Fast Effective Wireless Synchronization in Wireless Sensor Network

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Abstract-- Everybody wants put world in their hand. Accessibility of information should be in their hands. Nobody wants to take trouble for getting information. They want quick solution of their problem. When problem is created, at that time everybody wants solution of that problem at any cost. Nobody have to wait in this time. In this paper Fast Effective Wireless Synchronization has given procedure for fast performance in wireless sensor network by using low energy consumption through when node is active then pass the energy to node, if it is idle then no need to waste energy, when node invoked at that time only clock should work. Without invoking clock will be idle.

Keywords-- 3GPP Technology, UMTS standards, LTE Advanced standards, WPA, WPA2

I. INTRODUCTION

Fast Effective Wireless Synchronization will be fast to other synchronization methods. Each method has its own characteristics and behavior and constraints. They have their own algorithms. Each method has its advantages and limitations. By using Fast Effective Wireless Synchronization there is required that clock should synchronize and do not waste time to synchronize the clock every time. If node in the case of idle than there is no required to invoke node every time. There is require only when node is active.

II. FAST EFFECTIVE WIRELESS SYNCHRONIZATION METHOD

Fast Effective Wireless Synchronization contains the features of Post facto synchronization and WINS Platform. Some of the features of Reference Broadcast Synchronization have included. It shows Fast Effective Synchronization of nodes in wireless sensor networks.

So., that these node performance and effectiveness should be increased. Broadcast channel is needed in the network for effective performance.

- We know that WINS platform is based on post-facto synchronization nodes' radios,
- If nodes is not working than power supply will not invoked.
- There is no need to keeping clocks synchronized all the time.
- The Clocks run undisciplined (at their natural rate), and are reconciled after an event.
- They must therefore keep clocks synchronized all the time which is very wasteful if synchronized clocks are needed infrequently and unpredictably.
- In this case CPU powered down low-power pre processor powered.
- If pre processor detects interesting signal.
- The Client node exchange their respective reception times.
- The Client node calculate relative offset and rate differences with other clients.
- The Client node transforms local time reading into any other client's local timescale.
- The Pre processor powers on CPU further analysis, if CPU decides that event needs to be reported CPU turns on node's radio components consuming most energy powered down most time brings up significant problems.

III. LOW ENERGY DESIGN METHOD

At current time, cost of nodes is decreasing day by day because there are many technological enhancement.
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The impact of technological enhancement direct on cost. Low energy design considerations for low cost Environmental parameter monitoring wireless sensor network using recent 8-bit embedded controllers PIC16LC74A exhibits very low power operation which is available with options such as internal resources enabled mode and internal resources disabled mode. This ensures the requirement of the situation in which the WSN is being used. In remote and hostile areas, WSN demands low but continuous power requirement. Hence PIC controllers fulfill such demands without compromising with the quality. It is because of selective conditions of operation, such as sleep mode wherein only required power is drawn from the source to ensure most minimum power consumption and hence power supply unit will have longer life span. Typically, it needs only 0.9 µA when WDT and external oscillator of Timer 1 is disabled [4]. PIC16LC74A provides another feature such as it needs very low current when its oscillator works at low frequency. For example, when operated at 32 KHz[6].

IV. GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

Global System for Mobile Communications is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe protocols for second-generation digital cellular networks used by mobile phones. According to 2014, it has become the default global standard for mobile communications, wireless communication with more than 85 % market share, operating in over 219 different countries and different territories[2].

2G networks developed as a replacement for first generation analog cellular networks, and the GSM standard originally described a digital, circuit-switched network optimized for full duplex, where both side communication through voice telephone system. This type of strategy expanded over time to include data communications first by circuit-switched transport, then by packet data transport via GPRS (General Packet Radio Services) and Enhanced Data rates for GSM Evolution (EDGE).

Subsequently, the 3GPP Technology developed third-generation UMTS standards followed by fourth-generation LTE Advanced standards, which do not form part of the ETSI GSM standard.

"GSM" is a trademark of GSM Association. It may also refer to the (initially) most common voice codec used, Full Rate in 1982 [3].

4.1 3GPP Technology

The 3rd Generation Partnership Project (3GPP) is a collaboration between groups of telecommunications associations, known as the Organizational Partners. The initial scope of 3GPP was to make a globally applicable third-generation (3G) mobile phone system specification based on evolved Global System for Mobile Communications (GSM) specifications within the scope of the International Mobile Telecommunications-2000 project of the International Telecommunication Union (ITU) [10]. The scope was later enlarged to include the development and maintenance of:

- The Global System for Mobile Communications (GSM) including GSM evolved radio access technologies (e.g. General Packet Radio Service (GPRS) and Enhanced Data Rates for GSM Evolution (EDGE))
- An evolved third generation and beyond Mobile System based on the evolved 3GPP core networks, and the radio access technologies supported by the Partners (i.e., UTRA both FDD and TDD modes).
- An evolved IP Multimedia Subsystem (IMS) developed in an access independent manner

3GPP standardization encompasses Radio, Core Network and Service architecture. The project was established in December 1998 and should not be confused with 3rd Generation Partnership Project 2 (3GPP2), which specifies standards for another 3G technology based on IS-95 (CDMA), commonly known as CDMA2000 [12]. The 3GPP support team (also known as the "Mobile Competence Centre") is located at the European Telecommunications Standards Institute (ETSI) headquarters in Sophia-Antipolis (France)[11][13].

4.2 UMTS standards

UMTS (Universal Mobile Telecommunications Service) is a third-generation (3G) broadband, packet-based transmission of text, digitized voice, video, and multimedia at data rates up to 2 megabits per second (Mbps). UMTS offers a consistent set of services to mobile computer and phone users, no matter where they are located in the world. Based on the Global System for Mobile (GSM) communication standard, UMTS is endorsed by major standards bodies and manufacturers and is the planned standard for mobile users around the world.
4.3 LTE Advanced standards

LTE Advanced is a mobile communication standard and a major enhancement of the Long Term Evolution (LTE) standard. It was formally submitted as a candidate 4G system to ITU-T in late 2009 as meeting the requirements of the IMT-Advanced standard, and was standardized by the 3rd Generation Partnership Project (3GPP) in March 2011 as 3GPP Release 10 [9].

V. Wi-Fi Protected Access (WPA and WPA2)

Wi-Fi Protected Access encrypts information and makes sure that the network security key has not been modified. Wi-Fi Protected Access also authenticates users to help ensure that only authorized people can access the network [1].

There are two types of WPA authentication: WPA and WPA2. WPA is designed to work with all wireless network adapters, but it might not work with older routers or access points. WPA2 is more secure than WPA, but it will not work with some older network adapters. WPA is designed to be used with an 802.1X authentication server, which distributes different keys to each user. This is referred to as WPA-Enterprise or WPA2-Enterprise. It can also be used in a pre-shared key (PSK) mode, where every user is given the same passphrase. This is referred to as WPA-Personal or WPA2-Personal[1].

5.1 Wired Equivalent Privacy (WEP)

WEP is an older network security method that's still available to support older devices, but it's no longer recommended. When you enable WEP, you set up a network security key. This key encrypts the information that one computer sends to another computer across your network. However, WEP security is relatively easy to crack [1].

Warning

- We recommend using WPA2, if possible. We don't recommend using WEP. WPA or WPA2 are more secure. If you try WPA or WPA2 and they don't work, we recommend that you upgrade your network adapter to one that works with WPA or WPA2 [1].

802.1X authentication standard

802.1X authentication can help enhance security for 802.11 wireless networks and wired Ethernet networks.

802.1X uses an authentication server to validate users and provide network access. On wireless networks, 802.1X can work with WPA, WPA2, or WEP keys. This type of authentication is typically used when connecting to a workplace network[1]. As shown in the figure 1.0.

5.2 The Difference Between Wireless & Wi-Fi

People frequently think of the terms "wireless" and "Wi-Fi" as synonymous, when they describe two fully different means of accessing the Internet. A wireless connection utilizes a cellular phone network and allows you to use the Internet and establishing a Wi-Fi connection requires you to install hardware in your home or use your computer within range of a router to which you have access. Both types of connection. These connection have advantages and disadvantages in areas such as transfer speed, signal range and cost [5].

5.2.1 Wi-Fi

Wi-Fi is a standard for short-distance wireless communication, used as a primarily by computers. You can also utilize a Wi-Fi connection with some types of mobile devices and game consoles. In a Wi-Fi setup, a device connects to a router or access point that relays communication to the Internet through a broadband through modem. The wireless connections are used by mobile. It is also possible to utilize a wireless connection with a computer by installing the required hardware devices and software. In a wireless, the hardware device sends and receives data or information through the nearest mobile tower owned by the user's mobile phone service provider [5].
VI. HARDWARE REQUIREMENTS

If you have a mobile phone, you do not need additional hardware to access the Internet through a wireless connection; you need only to confirm that your mobile phone plan includes data access and open the phone's Web browser to get online. Some computers also contain built-in cellular wireless cards. If your computer doesn't contain a cellular card or USB device, install one to access the Internet through a mobile phone operator. To access the Internet through a Wi-Fi connection in your home, you have need to purchase a Wi-Fi router and connect it to your broadband modem and ISP. In computer, there is require a Wi-Fi networking adapter. Modern laptop computers include these things itself. They are also available as USB or expansion card added extras. Wi-Fi connections are accessible outside the home, offices, banks, business organizations and other public places like as Airport and railway stations. Typically, libraries, School, colleges, Universities offer Wi-Fi connections, restaurants, hotels and coffee shops [5].

6.1 The Signal Range of connection

A wireless connection has a much larger range than a Wi-Fi connection. Then we can say wireless is the best medium of connection, we can utilize a wireless connection from any location where we receive a signal from your cellular phone provider. The range of a Wi-Fi connection is limited only; for best performance point of view, utilize the Wi-Fi connection from within the same building. Figure 2.0 shoes Wi-Fi router. Where the Wi-Fi router is installed [5].

6.2 The Speed of connection

The download and upload speeds available with a wireless connection are typically slower than the speeds available with a Wi-Fi connection. According to a 2012 PC World article, customers in areas with 4G wireless service can receive download and upload speeds of up to 9.12 and 5.86 mbps respectively. The speeds of 3G networks are noticeably slower. A modern age Wi-Fi router compatible with the 802.11n standard communication supports. The transfer speeds of up to 300 mbps but the speed of the Internet connection restrictions download and upload speeds [5].

6.3 The Cost of connection

The costs associated with Wi-Fi connections be likely to be much lower than those of wireless connections used. When you purchase the required hardware devices and establishing a Wi-Fi connection in your home or office, your monthly Internet bill is your only cost, and there are no restrictions on usage. Connection charges may apply when you are using Wi-Fi access points outside the home. The base cost of a wireless connection is comparable, but you can often only download a few gigabytes memory of data per month or data usage. If you want to download more data than is extended in your data plan [5].

6.4 The difference between WiFi® and Wireless Internet

Figure. Shows Wireless router with two antennas. Some WiFi routers do not have any visible antennas. Wireless Internet is now one of the services that WiFi® optionally supports. WiFi® is a wireless communication standard used between computer devices to share different files and different resources. The WiFi® signal cannot travel up to very long distance without loss, and it is therefore used for Local Area Networks. In the home or office, a wireless LAN might include a personal desktop system or laptop, while in the place of work, a wireless [4]. Network commonly connects several computers within a commercial building or campus.
The WiFi® signal might also cover a small area within a city, hot spots or places where the WiFi® signal allows connectivity to the public from beginning to end wireless access points.

A WiFi® network is very simple to set up. The main computer acts as a computer server with a wireless network interface and cards. The wireless NIC features has a small type of antenna that broadcasts and receives WiFi® signals from the broadcast. A router and switch direct traffic node on the WiFi® network and are normally built into a high-speed modem used to put together wireless Internet into the WiFi® LAN. Each type of computer linked to the network, referred to as a client node, also requires a WiFi® NIC [4].

Personal digital assistants, mobile, cell phones, and other handheld electronics commonly have WiFi® ability built-in type. This allows them to connect wirelessly to a WiFi®-enabled network to transfer different files, access the data, or surf the Internet on computer [4].

6.5.1 Wi-Fi and Wireless Broadband

There is a more Confusion about the difference between Wi-Fi and Wireless Broadband. We had covered many aspects of internet different uses and different technologies, including social media, security, Integrity, privacy and cloud computing. It is confession, everyone was mainly interested in getting their head around the technological aspects of their internet connection used Internet Service Provider.

The fact that many people now have Wi-Fi in their home and offices, it can be set up with one device, known as Wi-Fi Router. It can be confusing because the name "Wi-Fi Router" abbreviates a small number of functions. A device which looks like this type of device, is usually at least 4 different types of devices combined together into one device:

1. Modem: Modem is the device which is used to connect to the internet, generally on a landline, like the old copper wire telephone lines used for landline phones across the country, or an Ethernet cable line like that used with various cable TV services now a days, and one day the landline will be the new National Broadband Network in India.

2. Router: this part serves two purposes, it contain an internet connection live, by using saving your login and security settings, so that the internet can be on all the time, when we compare to dial-up internet, which you have to connect when you need router and disconnect when you're finished; and it helps to share your internet connection. So, that more than one of devices can use this internet connection at the same time.

3. Network Switch: Network Switch part is another step in sharing the internet connection with more than one device or computers, Network Switch is used to manage the traffic between the devices on your network forming a Local Area Network, or LAN.

4. Wi-Fi transmitter: Wi-Fi transmitter part shares the LAN over a local area on a wireless radio frequency; Wi-Fi transmitter is usually a short range transmission, covering a office, house, or building. occasionally, using more than one device or a powerful one not commonly used by consumers, Wi-Fi transmitter might cover a larger area like a hotel, airport, or CBD.

6.5.2 The Difference Between Wi-Fi Data and Cellular Data

Wi-Fi and your cellular or mobile data coverage work together to help and get the most out of your cell phone or mobile plan. But what’s the difference between these two?

- A data plan and a Wi-Fi network basically let you do the same thing: use the Internet wirelessly. Some of the devices are built for Wi-Fi use only, while others, such as 4G LTE technology smart phones and like as Sony Xperia® Z2 Tablet, have Wi-Fi, 3G and 4G LTE access facility, its depend on how much you use the Internet and where, a data-enabled device gives you the best of both worlds—fast, secure access to the information you need on the go and some flexibility on overall data consumption [7].

- Wi-Fi is basically just another frequency of radio we can use to wirelessly connect devices to each other.
To use it for Internet access, your tablet or Smart phone connects (over Wi-Fi) to a wireless router—like the one you have installed at home or the one at your favorite coffee shop that allows customers free Internet access. (The router itself typically plugs into the wall to connect to an Internet service provider.) Use your device’s Settings menu to access available Wi-Fi networks. Choose a network from those listed, enter the password (if required), and you’re good to go. You can set up your device so that it automatically recognizes your home Wi-Fi network or other frequently used networks, like at work or school, or you can manually access Wi-Fi when it’s available [7].

- When you use data through a Verizon Wireless plan, you don’t need a router or a Wi-Fi connection. You can access movies, games, email, the web and more on your phone or tablet using Verizon’s network, as long as you’re in the coverage area[7].

VII. WIRELESS-NUT

The first kind you mention is probably a wireless repeater. (Unless you say it transmits to the computer next to it you mean it is by Ethernet. In that case it would be a wireless bridge)

The other is a wireless router which takes a hard wired connection and broadcasts a wireless network that wifi enabled devices can join. You should get the wireless router first.

Then if you need extra range, you could add a wireless repeater to your setup [8].

Summary

In this paper Fast Effective Wireless Synchronization Method has given procedure for fast performance in wireless sensor network by using low energy consumption. Here it is suggested that if node is not active than there is no require all time synchronization. When node is active at that time only power supply should be for fast effective synchronization. Don’t waste energy and clock active all time.

REFERENCES

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