



Intelligent Monitoring of Data through Embedded Web-Server Using Arm9

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Abstract:

An embedded system is a computer system designed for specific control functions within a larger system, often with real-time computing constraints .But when networking technology is combined with it, the scope of embedded systems would be further more. Here design and implementation of embedded web server is presented. That can be used for Electrical Equipment monitoring system. In h/w design arm 9. Sensors are interfaced with microcontroller. Parameters like temperature, gas are measured and transmitted to PC through serial protocol SPI. The received values in PC are uploaded in internet by Ethernet cable. So by typing IP address in web browser, client can monitor all devices in industry from any remote places via its own local browser. Ethernet communication is depicted and data flow is analysed last.

1.Introduction:

The arrival of internet reduced the whole world communication boundary to that of a single village. After the “everybody in internet wave” now obviously follows the “everything in the internet wave”. When the embedded devices are provided with internet access, it is of no doubt that demand will rise due to the remote accessing capability of the devices. The paper includes complete implementation of an HTTP Web Server in Raspberry Pi. This development kit which contains Ethernet interface is connected to PC using RJ45 cable. Sensors are connected to 89C51 Microcontroller. Temperature, Gas, Humidity, pressure, motion, and speed are must often measure parameters. Some electronic circuits, chemical reactions, biological processes perform best with in limited temperature and also

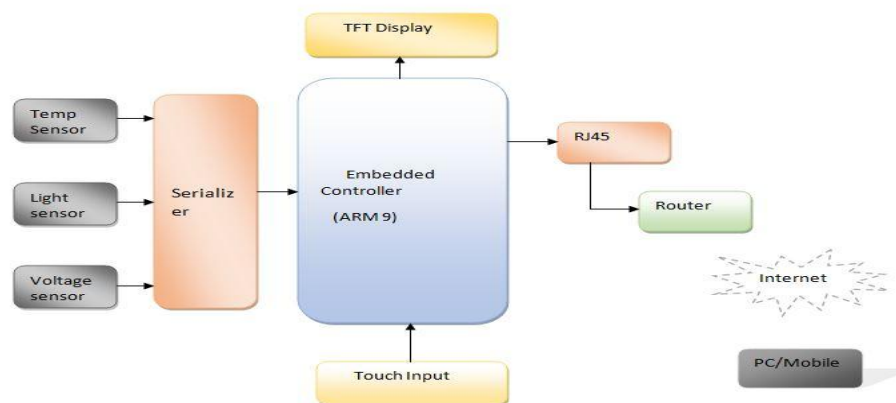
necessary to measure gas in environment. These parameters are mostly used in power plants, chemical industry, hospital, medicine Production Company. In this paper embedded systems and Internet technology are combined to form a new technology -the Embedded Internet Technology, which developed with the popularization of computer network technology in recent years. The heart of communication is TCP/IP protocol. Network Communication is performed by the IEEE 802.3 Ethernet standard. It is the most modern technology of embedded systems. Since ARM embedded web server based on Raspberry Pi has fast execution capability and Ethernet standard can provide internet access with reasonable speed, this system is suitable for enhancing security in industrial conditions by remotely monitoring various industrial applications.

2. EMBEDDED WEBSERVER

The implementation of embedded Internet technology is achieved by means of the embedded web server. It runs on embedded system with limiting computing resources to serve web documents including static and dynamic information about embedded system to web browser. We can connect any electronic device/equipment to web server and can obtain the real-time status information and control remote equipment without time and space

restriction through web page released by embedded web server. Embedded server is a single chip implementation of the Ethernet networking standard. It consists of two primary elements communicating with each other: i) a server consisting of an ARM processor with an Ethernet controller and ii) a client computer which is connected to controller through this RJ45 interface. The client computer sends/receives data to/from the arm microcontroller using TCP packets.

3. System Implementation:



3.1. Power supply:

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to other. This power supply section is required to convert AC signal to DC signal and also to reduce the amplitude of the signal. The available voltage signal from the mains is 230V/50Hz which is an AC voltage, but

the required is DC voltage (no frequency) with the amplitude of +5V and +12V for various applications. In this section we have Transformer, Bridge rectifier, are connected serially and voltage regulators for +5V and +12V (7805 and 7812) via a capacitor (1000 μ F) in parallel are connected parallel as shown in the circuit diagram below. Each voltage regulator output is again is connected to the capacitors of values (100 μ F, 10 μ F, 1 μ F, 0.1 μ F) are connected parallel through which the corresponding output (+5V or +12V) are taken into consideration.

3.2. Light sensor:

A photo resistor or Light Dependent Resistor or CdS (Cadmium Sulphide) Cell is a resistor whose resistance decreases with increasing incident light intensity. It can also be referred to as a photoconductor.

A photo resistor is made of a high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering resistance

3.3. Temperature sensor:

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^\circ\text{C}$ at room temperature and $\pm 3/4^\circ\text{C}$ over a full -55 to $+150^\circ\text{C}$ temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only $60\ \mu\text{A}$ from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a -55° to $+150^\circ\text{C}$ temperature range, while the LM35C is rated for a -40° to $+110^\circ\text{C}$ range (-10° with improved

accuracy). The LM35 series is available packaged plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.

3.4. TFT:

A thin-film-transistor liquid-crystal display (TFT LCD) is a variant of a liquid-crystal display (LCD) that uses thin-film transistor (TFT) technology to improve image qualities such as addressability and contrast. A TFT LCD is an active-matrix LCD, in contrast to passive-matrix LCDs or simple, direct-driven LCDs with a few segments. TFT LCDs are used in appliances including television sets, computer monitors, mobile phones, handheld video game systems, personal digital assistants, navigation systems and projectors. TFT LCDs are also used in car instrument clusters because they allow the driver to customize the cluster, as well as being able to provide an analogue-like display with digital elements. The liquid crystal displays used in calculators and other devices with similarly simple displays have direct-driven image elements, and therefore a voltage can be easily applied across just one segment of these types of displays without interfering with the other segments.

Working:

By using multicast routing protocol sends the data which we read from the sensors to other systems i.e., from one to many. By using router and changing the systems ip to one unique and sending the data.

Results:



Conclusion:

A remote user only requires a common Internet browser to carry out experiments on real hardware. The embedded web server that has been designed can be used in educational institutions, offices and many other places. For web-based network element management provide an administrator with a simple but enhanced and more powerful user interface without additional hardware. Software contention and architectures can significantly affect web server performance. Poorly designed and configured software architectures might even generate high response times while the physical resources display low utilization. Implementation of web server using Raspberry Pi for intelligent monitoring is a new method to monitor an environment which designed here for the real time implementation. The system can also communicate with PC through RS-232 Serial Port. It supports onlinesupervision and control not only within Private Network (LAN) but also in Public Network (Internet).The whole system has low-cost, good openness and portability, and is easy to maintain and upgrade. It is possible to interface different kind of Sensors with these modules and make various applications. So it can monitor embedded system operation state through Internet, achieving network monitoring purposes. This

work can further be extended with usage of high end embedded servers along with wireless sensor networks with increase in parameters and increase in sensor nodes.

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