



Raspberry Pi Based Global Industrial Process Monitoring Through Wireless Communication

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Abstract- The project 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, water level, gas detection and fire extinguisher. Along these lines we can screen and control the gadgets through remote PC as it is specifically transmitted through program it can be seen anyplace on the planet and can be effortlessly controlled. Now the users are no longer required to dedicatedly present on-site to monitor the process. Instead any employ of industry can do this task along with his other activities.

Index Terms— Raspberry Pi, Zigbee, Sensors--Temperature Sensor, Gas Sensor, Fire Sensors, LDR.

I. INTRODUCTION

In our system, the single board computer will be internet enabled and hence the industrial process parameters can be monitored from anywhere through a browser interface. Now the users are no longer required to dedicatedly present on-site to monitor the process. Instead any employ of industry can do this task along with his other activities.

II. EXISTING METHOD

In the current work, the created framework was not effective in the perspective of assignment booking as the framework utilized was a non-Linux gadget and furthermore outside Ethernet was utilized for correspondence. Each time the undertaking will be done physically.

III. PROPOSED METHOD

The proposed strategy is utilized to beat the disadvantages exhibit in existing technique. Here we are utilizing ARM Intelligent Monitoring Center which utilizes Samsung's processor as its fundamental controller. The natural conditions exhibit inside the lab can be checked utilizing sensors like temperature, gas and LDR. Every one of the sensors are associated with sensor board. From the sensor board we are sending checked esteems to control room (ARM board) through RS232 serial link. The serial link is associated with one of UART port of ARM board. At whatever point a man is entered inside the lab, the individual's picture can be caught by camera and send it to controller.

The controller transmits the information to remote PC through Ethernet by utilizing FTP. FTP is a convention through which clients can transfer

records from their frameworks to server. When information is set at server we can see the information at remote PC (with web) on site page with one of a kind IP address. We can see ceaseless spilling of video and additionally sensor's information.

On the off chance that we need to control the gadgets in view of sensor's data we can control through site page from remote area utilizing HTTP convention. HTTP convention constantly asks for the server for control (kill on or turn) the gadgets. Along these lines we can screen and control the gadgets through remote PC as it is specifically transmitted through program it can be seen anyplace on the planet and can be effortlessly controlled consequently.

IV. SYSTEM ARCHITECTURE

This undertaking is a usage of modern process checking through remote correspondence.

A. Block Diagram

Modules: Raspberry pi, Zigbee, UART, Temperature sensor, gas sensor, fire sensors, LDR.

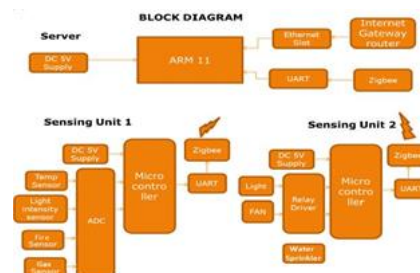


FIG1: Block Diagram

B. Temperature sensor:

LM35 is an exactness IC temperature sensor with its yield relative to the temperature (in °C). The sensor hardware is fixed and in this manner it is not subjected to oxidation and different procedures. With LM35, temperature can be measured more precisely than with a thermistor. It additionally have low self warming and does not cause more than 0.1 °C temperature ascend in still air. The working temperature run is from 55°C to 150°C. The yield voltage fluctuates by 10mV because of each °C rise/fall in encompassing temperature, i.e., its scale factor is 0.01V/°C.



FIG2: Temperature sensors

C. LDR Sensor:

A LDR is made of a high resistance semiconductor. On the off chance that light falling on the gadget is of sufficiently high recurrence, photons consumed by the semiconductor give bound electrons enough vitality to hop into the conduction band. The subsequent free electron (and its gap accomplice) direct power, along these lines bringing down resistance.



FIG3: LDR sensors

D. Fire Sensor:

Infrared (IR) fire indicators work inside the infrared ghostly band. Hot gasses produce a particular ghostly example in the infrared area, which can be detected with a warm imaging camera (TIC) a sort of thermo realistic. False cautions can be caused by other hot surfaces and foundation warm radiation in the range and in addition blinding from water and sun oriented vitality. A normal recurrence where single recurrence IR fire indicator is delicate is in the 4.4 micrometer run..

E. Gas Sensor

A smoke locator likewise called a smoke caution is a gadget that distinguishes smoke, normally as a marker of flame. Business, modern, and mass private gadgets issue a flag to a fire alert framework, while family unit identifiers, known as smoke cautions, for the most part issue a nearby capable of being heard or visual caution from the finder itself.

F. Raspberry Pi

The Raspberry Pi is a Visa measured single-board PC made in the UK by the Raspberry Pi Foundation with the objective of propelling the

educating of principal programming building in schools.

The Raspberry Pi is created in two board setups through approved amassing oversees Newark element14 (Premier Farnell), RS Components and Egoman. These associations offer the Raspberry Pi on the web. Egoman produces a frame for spread only in China and Taiwan, which can be perceived from various Pis by their red shading and nonappearance of FCC/CE checks. The gear is the same over all creators. The Raspberry Pi has a Broadcom BCM2835 structure on a chip (SoC), which joins an ARM1176JZF-S 700 MHz processor, Video Core IV GPU, and was at first dispatched with 256 megabytes of RAM, later climbed to 512 MB.

G. ZigBee

The ZigBee Alliance is not pushing an innovation; rather it is giving an institutionalized base arrangement of answers for sensor and control frameworks. The physical layer was intended to suit the requirement for a minimal effort yet taking into consideration elevated amounts of combination. The utilization of direct succession enables the simple hardware to be extremely straightforward and exceptionally tolerant towards economical usage.

The media get to control (MAC) layer was intended to permit various topologies without intricacy. The power administration operation doesn't require various methods of operation. The MAC permits a lessened usefulness gadget (RFD) that needn't have streak nor a lot of ROM or RAM. The MAC was intended to deal with vast quantities of gadgets without expecting them to be "stopped".

V. DESCRIPTION OF THE SYSTEM

Industrial process monitoring and control system is developed to speed up the manufacturing process of the industry and to improve the efficiency and accuracy of the system manufacturing the plant, vital parameters in the industry.

Which effect the robustness of the plant to monitor with the help of highly sensitive sensor units connecting to the 8 bit micro controller unit and transmitter to ARM 11Raspberry Pi processor using ZigBee of 2.4GHzprotocol for web enabled monitoring and controlling to have video streaming live telecast a USB camera connected to Raspberry Pi processor with Wi-Fi connectivity.

On a Raspberry Pi (SingleBoard Computer) board of ARM 11 architecture will be ported with an Em bedded Linux operating system and using Ethernet protocol for IOT applications, we will acquire the data from the Wireless Sensor Network (WSN), post the data over the web such that it can be viewed

over internet on any browser as well also in advancement will operate the appliance from the web.

SCHEMATIC: Temperature sensor, gas sensor, fire sensor and LDR sensor are connected with ADC0808, which is of 8 channel and measures reading at precision time period of 10 micro seconds having a channel length of 8 bits and supporting 8 different channels. These valves are given to 8052 controller and from this controller send wirelessly with ZigBee UART transmitter.

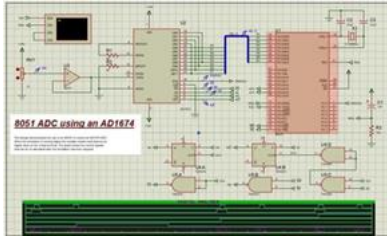


FIG 4: schematic diagram

VI. HARDWARE SNAPSHOT



FIG 5 Monitoring Section

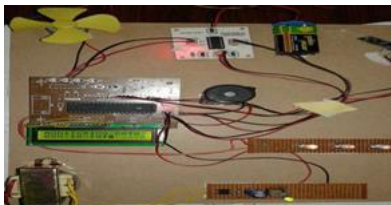


FIG 6: (a) Controlling section



FIG 6 (b) Controlling section

ADVANTAGES

Low support cost.

Easy to implement and low power consumption.
Avoid unplanned lab operation interruptions.

Increase laboratory efficiency.

Remotely track critical system parameters.
Controlling is done by using web technology.

VII. FUTURE SCOPE

We can likewise record this live gushing information by interfacing outer memory stockpiling. We can finish our undertaking utilizing remote innovation. In future we can give greater security to information by utilizing encryption, unscrambling strategies.

VIII.CONCLUSION

The task "mechanical process checking through remote correspondence" has been effectively outlined and tried. It has been created by coordinating highlights of all the equipment segments and programming utilized and tried.

It is a reconfigurable keen sensor interface for mechanical WSN. The framework can gather sensor information cleverly.

It is extremely appropriate for continuous and powerful necessities of the rapid information obtaining framework. At last, by taking continuous observing of water condition we checked that the framework accomplished great impacts unfeasible application.

IX. ACKNOWLEDGMENT

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