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Smart Sensor Interface for Industrial environment by using GSM

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ABSTRACT
IoT is nothing but the Internet-of-Things in which where daily life all things connected to internet and can be monitor & can be operate remotely from anywhere. Daily life things like urban management, Green agriculture, industrial wireless sensor network or Industrial management, Environmental monitoring, Tele-medicine, intelligent transportation and smart homes etc. To develop such systems smart or standard technologies are used like Zigbee, Radio Frequency Identification, Gsm, WSN (Wireless Sensors Network), and Actuators etc. This paper provides an overview on IoT and technologies used in IoT.

1. Introduction
Now days, IoT (Internet of Things) is a new revolution of the Internet and it provides a platform for communication between objects where objects can organize and manage themselves. Internet of Things (IoT) is the expansion of internet services because it allows daily life things to connect with user and operate remotely from anywhere. We can describe IoT in simple words, when the objects or things connected with each other using standard protocols and standard infrastructure so that they can communicate between each other and all these objects/things can be monitored and controlled by anywhere and anytime using internet. The IoT was began in the year 1998 and the term Internet of Things was first called by Kevin Ashton in 1999 [4]. The Internet of Things is a new area where it provides a privilege to communicate around the world. The objective of IoT is Anything, Anyone, Anytime, Anyplace, Any service and any network.

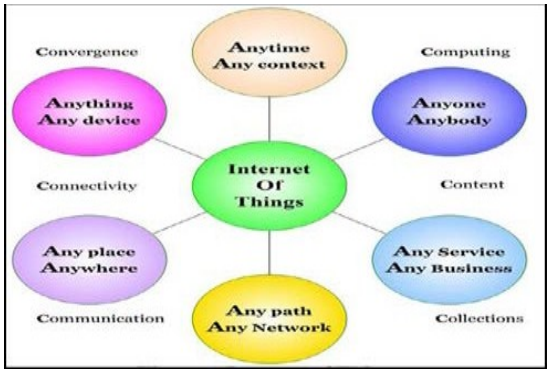

Fig.1 describes the coupling of two things suppose its C's and A's which may be reveals, people and things can be connected Anytime, Anyplace, with Anything and Anyone, ideally by using in Any path/network and Any service. This implies addressing elements such as Convergence, Content, Collections (Repositories), Computing, Communication, and Connectivity in the context where there is seamless inter connection between people and things and/or between things and things so the A and C elements are present and tightly coupled [8]

2. Literature Survey

Qingping Chi et al. [1], proposed a new method to design a reconfigurable smart sensor interface for industrial WSN in IoT environment, which is CPLD i.e. complex programmable logic device is adopted as the core controller which provides

reading data in parallel and in real time with high speed on multiple different sensor data. Complex programmable logic device solved all previous problems like the current connect number, sampling rate, and signal types of sensors are generally restricted by the device means each sensor connected to the device is required to write complicated and cumbersome data collection program code. In this system the standard of IEEE1451.2 intelligent sensor interface specification are used so that system can collect sensor data intelligently. This system is based on IEEE1451 protocol and by combining with CPLD and the application of wireless communication; it is very suitable for real-time and effective requirements of the high-speed data acquisition system in IoT environment. The system achieved good effects in practical application in taking real time monitoring of water environment in IoT environment as an example and also more flexible and extensible.

Shifeng Fang et al. [2], presents an integrated approach to water resource management based on geoinformatics including technologies such as Remote Sensing (RS), Geographical Information Systems (GIS), Global Positioning Systems (GPS), Enterprise Information Systems (EIS), and cloud services. This paper also introduces a prototype IIS called WRMEIS i.e. Water Resource Management Enterprise Information System that integrates functions such as data acquisition, data management and sharing, modeling, and knowledge management. This system provides best management for water security and flood for human society which is future for human life. This system is combination of Snowmelt Flood Forecasting Enterprise Information System i.e. SFFEIS, which is based on the Water Resource Management Enterprise Information System. This system contains operational database, Extraction-Transformation-Loading (ETL), information warehouse; in which it contains information management that allows any participant play the role as a sensor as well as a contributor to the information warehouse, temporal and spatial analysis, simulation/prediction models to predict the atmospheric condition, knowledge management is useful for the taking decision; which is provided by both users and public play the role of providing data and knowledge, and other functions. This system is a prototype water resource management IIS which integrates geoinformatics, EIS, and cloud service. This system provides the crucial importance of a systematic approach toward IISs for effective resource and environment management.

Cheong, P. et al. [3], paper presents a ZigBee-based wireless sensor network node for the ultraviolet i.e. UV detection of flame. This system is based on the sensor node; which is composed of a ZnSSe UV photo detector and also contains current-sensitive front end including a high-gain current-to-voltage amplifier with 120 dB and a logarithm converter, a transceiver operated at a 2.4-GHz industrial, scientific, and medical band. For converting the ultraviolet emission of flame into picoamperes the passive photo detector is designed or set in a such a way that it will having a cutoff at 360 nm and system can detect the flame at the speed of 70 ms. System also contains mixed signal processing for the speed of flame detection is as fast as 70 ms and ZigBee transmission provides send data from the sensor to the central processor system or to the application layer. The systems sensor node consumes only an average of 2.3 mW from a 3.3-V supply. This system is tested under the condition such that the luminous flame was imaged onto the sensor node with different angles ranging from -30° to 30° and distances of 0.1, 0.2, and 0.3 m enabling effective fire safety applications.

GauravTiwari and RiyazKazi [7], present Autonomic Smart Sensor Interface for Industrial in IOT Environment. Sensors are generally restricted by the device because of the current connect number, sampling rate, and signal complicated and cumbersome data collection

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programming code.to solve this problem this paper provides the new method i.e. design a functional smart sensor interface for industrial WSN in IoT environment, in this field programmable gate array device (FPGA) is adopted as a core-controller.

HARDWARE DESIGN:

ARM7

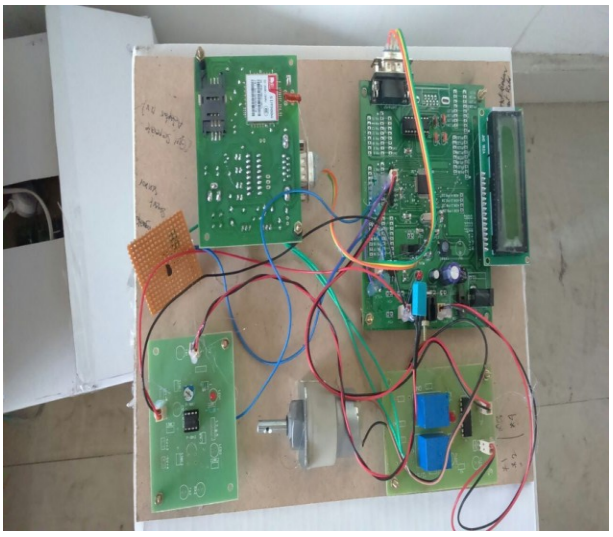
The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power-sensitive applications, the ARM7TDMI solution provides the low power consumption, small size, and high performance needed in portable, embedded applications.

The ARM7EJ-S processor is a synthesizable core that provides all the benefits of the ARM7TDMI low power consumption, small size, and the thumb instruction set while also incorporating ARM's latest DSP extensions and enabling acceleration of java-based applications. Compatible with the ARM9™, ARM9E™, and ARM10™ families, and Strong-Arm® architecture software written for the ARM7TDMI processor is 100% binary-compatible with other members of the ARM7 family and forwards-compatible with the ARM9, ARM9E, and ARM10 families, as well as products in Intel's Strong ARM and x scale architectures. This gives designers a choice of software-compatible processors with strong price-performance points. Support for the ARM architecture today includes:

- Operating systems such as Windows CE, Linux, palm and SYMBIAN OS.
- More than 40 real-time operating systems, including qnx, Wind River's vxworks and mentor graphics' vrtx.
- Co simulation tools from leading eda vendors A variety of software development tools

LCD:

Liquid crystal display is very important device in embedded system. It offers high flexibility to user as he can display the required data on it. But due to lack of proper approach to LCD interfacing many of them fail. Many people consider LCD interfacing a complex job but according to me LCD interfacing is very easy



task, you just need to have a logical approach. This page is to help the enthusiast who wants to interface LCD with through understanding. Copy and Paste technique may not work when an embedded system engineer wants to apply LCD interfacing in real world projects. You will be knowing about the booster rockets on space shuttle. Without these booster rockets the space shuttle would not launch in geosynchronous orbit. Similarly to understand LCD interfacing you need to have booster rockets attached! To get it done right you must have general idea how to approach any given LCD.This page will help you develop logical approach towards LCD interfacing. First thing to begin with is to know what LCD driver/controller is used in LCD. Yes, your LCD is dumb it does not know to talk with your microcontroller. LCD driver is a link between the microcontroller and LCD. You can refer the datasheet of LCD to know the LCD driver for e.g. JHD 162A is name of LCD having driver HD44780U.You have to interface the LCD according to the driver specification. To

understand the algorithm of LCD interfacing user must have datasheet of both LCD and LCD driver. Many people ignore the datasheets and end up in troubles. If you want to interface LCD successfully you must have datasheets. Why people ignore datasheets? Most of us do not like to read 100 pages of datasheet. But for a accurate technical specification datasheets are must. I will show you a technique to manipulate a datasheet within minutes. First thing to find out in datasheet is the features viz. operating voltage, type of interface, maximum speed for interface in MHz, size of display data RAM, number of pixels, bits per pixel, number of row and columns. You must have the pin diagram of LCD.Pin diagram of LCD driver can be omitted. Study the type of communication protocol whether it is parallel or serial interface.

GSM:

GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile), is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991.[2] As of 2014it has become the default global standard for mobile communications - with over 90% market share, operating in over 219 countries and territories.[3]

2G networks developed as a replacement for first generation (1G) analog cellular networks, and the GSM standard originally described a digital, circuit-switched network optimized for full duplex voice telephony. This expanded over time to include data communications, first by circuit-switched transport, then by packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution or EGPRS).

Conclusions

Now a day applications of Internet are increasing and IoT is the new era of the internet where daily life all things connected to internet and can be monitor & can be operate remotely from anywhere. This paper provides objectives of IoT, most of the application domains where IoT is used and the system architecture of IoT. Literature Survey provides the different Iot based existing system and gives details about the system.

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