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Wireless Industrial Automation for Environmental Monitoring Using Internet of Things with High Security

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ABSTRACT: The Internet of Things (IOT) has become popular subject within the technology business and can before and long reaches the recognition level of level of smart phones. With the rapid technological advancements of the sensors, wireless sensor networks (WSNs) have become the most technology for IOT. We tend to investigate the safety of WSNs in associate in nursing environmental watching system with the goal to boost the general security. We enforced a Secure Temperature observance System (STMS), which served as our investigational setting. Our results revealed a security flaw found within the bootstrap loader (BSL) watch word accustomed defend microcode found within the MSP430 MCU. We tend join contestable however the BSL password may well be brute forced in a very matter of days. The impractical brute force time assures the safety of microcode and prevents future reverse engineering techniques.

KEYWORDS: Boostrap, Loader, Wireless Sensor Network, Encryption, Security. Burte Force.

I. INTRODUCTION

Wireless Sensor Networks accommodates distributed Will not be remotely collect physically collect physical environmental information. Three characteristics of device networks ar to endlessly monitor surroundings, trigger any alerts supported circumstances occurring, and provision of knowledge “on demand” [2]. variety of the data collected by sensors are: temperature levels, status levels, transport movement, lightning condition, pressure levels, soil makeup, noise levels, the presence or absence of certain styles of objects, mechanical stress levels on attached objects, associate degreed speed/direction/size of Associate in Nursing object [1].

For our analysis functions we've got a bent to implement a temperature observation application just like the one implemented at Sirindhorn International Institute of Technology [5]. We tend to found temperature observation detector systems to be terribly common for temperature relegations functions [2] or investigating fires [3]. There are varied analysis proposals with efforts to secure the communication in WSNs. As Associate in Nursing example, little Sec [7] was the first completely enforced link layer cryptography that used Skipjack to write down packets.

There have additionally been similar proposals like mini Sec [6] with the same goal of reducing memory and procedure overhead. Moreover, there have in addition been proposals like little ECC to implement public key cryptography on WSNs. One issue that each one security proposals have in common is that their goal is to implement resource low-cost technologies.

II. SECURE TEMPERATURE MONITORING SYSTEM DESIGN

Wireless sensor network can be supported in to STMP. In environmental system that require to resource to simulate. It has three different features are implemented in to STMS. Here using three end devices.
1. PPPSniffer: It has two major role having that is
1. Capturing packets on the STMS

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2. Forward the packets to the computer
2. End-Device: It is mainly used to collecting the temperature level.
3. Coordinator: It listening the packets send by the end-devices.

It has collected in to temperature level within 5 sec. Sometimes what time we already given that time it will be collected in to that during time. Here using computer or mobile phones from the coordinator and PPPSniffer. Now-a-days monitoring system is the manually process but in this time here using in this process is very usefull.

III. STMS WORKING PROCESS

It is highly used in now-a-days research to evaluate the protocols and algorithm for WSNs environment process.

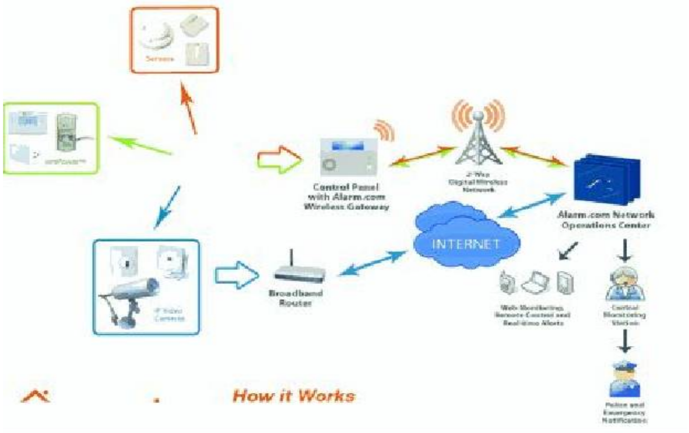
Sensors
Control Panel with Alarm.com Wireless Gateway
2-Way Digital Wireless Network
Alarm.com Network Operations Center
INTERNET
Broadband Router
IP Video Cameras
Web Monitoring, Remote Control and Real-time Alerts
Central Monitoring Station
Police and Emergency Notification
How it Works

Fig.1.Secure Temperature Monitoring Works

It is big open source community and the best
Monitoring system. The STMS uses the temperature system but here using what we can use the level of the monitoring in the environment system.

III. IMPLEMENTATION PROCESS

STMS most popular WSNs technology. Here using pic microcontroller to dumped the software which software are used to LABVIEW nd also used to 16-bits RISC process are used.16KB of EEPROM, 10KB of RAM, 48KB of flash memory are the main. it used in the implementation process. In this process we can implemented in to anywhere anyplace using wireless network process. It can be implemented in to anywhere in the world. Save the memory from the new update the sensor values it is possible to update the anywhere in the world.

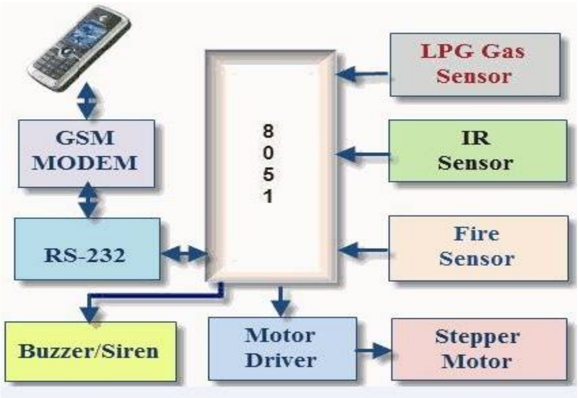

Fig.2.Implemetation process for monitoring system

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Here using the 8051 microcontroller and connecting the RS-232 serial port cable for using serial connection facility. Buzzer is mainly used to alert the sensor level. Here using the some sensor level if suppose any problem in the sensor or any dander condition means it will give the some alarm sound. After that we can implemented into the IOT (Internet of Things) process in this monitoring system reduced in the power consumption and manual process.

IV. LITERATURE SURVEY AND WORK RELATED

Recent communication and electronics have enabled the development of low cost low power, multi functional sensor nodes that can be used in many different applications like environmental monitoring, military sensing, healthcare etc. WSN monitoring system was developed for living environment. In system several sensors were built in monitoring living conditions.

The environmental monitoring parameters can be transmitted by wireless to data value to the server and then viewed throw PC or PDA accessed to the local area networks by administration. We present a provably secure routing protocol for wireless sensor networks, called Secure-SPIN that is a security extension of SPIN. The MAC scheme is introduced to guarantee the correctness and integrity of the information. And wecan prove that under the formal security framework proposed by at all by using a mathematically proof technique, secure if the MAC scheme is secure against external attack. Wireless sensor networks (WSN) greatly extend our handle to monitoring and control the physical world. It can collaborate and agree a huge amount of sensed data information. It provide continuous and spatially observation of environment. The control and monitoring of indoor atmosphere conditions represents an important task with the aim of ensuring suitable working and living spaces to people. WSN monitoring system was developed for the living environmental system. In the system many of the sensors were built in a transceiver board for monitoring conditions. The environmental monitoring parameter it can be transmitted by wireless to database server and then viewed throw PC or PDA accessed to the local area networks by administrators. It used to develop the high security purpose for all real time application system and also used to capture the image and sensing the values.

V. PREVIOUS SYSTEM

In previous system we can implemented in to IOT process. In previous system using a manual process it has high power consumption and more physical sensor process.

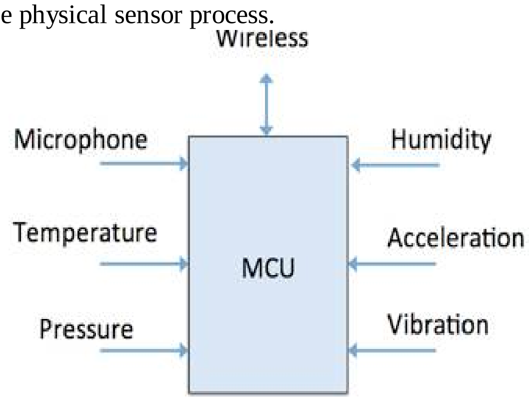


Fig.3. Diagram for existing system

Here using MCU (Multi Core Unit) it is high cost. We replace this system using PIC micro controller. It is used to additionally connect to the port. It is reduced in the manual process and also measuring the sensor values. In this existing system we can’t implement in the security purpose it is not implemented. Here using link layer encryption The MSP430-BSL uses a 32 bytes password to protect access to the MSP430 MCU.

VI. PROPOSED SYSTEM

In proposed system here using some security purpose using boos trap loading for higher.security process.

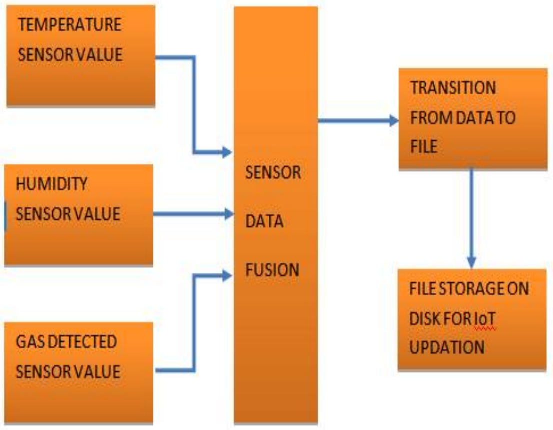

TEMPERATURE SENSOR VALUE
HUMIDITY SENSOR VALUE
GAS DETECTED SENSOR VALUE
SENSOR DATA FUSION
TRANSITION FROM DATA TO FILE
FILE STORAGE ON DISK FOR IoT UPDATION

Fig.4.Proposed System

The remote server integration using IOT is implemented with this approach by using Server side coding methodology C#. The values gathered from Sensors such as Temperature, gas and etc are collected as well as store that raw values into system's respective drive either C;\ or D:\. C# application is used to perform the server side integration, which gathers the value stored in the drive into server application.

These values are uploaded into server presented in cloud environment by using Internet of Things (IoT). The sensor values are uploaded into server with proper date and time. Once the sensor values are uploaded into server anyone can view the sensor values globally from all over the world with proper authentication means.

If we have to see the above waveform it considers the higher level security. We discuss the environment monitoring system. First we can update the any value in this process it will be display the sensor data serialization values and it show the successfully updated and we can open the folder using internet of things it will display the update the data.

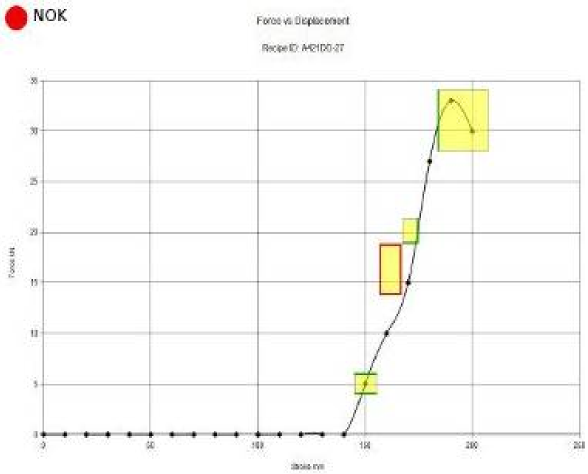
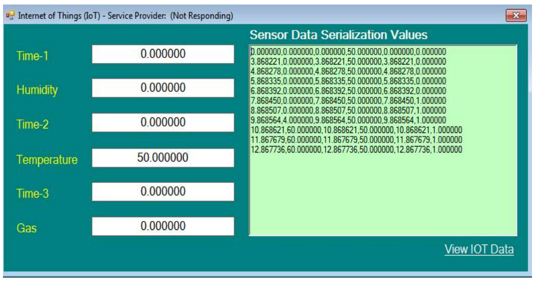


Fig.5. Waveform for Monitoring System

It is very useful for human power and also reduced the power consumption the system.

VII. SIMULATION RESULT

Finally we get the output from the internet of things with high security. If we give the output values form the given system it can be automatically run the program when the stop windows it will detect the given sensor values and update the simulation time.


Internet of Things (IoT) - Service Provider: (Not Responding)
View IOT Data

Time-1: 0.000000
Humidity: 0.000000
Time-2: 0.000000
Temperature: 50.000000
Time-3: 0.000000
Gas: 0.000000

Sensor Data Serialization Values

```
0.000000,0.000000,0.000000,50.000000,0.000000,0.000000
3.868221,0.000000,3.868221,50.000000,3.868221,0.000000
4.868278,0.000000,4.868278,50.000000,4.868278,0.000000
5.868335,0.000000,5.868335,50.000000,5.868335,0.000000
6.868392,0.000000,6.868392,50.000000,6.868392,0.000000
7.868450,0.000000,7.868450,50.000000,7.868450,1.000000
8.868507,0.000000,8.868507,50.000000,8.868507,1.000000
9.868564,4.000000,9.868564,50.000000,9.868564,1.000000
10.868621,60.000000,10.868621,50.000000,10.868621,1.000000
11.867679,60.000000,11.867679,50.000000,11.867679,1.000000
12.867736,60.000000,12.867736,50.000000,12.867736,1.000000
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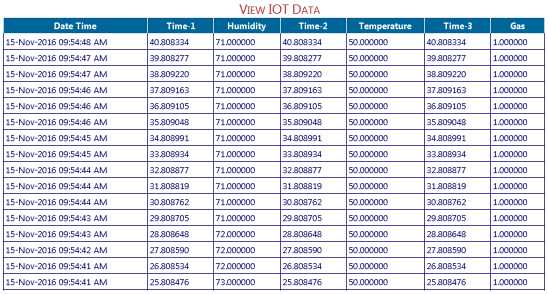
Fig.6. Sensor Data Serialization Value

It is meant to save the electric power and human energy.The automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. It is the main output of the wireless industrial automation for environmental monitoring system using internet of things with high security. Here we give the value from the temperature, humidity and gas sensor if it have update the automatically from the IOT with date and time.



VIEW IOT DATA

Date Time	Time-1	Humidity	Time-2	Temperature	Time-3	Gas
15-Nov-2016 09:54:48 AM	40.808334	71.000000	40.808334	50.000000	40.808334	1.000000
15-Nov-2016 09:54:47 AM	39.808277	71.000000	39.808277	50.000000	39.808277	1.000000
15-Nov-2016 09:54:47 AM	38.809220	71.000000	38.809220	50.000000	38.809220	1.000000
15-Nov-2016 09:54:46 AM	37.809163	71.000000	37.809163	50.000000	37.809163	1.000000
15-Nov-2016 09:54:46 AM	36.809105	71.000000	36.809105	50.000000	36.809105	1.000000
15-Nov-2016 09:54:46 AM	35.809048	71.000000	35.809048	50.000000	35.809048	1.000000
15-Nov-2016 09:54:45 AM	34.808991	71.000000	34.808991	50.000000	34.808991	1.000000
15-Nov-2016 09:54:45 AM	33.808934	71.000000	33.808934	50.000000	33.808934	1.000000
15-Nov-2016 09:54:44 AM	32.808877	71.000000	32.808877	50.000000	32.808877	1.000000
15-Nov-2016 09:54:44 AM	31.808819	71.000000	31.808819	50.000000	31.808819	1.000000
15-Nov-2016 09:54:44 AM	30.808762	71.000000	30.808762	50.000000	30.808762	1.000000
15-Nov-2016 09:54:43 AM	29.808705	71.000000	29.808705	50.000000	29.808705	1.000000
15-Nov-2016 09:54:43 AM	28.808648	72.000000	28.808648	50.000000	28.808648	1.000000
15-Nov-2016 09:54:42 AM	27.808590	72.000000	27.808590	50.000000	27.808590	1.000000
15-Nov-2016 09:54:41 AM	26.808534	72.000000	26.808534	50.000000	26.808534	1.000000
15-Nov-2016 09:54:41 AM	25.808476	73.000000	25.808476	50.000000	25.808476	1.000000

Fig.7.Output for the Internet of Things

We have applied this system anywhere anyplace using internet. Using internet we can update sensor value around the world. Main advantage of this system machine to machine sensor communication, high security and speed of response is more sensor devices do not require user interaction of the wireless monitoring system. It is also reduced in the manual process also. Here using high security Boostrap loading for high security purpose.

VIII. CONCLUSION

Finally we get the output using internet of things here using IOT reduce the manual process and also reduce the time delay. IOT protocol is implemented using PIC micro controller for real time application such as Smart home appliance control, remote monitoring. In future work we have to implemented in AVR,ARM microcontroller.It is very useful for the environmental monitoring system using any internet system like us mobile phones,laptop any app in the system with internet around the world.

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