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Web Based Industrial Monitoring System Using Sensors and Embedded Linux Board

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ABSTRACT:

This paper proposes an advanced system for process management via a credit card sized single board computer called raspberry pi based multi parameter monitoring hardware system designed using RS232 and microcontroller that measures and controls various global parameters. The system comprises of a single master and multiple slaves with wireless mode of communication and a raspberry pi system that can either operate on windows or Linux operating system. The parameters that can be tracked are temperature, light intensity and gas sensor. The hardware design is done with the surface mount devices (SMD) on a double layer printed circuit board (PCB) to reduced the size and improve the power efficiency. The various interesting features are field device communication via USB-OTG enabled Android devices, on field firm ware update without any specific hardware and remote monitoring and control.

Keywords:

Raspberry Pi (Rpi), web server, Embedded Linux, sensors.

I. INTRODUCTION:

The project is aimed at evaluating the performance of an operating system on an embedded system. Before delving into its implementation, an introduction is needed to the parts involved in the project.

The whole report is centered around the field of embedded systems and the use of Linux to run applications on them. Hence an introduction to Embedded Systems and using Linux as an OS in them is provided.

II. RELATED TO WORK:

2.1 BLOCK DIAGRAM:

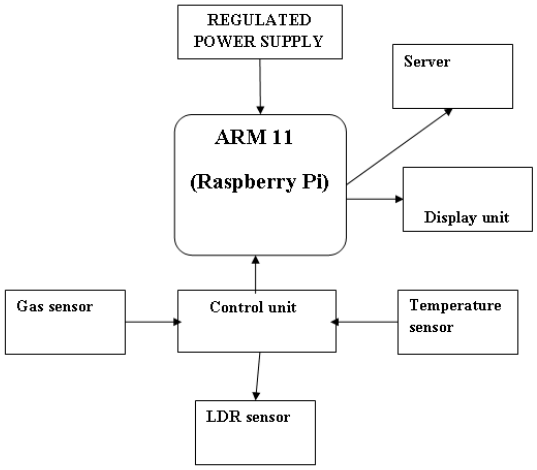

Figure-1: Block diagram

2.2 EXISTING METHOD:

THE SMART GRID is an intelligent monitoring system, distribution, and control system. The proposed system is helpful in collection and analysis of real time data. emphasizing the importance of the

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communication infrastructures required to support data exchange between the various domains which comprises the smart grid.

2.3 PROPOSED METHOD:

In proposed system we extend our data transmission to server so that the relevant parameters are monitored controlling through server. This is very useful in the case when the user is moving in industrial area. Along with the data monitoring devices is also controlled based on the values.

III. HARDWARE COMPONENTS:

3.1 RASPBERRY PI PROCESSOR:

Figure-2: Raspberry Pi diagram

The Raspberry Pi board involves a processor and snap shots chip, Random Access Memory (RAM) and more than a few interfaces and connectors for external devices. Some of these instruments are main others are optional. It operates in the identical method as a ordinary pc, requiring a keyboard for command entry, a show unit and a vigor give. considering that raspberry Pi board operates like pc it requires 'mass-storage', but a tough disk pressure of the variety observed in a ordinary pc is not relatively in maintaining with the miniature dimension of Raspberry Pi.

3.2 GAS SENSOR:

Figure-3: Gas Sensor

MQ2 flammable gas and smoke sensor detects the concentrations of combustible gas in the air and outputs its reading as an analog voltage. The sensor can measure concentrations of flammable gas of 300 to 10,000 ppm. The sensor can operate at temperatures from -20 to 50°C and consumes less than 150 mA at 5 V. Connecting 5v across the heating (H) pins keeps the sensor hot enough to function correctly. Connecting five volts at either the A or B pins causes the sensor to emit an analog voltage on the other pins. A resistive load between the output pins and ground sets the sensitivity of the detector. Both configurations have the same pin out consistent with the bottom configuration. The resistive load should be calibrated for your particular application using the equations in the datasheet, but a good starting value for the resistor is 20 kΩ.

3.3 LIGHT DEPENDENT RESISTOR:

Figure-4: Light Dependant Resistor

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LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1,000,000 ohms, but when they are illuminated with light, the resistance drops dramatically. If the intensity of light is more (during daytime) the loads will be in off condition. And if the intensity of light is less (during nights), the loads will be switch. LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

IV.RESULT:

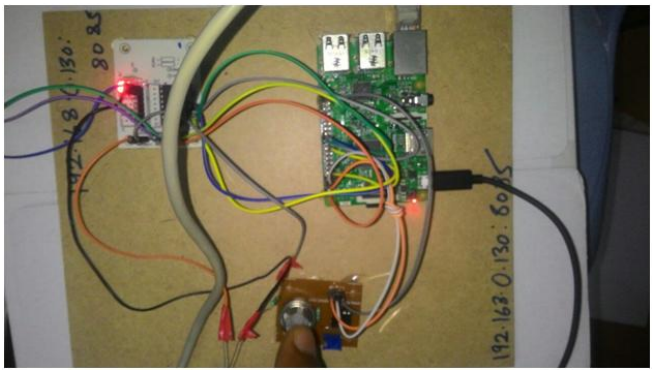

Figure-5: Hardware diagram of project

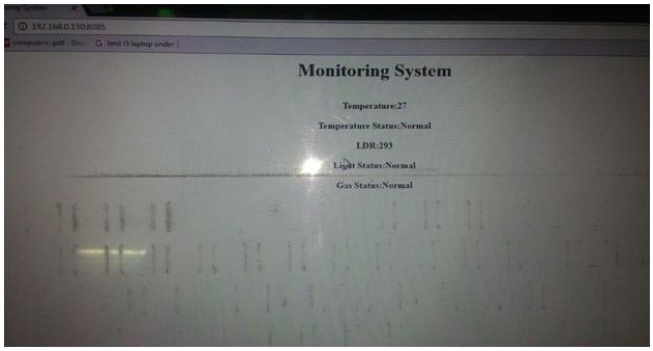

Figure-6: Monitoring on Web server

V. CONCLUSION:

The project "Web based industrial monitoring System using sensors and Embedded Linux board" has been successfully designed and tested.

It has been developed by integrating features of all the hardware components and software used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced ARM11 board and with the help of growing technology the project has been successfully implemented.

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