**Miniature wireless sensor, MEMS based, application in cold chain (Food/Medicine Process) logistics with Real Time Temperature Data Storage and Remote Data Access using Super RFID**

***Abstract:***

The cold chain logistics is a systematic project which ensure the temperature-sensitive product under the pro-established low temperature in every process of production’s Storage, transportation and sale which can make sure the products quality and reduce the logistics loss, Since the environment is changing vastly, and due to the limitation of tech and cost , the risk of quality accidents due to the goods temperature change in the process of transportation and dispatching is more often than in other process.

Moreover, in common situation, the closeness of transportation and dispatching process always makes more difficulties for the next accident survey works, that is when and where the goods temperature began to fall outside the limitation range. On the other hand, whether it is caused by an unexpected environmental factor or a persistent error of cold storage system. The resolution for these problems is a kind of tech, which can constantly record and store the goods temperature and send the temperature data to the back-stage management system.

***ARCHITECTURE OF RFID WIRELESS SENSOR NETWORK:***

******

**Figure1. Architecture of RFID wireless sensor networks**

The Architecture of RFID wireless sensor networks, as shown in **Figure 1**, is extended from WSNs architecture and supports standard RFID, WSN and their integration. The smart node includes a microprocessor, a RFID reader, a RF transceiver and a number of sensors. In a smart node, a reader reads tags attached to an object in a non-line-of-sight way and sensors sense the phenomena in which the object located. These data are sent to a sink node by different types of protocols, such as ZigBee. Then they are filtered, grouped and reported to a user database. RFID data and sensor data, together with their business logic are stored in the database. Thus, applications can query data in the database.

**Hardware structure of smart nodes**

Temperature sensor unit-1

Signal

Conditioning

PIC Microcontroller with

10-BIT ADC

***IEEE 802.15.4 WPAN protocol***

RFID Reader with Antenna

LCD 2x16 screen

Temperature sensor unit-2

**RFID/ WSN Information Service Network**

PIC

Microcontroller

***IEEE 802.15.4 WPAN protocol***

PC

RFID/ WSN Information Service Network

***RFID Technology:***

Pervasive computing is the next generation computing environments with information and communication technology everywhere, for everyone, at all times. Pervasive computing is a rapidly developing area of Information and Communications Technology (ICT). The term refers to the increasing integration of ICT into people’s life and environments. Among the pervasive computing the most important technologies are WSNs and RFID.

* + To evolve the communication and network in pervasive computing the WSNs are utilized. Moreover in such kind of computing this high performance and low data rate and moderate operating voltage Wireless sensor network is the obvious thing.
  + In vast information technology the new upcoming platform is RFID system, it consists of a tag made up of a microchip with an antenna, and an interrogator or reader with an antenna.

The general application domain of RFID and WSNs is different. Most WSNs applications have been designed and realized to provide physical environment monitoring, while RFID applications have been applied historically for asset identification.

However, according to technology research groups and visionaries, the RFID and WSNs technologies will eventually be converged in the future. In an integration system of RFID and WSNs, RFID is used to identify objects while WSNs can provide context environment information of these objects. Thus, it increases system intelligent in pervasive computing.

***HARDWARE & SOFTWARE REQUIREMENTS:***

* **Hardware components**: PIC 16F877A, 2x16-LCD, RS232, 802.15.4 module, PC interface and demo application sources
* **Software tools**: Development tool – MPLAB v7.42, Hardware Compiler - HI-Tech PIC C, Programmer - PIC Flash, Hardware Simulation tool - Proteus v6.9 Sp4