International Journal of Emerging Engineering Research and Technology
Volume 3, Issue 5, May 2015, PP 55-61
ISSN 2349-4395 (Print) & ISSN 2349-4409 (Online)

Application of Mobile Agent in VANET for Measuring Environmental Data by Using RISC Processor

[1]U.Subhadra Anjani, [2]S.Mohammed Rafi, [3]Y.Kiran

[1]*Research Scholar, Malla Reddy Engineering College for Women's*
[2]*Assistant Professor, Malla Reddy Engineering College for Women's*
[3]*Application Engineer, Unistring Tech Solution's*

ABSTRACT

We use VANET for collecting environmental data. Measuring environmental data of a certain area can be done efficiently using sensor enabled vehicles without the need of fixed infrastructure of sensors. As sensors in vehicles are continuously moving, less number of them will be needed to cover a certain area. Disadvantage of fixed Wireless Sensor Network is that sensors deployed initially may not have total coverage of area for sensing. But in vehicular sensor network, moving cars with sensors provide flexibility in choice of area. Any area can be monitored if we deploy vehicles from a fixed monitoring center. Mobile agents are programs that can move from one node to another in a network and execute in the destination node. An agent consists of three components: the program which implements it, the execution state of the program and data. Mobile agents decide when and where to move. Agents migrate from one vehicle to another in order to reach the target area.

Keywords: VANET, Mobile Agents

INTRODUCTION

As computer networks and embedded Internet technology rapid development of embedded systems in industrial production and daily life have been widely used. Embedded real-time operating system and dedicated hardware structure of Internet users around as long as you can at any time, any place using the system remote monitoring and control of embedded devices. Embedded system is an intelligent system that has the capability of processing, monitoring and controlling. It may comprise of Sensors, Microcontrollers, etc. The TCP/IP protocol is a widely used standard for modern digital communication. Increasing amounts of integration of microcontrollers in electrical goods in today's world and the ever growing adoption of cheap 'smart home' solutions. Consider if we can remotely monitor the status of our embedded system using a web browser, or if send an alert when it needs a service or is sold out of specific items. These things are all made possible with Embedded Ethernet. The key benefits of Embedded Ethernet Connectivity are described in the following paragraphs. Embedded connectivity stands at the forefront of today's embedded systems. So a solution need be found to realize the communication between industrial control devices and Ethernet. As the embedded system itself has the performance of network and human-computer interaction, it is possible that the embedded system replaces the previous control method based on microcontroller.

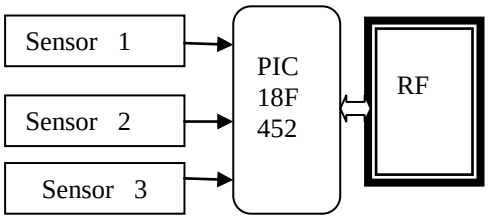
PROPOSED SYSTEM

In the proposed system, there are total 3 sensor nodes, one reader (operator) node, and Monitoring node. In this system each sensor node is placed in different places and each node is assigned with one RFID tag to track the place where it is installed. These nodes continuously sense the environment parameters like temperature, Humidity, light etc. The Reader node is having one RFID reader which will read the TAG information placed in sensor node to detect the exact place from which node we want to read the parameters. If the tag id is matched with the sensor node then the parameters can be read and transmitted to the monitoring node using WSN. Here the Monitoring node is interfaced with Wireless module and Ethernet connection. All these sensors information is updated in the corresponding webpage in run time. As this monitoring system is installed with internet we can monitor the information from any remote places.

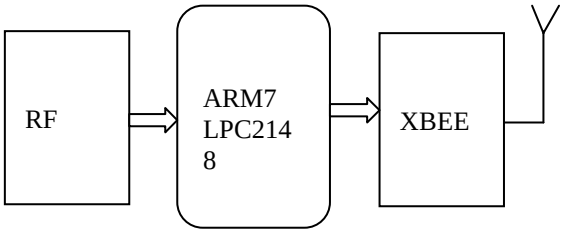
Address for correspondence

anjani3dec@gmail.com

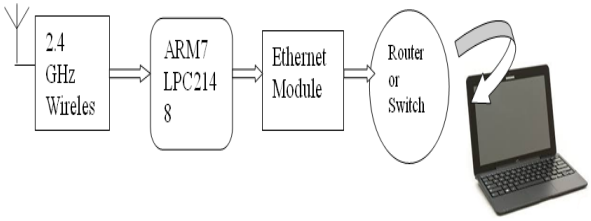
Block Diagram



Sensor Node



Reader Node



Monitoring Node

HARDWARE IMPLEMENTATION

PIC Microcontroller 18f452

Microchip is providing the 8-bit, 16-bit and the 32 bit microcontrollers. Based on the desired application requirement the design engineer can choose from those. Microchip is also providing the software for the microcontrollers where the application programs are written MPLAB IDE, it is also providing the in circuit debugger called MPLAB ICD3. The compilers for the 8bit, 16-bit and the 32 bit are different.

The main features of the PIC 18f452 microcontroller are given below:

- C compiler optimized instruction set architecture
- Up to 10 MIPS operation:
- DC - 40 MHz osc./clock input
- 4 MHz - 10 MHz osc./clock input with PLL active
- 16-bit wide instructions, 8-bit wide data path
- Priority levels for interrupts

ARM Architecture

History of ARM

ARM stands for Advanced RISC machine. The first processor in ARM family was developed at Acorn Computers Ltd between October 1983 and April 1985. Acorn Computers was a British

computer company established in Cambridge, England, in 1978. The company worked for Reduced Instruction Set Computer (RISC) processor design. The company produced a variety of computers which were very popular in the United Kingdom. These included the Acorn Electron, the BBC Micro and the Acorn Archimedes. Particularly BBC Micro computer dominated the UK educational computer market during the 1980s and early 1990s.

The ARM7TDMI core is a 32-bit embedded RISC processor delivered as a hard macro cell optimized to provide the best combination of performance, power and area characteristics.

ARM7TDMI Features

- 32/16-bit RISC architecture (ARM v4T)
- 32-bit ARM instruction set for maximum performance and flexibility
- 16-bit Thumb instruction set for increased code density
- Unified bus interface, 32-bit data bus carries both instructions and data
- Three-stage pipeline
- 32-bit ALU
- Very small die size and low power consumption
- Fully static operation
- Coprocessor interface

LPC2148 Microcontroller

LPC2148 microcontrollers are based on a 32 bit ARM7TDMI-S CPU with real-time emulation and embedded trace support that combines the microcontroller with embedded high speed flash memory of 512kb. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at the maximum clock rate. For critical code size applications, the alternative 16-bit Thumb mode reduces the code by more than 30% with minimal performance penalty.

- 16/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8 to 40 kb of on-chip static RAM and 32 to 512 kb of on-chip flash program memory.
- 128 bit wide interface/accelerator enables high speed 60 MHz operation.

Humidity Sensor

Humidity is an important factor in personal comfort and in quality control for materials, machinery etc. Now we are using SYH2 and SYH-2S humidity sensors in most of the circuits.

Humidity sensors are gaining more significance in diverse areas of measurement and Control technology. Manufacturers are not only improving the accuracy and long-term drift of their sensors, they are improving their durability for use in different environments, and simultaneously reducing the component size and the price.

Following this trend, Swiss-based Sensation AG has introduced a new generation of integrated, digital, and calibrated humidity and temperature sensors using CMOS "micro-machined" chip technology. The new products, SYH2 and SYH-2S, are a single chip relative humidity and temperature multi sensor module with a calibrated digital output which allows for simple and quick system integration.

Conventional sensors determine relative air humidity using capacitive measurement technology. For this principle, the sensor element is built out of a film capacitor on different substrates (glass, ceramic, etc.). The dielectric is a polymer which absorbs or releases water proportional to the relative environmental humidity, and thus changes the capacitance of the capacitor, which is measured by an onboard electronic circuit.

Features

- Operating humidity 20-95%RH
- Standard characteristics 33KQ (At 25degree centigrade, 60%RH)
- Storage temperature -30—85° centigrade

- Storage humidity within 95%RH
- Humidity accuracy +/- 5%RH (at 25degrees centigrade,60%RH)
- Humidity response time <60sec (40-80%RH)

Light Dependent Sensor

A **Light Dependent Resistor** (LDR) or a photo resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells. They are made up of semiconductor materials having high resistance. There are many different symbols used to indicate a **LDR**, one of the most commonly used symbol is shown in the figure below. The arrow indicates light falling on it.

Temperature Sensor (LM35)

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling.

The LM35 can be applied easily in the same way as other integrated-circuit temperature sensors. It can be glued or cemented to a surface and its temperature will be within about 0.01°C of the surface temperature. This presumes that the ambient air temperature is almost the same as the surface temperature; if the air temperature were much higher or lower than the surface temperature, the actual temperature of the LM35 die would be at an intermediate temperature between the surface temperature and the air temperature.

Features

1. Calibrated directly in ° Celsius (Centigrade)
2. Linear + 10.0 mV/°C scale factor
3. 0.5°C accuracy guarantee able (at +25°C)
4. Rated for full -55° to +150°C range

Liquid Crystal Display

A liquid crystal display (LCD) is a thin, flat display device made up of any number of color or monochrome pixels arrayed in front of a light source or reflector. Each pixel consists of a column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity of which are perpendicular to each other. Without the liquid crystals between them, light passing through one would be blocked by the other. The liquid crystal twists the polarization of light entering one filter to allow it to pass through the other.

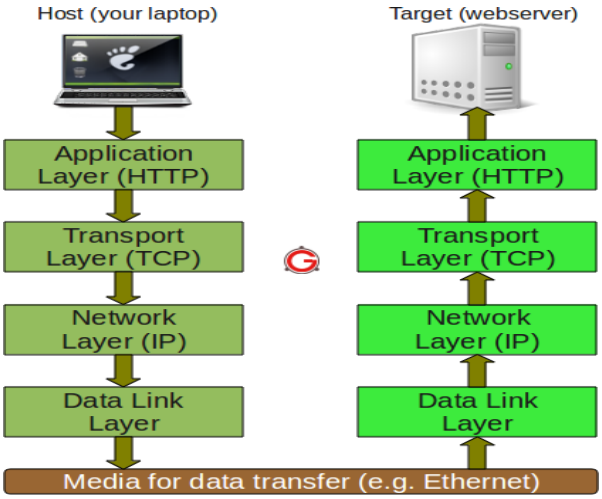
Transmission Control Protocol/Internet Protocol (TCP/IP)

Communications between computers on a network is done through protocol suits. The most widely used and most widely available protocol suite is TCP/IP protocol suite. A protocol suit consists of a layered architecture where each layer depicts some functionality which can be carried out by a protocol. Each layer usually has more than one protocol options to carry out the responsibility that the layer adheres to. TCP/IP is normally considered to be a 4 layer system. The 4 layers are as follows:

1. Application layer
2. Transport layer
3. Network layer
4. Data link layer

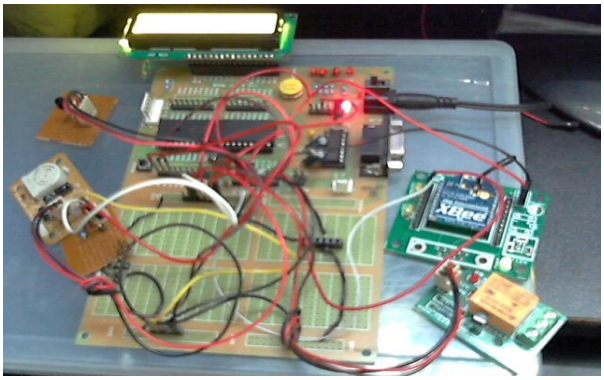
Application Layer

This is the top layer of TCP/IP protocol suite. This layer includes applications or processes that use transport layer protocols to deliver the data to destination computers

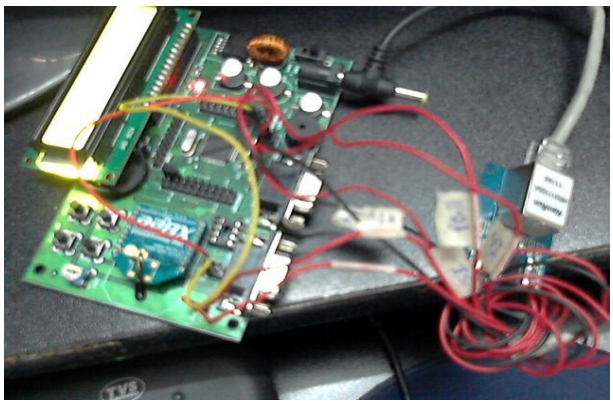


Hardware Results

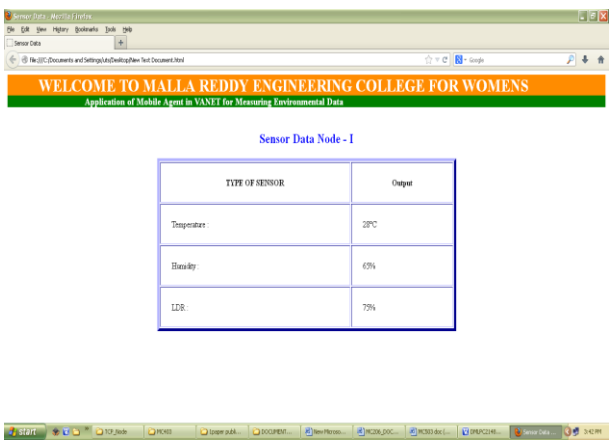
Sensor Node



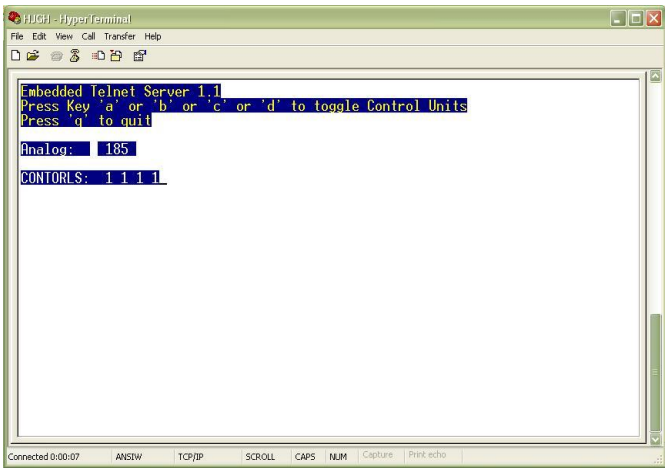
Central Node



Web Page



Telnet for Controlling



CONCLUSION

The project entitled "Application of Mobile agent in VANET for Measuring Environmental Data" undertaken by us consists of 3 major portions: the sensors, the microcontroller, and the Ethernet chip which is used to connect to a LAN. It includes the 3 concepts: embedded systems, TCP/IP communication, and a weather station. It provides real time data of weather in remote/inaccessible locations through a wireless/wired connection.

REFERENCES

[1] K. Romer and F. Mattern, "The design space of wireless sensor networks," IEEE Wireless Commun., vol. 11, no. 6, pp. 54–61, Dec. 2004.

[2] I.Talzi, A.Hasler, S.Gruber and C.Tschudin, "Permasense: Investigating permafrost with a WSN in the Swiss Alps," in Proc. 4th Workshop Embedded Netw. Sensors, New York, 2007, pp. 8–12.

[3] P. Harrop and R. Das,Wireless sensor networks 2010–2020, IDTechEx Ltd, Cambridge, U.K., 2010.

[4] N. Burri, P. von Rickenbach, and R. Wattenhofer, "Dozer: Ultra-low power data gathering in sensor networks," in Inf. Process. Sensor Netw., Apr. 2007, pp. 450–459.

[5] I. Dietrich and F. Dressler, "On the lifetime of wireless sensor networks," ACM Trans. Senor Netw., vol. 5, no. 1, pp. 5:1–5:39, Feb. 2009.

[6] B. Yahya and J. Ben-Othman, "Towards a classification of energy aware MAC protocols for wireless sensor networks," Wireless Communication Mobile Computer, vol. 9, no. 12, pp. 1572–1607, 2009.

[7] J. Yang and X. Li, "Design and implementation of low-power wireless sensor networks for environmental monitoring," Wireless Commun, Netw. Inf. Security, pp. 593–597, Jun. 2010.

[8] K. Martinez, P. Padhy, A. Elsaify, G. Zou, A. Riddoch, J. Hart, and H. Ong, "Deploying a sensor network in an extreme environment," Sensor Netw., Ubiquitous, Trustworthy Comput., vol. 1, pp. 8–8, Jun. 2006.

[9] A. Hasler, I. Talzi, C. Tschudin, and S. Gruber, "Wireless sensor networks in permafrost research—Concept, requirements, implementation and challenges," in Proc. 9th Int. Conf. Permafrost, Jun. 2008, vol.1, pp. 669–674.

[10] J. Beutel, S. Gruber, A. Hasler, R. Lim, A. Meier, C. Plessl, I. Talzi, L. Thiele, C. Tschudin, M. Woehrle, and M. Yuecel, "PermaDAQ: A scientific instrument for precision sensing and data recovery in environmental extremes," in Inf. Process. Sensor Netw., Apr. 2009, pp. 265–276.

AUTHORS' BIOGRPAHY

Upadhyayula Subhadra Anjani is presently pursuing final semester M. Tech in VLSI & Embedded Systems at Malla Reddy College of Engineering for Women, Secunderabad.

S. Mohammed Rafi is presently working as Assistant Professor in the department of Electronics and Communication Engineering, Malla Reddy College of Engineering for Women, Secunderabad, Telangana, India.

Y. Kiran is presently working as Application Engineer in Unistring Tech Solutions Pvt Ltd, Hyderabad, Telangana, India.