

A RECONFIGURABLE SMART SENSOR INTERFACE FOR INDUSTRIAL WSN IN IOT ENVIRONMENT

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ABSTRACT: This project discusses ongoing research being carried out on an industrial Smart sensor interface for sensor data collection of industrial wireless sensor networks (WSN) in IoT environments. The current connect number, sampling rate, and signal types of sensors are generally restricted by the devices. In the Internet of Things (IoT) environment, every sensor connected to the device is required to write complicated and cumbersome data collection programming code. In this paper, we are going to solve this problem. In current method the cable are laying through conduits, Sometime inside wall as well as ground also, so on that condition maintenance/ breakdown is very difficult to attend, and also operator has to go to particular room to monitor and control the operator. . We are designed a system by using ARM 32-bit micro controller which supports different features and algorithms for the development of the automation system Using ARM controller, connect all types of sensor and also connect the 8 Bit microcontroller based sensor network to ARM, and wireless technology using Zig bee. Here field programmable gate array device (FPGA) is adopted as a core-controller. Means, it is capable read data in parallel and real time with high speed on nth no of different sensor data. The device is combination with the newest FPGA programmable technology and the standard of IEEE1451.4 intelligent sensor with specific specification.

Keywords: ARM Controller, Industrial Sensor, Wireless sensor network, Internet of Things, KEIL Software

I. INTRODUCTION

1.1 EXISTING METHOD:-

Automatic control panel are available in industries for monitoring and controlling the parameters of machines and hence final product. But most of the control panels in industries are wire panels and machines are controlled and monitor by the control room operator using wire network. The wires are moving through conduits, sometimes inside walls and sometimes underground also. So breakdown maintenance of these wires is difficult task in industries. As these wires are not open so it is difficult to locate the fault. And even after locating the fault it takes time to repair them. The second disadvantages of this method are operator console cannot move from one room to another. Every time operator has to go to particular room to monitor and control the operation.

1.2 PROPOSED METHOD:-

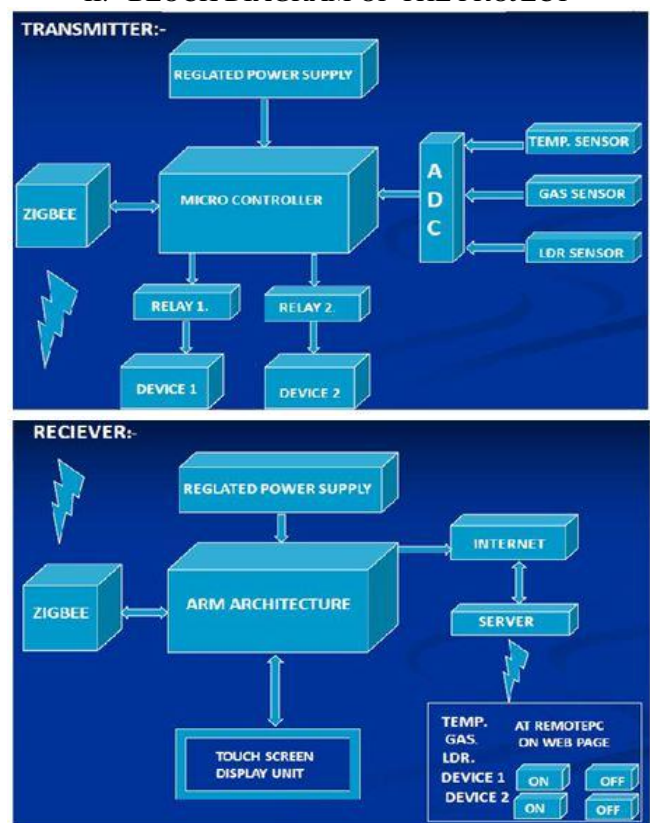
In the proposed method we overcome the drawback present in existing system by using wireless sensor network. We are

designed a system by using ARM 32-bit micro controller which supports different features and algorithms for the development of industrial automation systems. Using ARM controller we can connect all types of sensors and we can connect 8 bit microcontroller based sensor network to ARM controller using different wireless technology called Zigbee. Many open source libraries and tools are available for ARM-linux wireless sensor network development and controlling. We can monitor and control the wireless sensor network remotely using internet and webservice.

For implementing this project we are using Linux and Qt for embedded Linux.

The main purposes of the microprocessors are to simplify the system design and also for high flexibility. A microprocessor in the device means that removing the bugs, making modifications, or adding new features are only rewriting the software that controls the device. Or in other words embedded computer systems are electronic systems that include a microcomputer to perform a specific dedicated application. The computer is hidden inside these products.

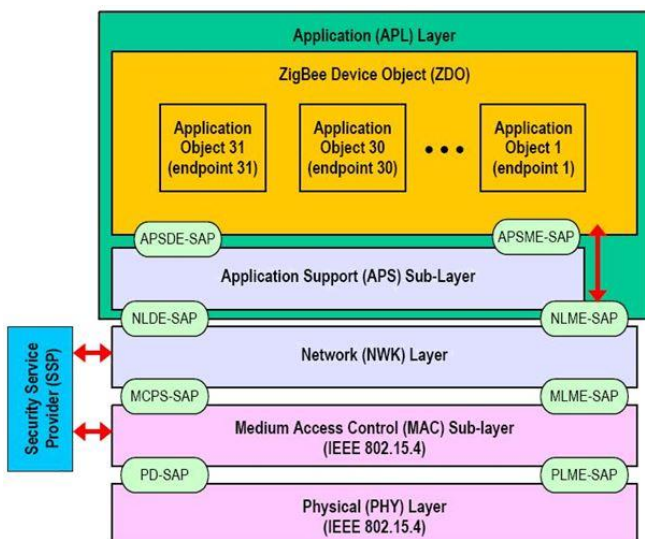
II. BLOCK DIAGRAM OF THE PROJECT



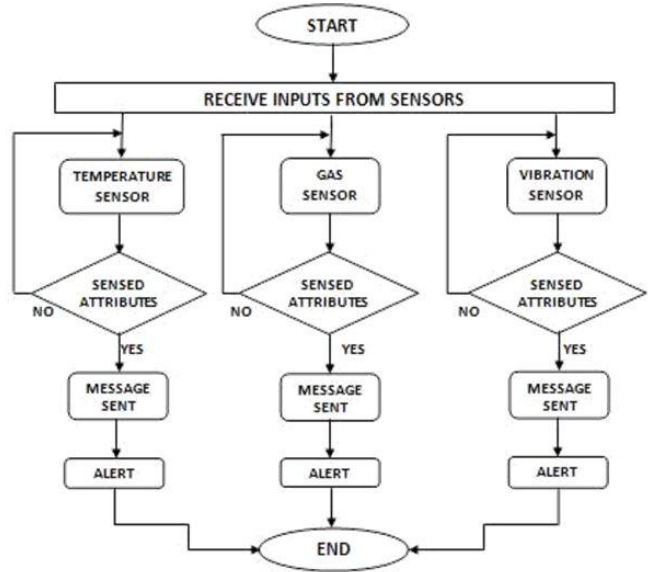
In design a reconfigurable smart sensor, integrates data collection, data processing, wired or Wireless transmission can be perform together.it can be used in many application in IOT area and WSN to collect sensor data in real time. In this program IP module is ARM. Our interface device automatically connected to it and collect multiple data with high speed. Arm is core controller interface device its also used to control data acquisition, processing and transmission. The chips driver on the interface device is also programmed inside the ARM. It can be extended to 8-channel analog signal interface and 24-channel Digital signal interface. Its insures that device can connect with a number of sensor among the application of industrial IOT or WSN and guarantee the diverse collection of all the information. We can select the different transmission mode of the device in different industrial industries. The device collects Analog Signal transmit from the light intensity sensor, color sensor and other similar sensor, It also can collect Digital Signal such as humidity sensor, Temperature sensor etc. The ARM is controlling the ADC module. And it make to possible to collect the 8 –channel Analog signal and 24-channel Digital signal circularly and set the data into integrated static Random Access Memory on the interface device. The collected data transmit to the host computer by way of USB serial communication, so user can analyze the data and proceeds. The field sensor change the mechanical energy in to electrical energy in form of analog signal. The ADC take the analog signal data from field sensor/devices and convert in digital signal and send to microcontroller, the microcontroller having the relay based device and also Zigbee is connected to microcontroller. The zigbee device transmitter the signal which is received by receiver of Zigbee. In receiver block having the ARM controller, which transmit the data through internet and its server. Show the data on HMI.

The operator accordingly give the input data and find out the status of the device and particular components and control the production or prevent the failure or troubleshooting.

III. ZIGBEE PROTOCOL STACK



IV. FLOW CHART OF THE PROJECT

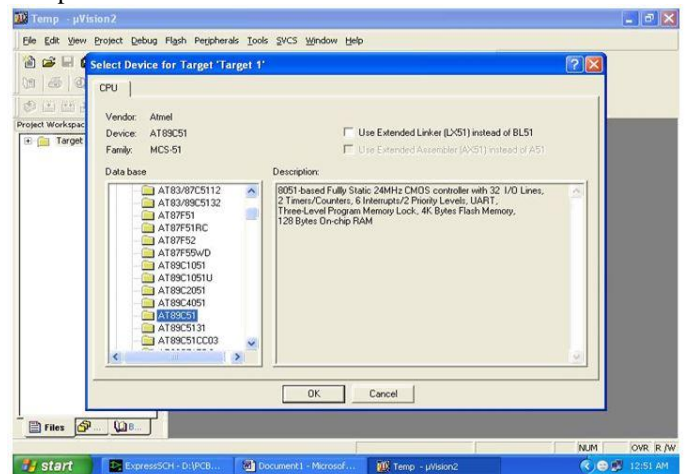


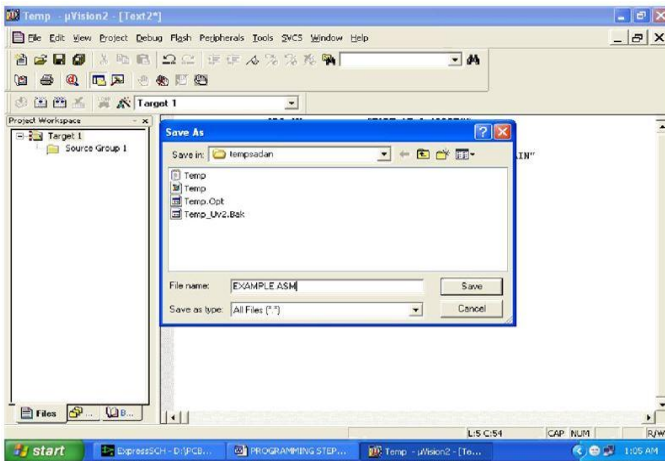
V. RESULTS AND DISCUSSION

The system allows the user to control appliances and lights in their home from a smart phones and PC from anywhere in the world through an internet connection. It also allows the user to control their units within their home from a wireless remote. In these papers we proposed a Novel technique that will give us best result. Which include prediction by providing Notifications to the user if problem occurs in any device? First of all we collect different sensor values and analyzes with the help of microcontroller. Accordingly the data, monitor and control it with Computer or any android device connected to it. If any problem found in any device we notify owner and the related technician mapped on the particular problem. We use Naive Bayes classifier algorithm for data mining which is a simple probabilistic classifier based on applying Bayes’ theorem with strong (naive) independence assumptions.

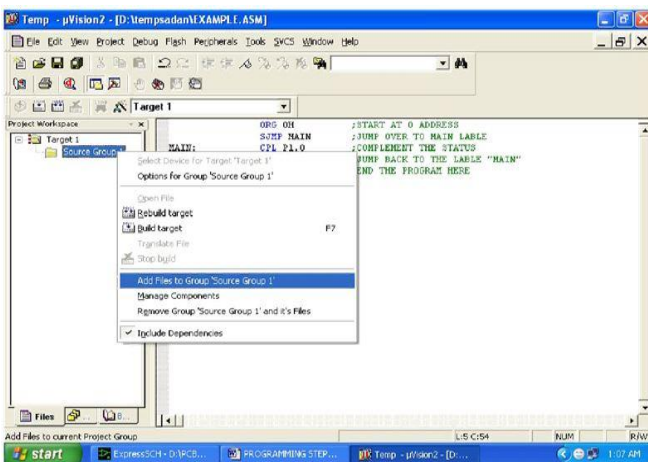
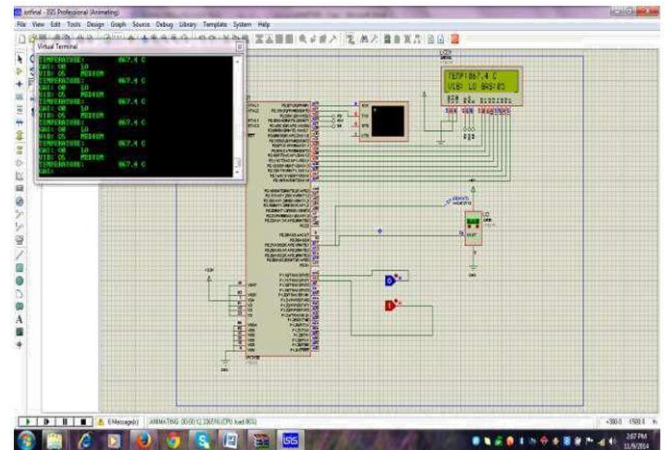
SOFTWARE COMPONENTS:-

Now right click on Source group 1 and click on “Add files to Group Source”



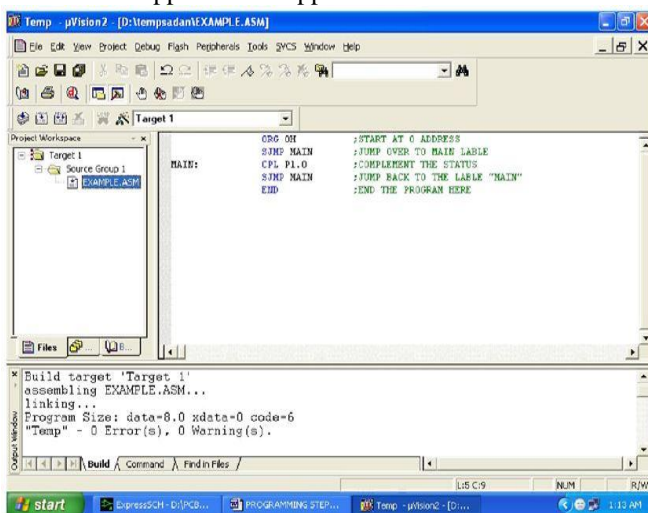


TEMPERATURE SMART SENSOR:-



Add files to Group Source

- Now select as per your file extension given while saving the file
- Click only one time on option “ADD”
- Now Press function key F7 to compile. Any error will appear if so happen.



Compile the program

- If the file contains no error, then press Control+F5 simultaneously.
- The new window is as follows

VI. CONCLUSION AND FUTURE WORK

In our system we have SMS and e-mail notifications to the user but in future we can add also some voice alerts. This system can be expanded to include various other options which could include home security feature such as open-door and motion detection, energy monitoring.

A Smart Home system integrates electrical devices in a house with each other. The techniques which are going to use in home automation include those in building automation as well as the control of domestic activities, such as TV, fan, electric tubes, refrigerator and washing machine. After studying and understanding literature survey and other existing works, we proposed a Novel technique that will gives us better understanding of the Environmental conditions in home. Our system not only just monitors environmental conditions but it acts according to inhabitant requirement. We also provide notification to the user about any error occurs in the devices and send mail or SMS to the service provider about the problem. In this paper we are planning to eliminate most of the human interaction by providing intelligent system. Development of such Smart Home achieve by using Internet of Things technologies. By using these system we can actually manage to make low cost, flexible smart homes to adjust its environmental conditions and resolve its errors with energy saving

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