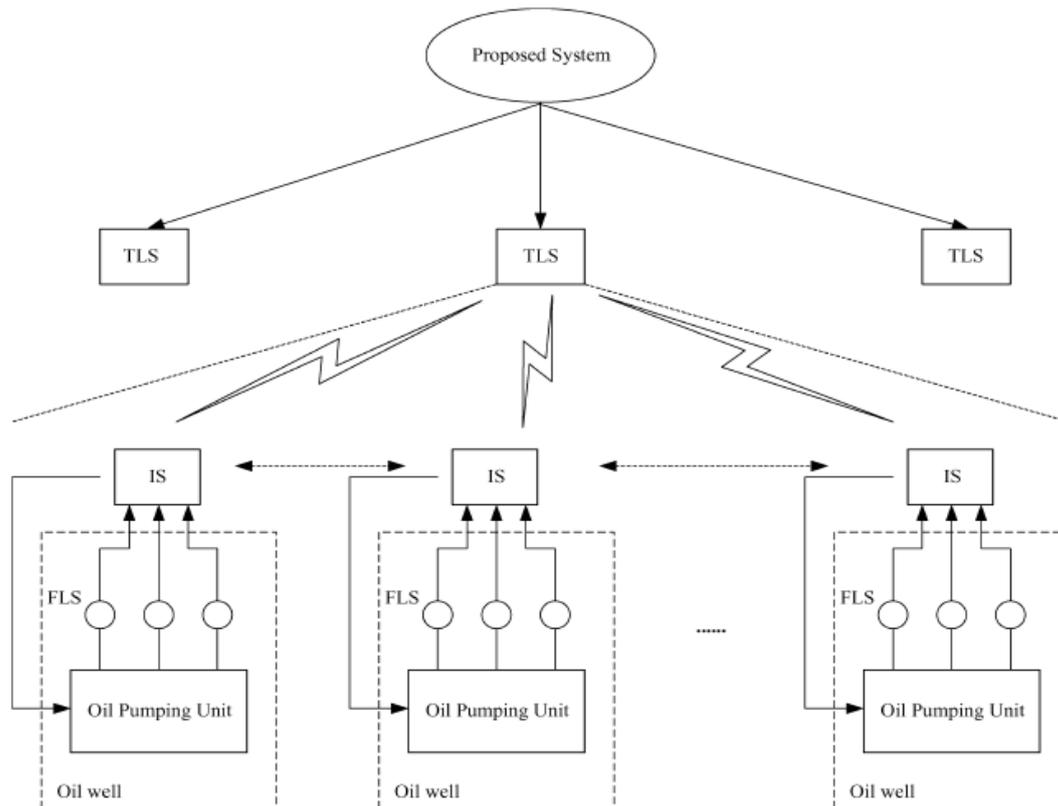


Fig. 1. System topology for OPU health monitoring and intelligent control.

2.2 Block Diagram of the System

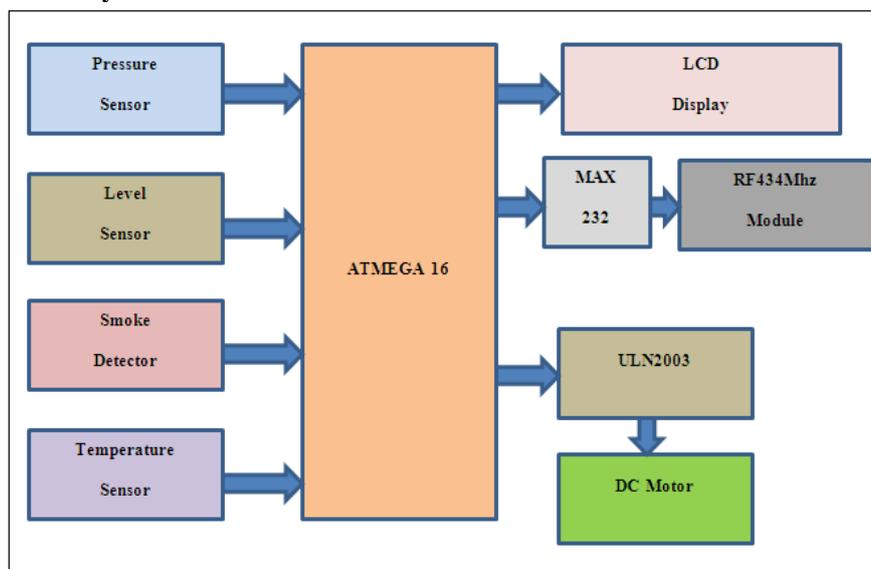


Fig -2: Block Diagram of the System

Block Diagram consist of -Temperature sensor-it is used for temperature of oil, Level sensor-it is used to measure tank level, Gas sensor-it is used to measure smoke of gas oil, Pressure sensor-it is used to measure oil pump pressure.RF used to send the parameter to the control station.& Motor is nothing but the actuator for the system.

III. HARDWARE DESIGN

Sensing module contains pressure sensor, an level sensor, a voltage sensor, a smoke sensor and an temperature sensor and the corresponding conditioning circuit.temperature sensor is employed to acquire instantaneous temperature of pumping unit. smoke sensor is used for measuring the instantaneous value of OPU . Voltage sensor and current sensor are used for measuring the instantaneous voltage and current of power supply, respectively. Oil pressure sensor is used for measuring the oil pressure of oil pipe. 9-pin RS232 serial is utilized for the connection between CPU and radio station. Interface module includes 4 × 4keyboard, 128 × 64 LCD, indicator lights, a buzzer, power switch, start button and stop button.

Table -1: Result

Pressure (pa)	Temperature (⁰ C)	Smoke (ppm)	Level (TTL)
215	24	84	1
220	21	83	1
230	24	87	1
240	28	90	1

IV. CONCLUSIONS

By using RF technology it is possible to send as well as receive all the information without any intervention of any environmental condition. That means there is no problem of line of sight. By using AVR microcontroller the system response we are getting is very good. In this paper, a sensor network based oil well remote health monitoring and intelligent control system was proposed for OPU management in the oilfield. This proposed system consists of three-level sensors: the FLS, the IS and the TLS. The FLS have been used for an oil well's data sensing, including a pressure sensor, an level sensor, a voltage sensor, a smoke sensor and an temperature sensor for each oil well.

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