

Industrial Process Monitoring Through IOT

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Abstract:

A sensor interface device is important for sensor data assortment of industrial wireless sensor networks (WSN) in IoT environments. However, this connects variety, sampling rate, and signal types of sensors are usually restricted by the device. Meanwhile, within the web of Things (IoT) atmosphere, every sensor connected to device is needed to write sophisticated cumbersome data assortment program code. During this paper, to resolve these issues, a new technique is projected to design a reconfigurable good sensor interface for industrial WSN in IoT atmosphere, within which ARM 11 chip is adopted as the core controller. Thus, it will scan data in parallel and in real time with high speed on multiple totally different sensor data. It comprehensively stipulates the smart detector hardware and software system design framework and relevant interface protocol to understand the intelligent acquisition for common sensors. A brand new solution is provided for the standard detector data acquisitions. The device is combined with the most recent embedded Linux technology and therefore the standard of sensor specification.

I.INTRODUCTION

Wireless based industrial automation is a prime concern in our day-to-day life. The approach to Wireless Network for Industrial Applications standardized nowadays. Intelligent and low-cost automation of industrial processes are crucial in order to improve process efficiencies, deliver quality products, and ensure timeliness and accuracy of systems. Wireless is predicted to be one of the fastest growing technologies in the area of process automation sector.

This paper is focused on design & implementing a secured wireless communication system of ARM embedded IOT server based on Raspberry Pi. The system with addition to the industrial production with which it is popularly associated. Now it covers a number of unexpected areas in system research. In recent environmental protection engineering, traffic engineering, safe system, agriculture, building engineering, and medical engineering are but some of the areas where automation is playing a vital role as well application. In new approach of automation engineering is a cross sectional discipline where it mainly requires exact, proportional knowledge in hardware and software research development and their applications in particular field. As a result of the developments in Communication technologies, systems are no longer monitored and controlled by personnel using classic methods, but automatically by computer-controlled or remote-controlled devices. Industrial environmental conditions have been upgrading day by day with this newly introduced automatic techniques as a result of getting rid of the conventional procedures of manufacturing increasing huge workloads.

II.PROPOSED METHOD

The planned methodology is employed to beat the drawbacks gift in existing methodology. Here we have a tendency to avoid mistreatment ARM Intelligent observation Center that uses Samsung's processor as its main controller. The environmental conditions gift within the workplace will be monitored mistreatment sensors like temperature, gas and LDR. All the sensing elements are connected to sensor board.

From the sensing element board we have a tendency to ar causing monitored values to regulate space (ARM board) through RS232 serial cable. The serial cable is connected to at least one of UART port of ARM board. Whenever someone is entered within the workplace, the person’s image will be captured by camera and send it to controller. On a Raspberry Pi (Single-Board Computer) board of ARM eleven design are going to be ported with AN Embedded UNIX system package and mistreatment local area network protocol for IOT applications, we are going to acquire the information from the Wireless sensing element Network (WSN), post the information over the online such it will be viewed over web on any browser furthermore conjointly in advancement can operate the appliance from the online.

cells. A typical ARM chip will contain many peripheral controllers, a digital signal processor, and a few quantity of on-chip memory, in conjunction with AN ARM core. Second, each ARM ISA and pipeline style ar geared toward minimizing energy consumption — a important demand in mobile embedded systems. Third, the ARM design is extremely modular: the sole obligatory part of AN ARM processor is that the number pipeline; all alternative elements, together with caches, MMU, floating purpose and alternative co-processors ar optional , which supplies plenty of flexibility in building application-specific ARM-based processors. Finally, whereas being little and low-power, ARM processors offer high performance for embedded applications.

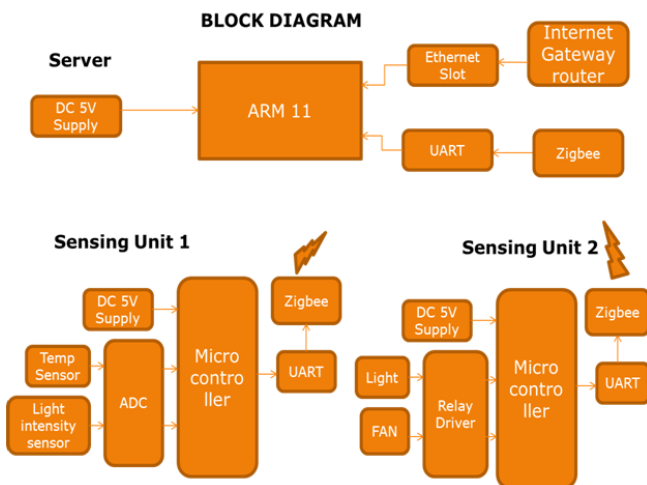


Fig. Proposed block diagram

RASPBERRY PI BOARD



Fig. Raspberry Pi Board

A.ARM 11 MICROCONTROLLERS

ARM could be a 32-bit {risc} reduced instruction set computing reduced instruction set computer| RISC| computer design| architecture} processor architecture developed by the ARM corporation. ARM processors possess a novel combination of options that creates ARM the foremost in style embedded design these days. First, ARM cores ar terribly straightforward compared to most alternative general processors, which suggests that they will be factory-made employing a relatively little range of transistors, feat many house on the chip for application specific macro

The Raspberry Pi contains a Broadcom BCM2835 system on a chip (SoC), which has Associate in Nursing ARM1176JZF-S 700 megacycle per second processor, Video Core IV GPU, and was originally shipped with 256 megabytes of RAM, later upgraded to 512 MB. It doesn't embrace a intrinsic magnetic disk or solid-state drive, however uses Associate in Nursing Mount Rushmore State card for booting and protracted storage.

B.8051 MICROCONTROLLER

The AT89S52 may be a low-power, superior CMOS 8-bit microcontroller with 8K bytes of in-system programmable non-volatile storage. The device is factory-made mistreatment Atmel's high-density nonvolatile memory technology and is compatible with the indus-try-standard 80C51 instruction set and pinout. The on-chip Flash permits the program memory to be reprogrammed in-system or by a standard nonvolatile memory coder. By combining a flexible 8-bit processor with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 may be a powerful microcontroller that provides a highly-flexible and cost-efficient answer to several embedded management applications. 4.2 AT89S52.

C. TEMPERATURE SENSOR

LM35 may be a preciseness IC temperature sensing element with its output proportional to the temperature (in oC). It conjointly possesses low self-heating and doesn't cause quite zero.1 oC temperature rise in still air. The operational temperature vary is from -55°C to 150°C. The output voltage varies by 10mV in response to each oC rise/fall in close temperature, i.e., its multiplier is zero.01V/ oC.

D. LIGHT DEPENDENT RESISTOR

A light-dependent electrical device, {alternatively| as associate degree alternative| instead| or else} referred to as an LDR, photo resistor, photoconductor, or sensing element, may be a rheostat whose price decreases with increasing incident strength. An LDR is created of a high-resistance semiconductor.

E. A/D convertor (ADC)

The ADC0808, ADC0809 knowledge acquisition part may be a monolithic CMOS device with associate degree 8-bit digitiser, 8-channel electronic device and chip compatible management logic. The 8-bit A/D convertor uses sequent approximation because the conversion technique. The convertor options a high electric resistance chopper stabilised comparator, a 256R resistance with analog switch tree and a sequent

approximation register. The 8-channelmultiplexer will directly access any of 8-single-endedanalog signals.

F. Ethernet

Ethernet may be a family of pc networking technologies for native space networks (LANs) commercially introduced in 1980. Standardized in IEEE 802.3, local area network has mostly replaced competitive wired computer network technologies. Systems act over local area network divide a stream of information into individual packets referred to as frames. every frame contains supply and destination addresses and error-checking knowledge in order that broken knowledge is detected and re-transmitted.

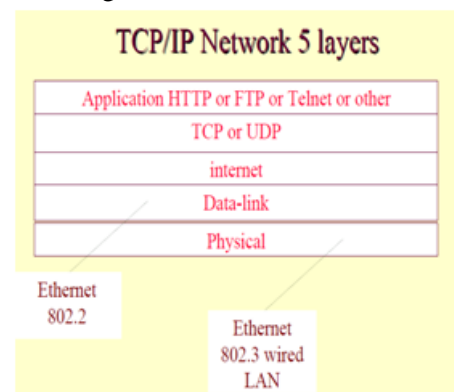


Fig. TCP/IP Network layers

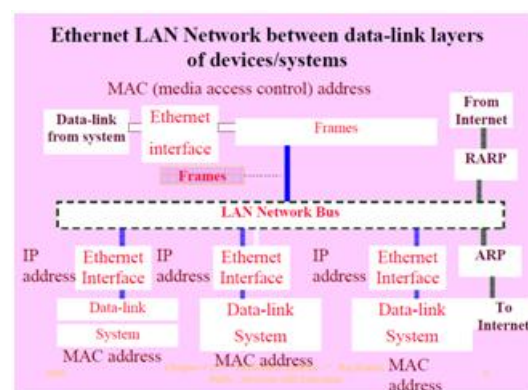


Fig. LAN connection among different systems

G.LINUX Operating system

Linux or GNU/Linux could be a free and open supply computer code OS for computers. The OS could be a assortment of the essential directions that tell the electronic elements of the pc what to try to to and the

way to figure. Free and open supply computer code (FOSS) means everybody has the liberty to use it, see however it works, and changes it. There is plenty of computer code for UNIX system, and since UNIX system is free computer code it means none of the computer code can place any license restrictions on users. this can be one in every of the explanations why many folks prefer to use UNIX system.

H.QT EMBEDDED FRAME WORK

Qt could be a cross-platform application framework that's wide used for developing application computer code with a graphical computer program (GUI) (in that cases Qt is classed as a gadget toolkit), and additionally used for developing non-GUI programs like command-line tools and consoles for servers.

I. GCC COMPILER

The original wildebeest compiling program (GCC) is developed by Richard Stallman, the founding father of the wildebeest Project. Richard Stallman based the wildebeest project in 1984 to make an entire Unix-like OS as free computer code, to push freedom and cooperation among laptop users and programmers. GCC, erstwhile for "GNU C Compiler", has adult over times to support several languages like C++, Objective-C, Java, FORTRAN and enzyme. it's currently spoken as "GNU Compiler Collection". The mother website for GCC is <http://gcc.gnu.org/>.

III. WORKING PRINCIPLE

In this project, we have a tendency to square measure giving the whole description on the planned system design. Here we have a tendency to square measure victimization Raspberry Pi board as our platform. it's AN ARM-11 SOC with integrated peripherals like USB, LAN and serial etc. On this board we have a tendency to square measure putting in UNIX operating system package with necessary drivers for all peripheral devices and user level code stack which incorporates a lightweight weight user interface supported XServer, V4L2 API for interacting with video devices like cameras, TCP/IP stack to speak with

network devices and a few commonplace system libraries for system level general IO operations. The Raspberry Pi board equipped with the higher than code stack is connected to the skin network and a camera is connected to the Raspberry Pi through USB bus. The board continuously reads data from the camera and at the same time it reads the data from the sensors. The scheduler is monitoring the process dedicated for camera reading and sensor reading. The camera read image and sensor values with scheduler information will send to the web server. There the user in front of the web server will monitoring the priorities and the sensor and camera data. Whenever the user wants to change the priorities of the processes then using the web interface he can change the priorities. Whenever change is occurred then the web server sends the modified signals to board. Whenever the board got the modification, it will send the scheduler to change the priorities

IV. ADVANTAGES

- Low support cost, easy to implement and low power consumption and controlling is done by using web technology.
- Avoid unplanned lab operation interruptions.
- Increase laboratory efficiency.
- Remotely track critical system parameters.

V. APPLICATIONS AND FUTURE SCOPE

Used to monitor the parameters like temperature, darkness etc. inside the lab and also control the parameters through web technology.

- The cost of ARM11 is more that's why in future we can implement this system using ARM CORTEX A8, Beagle bone etc as well as updated processors with high frequencies will work fine.
- As the storage space is also less in future we can also record these live streaming data by connecting external memory storage.
- We can complete our project using wireless technology.
- In future we can provide more security to data by using encryption, decryption techniques.

VI. CONCLUSION

The project of “An Industrial process monitoring through IoT for Industrial WSN in IoT Environment” had successfully designed & tested by using IOT method. It had developed by integrating features of the hardware components and software used and tested. Presence of each and every module has been reasoned out and placed carefully thus by contributing to the best working of unit. Secondly, by using highly advanced ARM Cortex A8 Processor board and with help of growing technology the project has been successfully implemented.

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