Wireless communications | analysis

Introduction

Without any doubt Wireless communications can be considered as the fastest growing segment in the communications industry. Due to, it has captured the interest of the media and the interest for most of the people all over the world.

Wireless technology has a huge impact on our lives today more than ever before. In addition, Methods of communication have evolved along many years ago starting from the first attempts to communicate verbal and even to manage the modern technology for the advancement of the ability to communicate effectively with each other. Every time you make a phone call, using the television or the computer is leading to activate the role of wireless technology and benefit from its positive sides.

The principle of wireless communication as a process of transferring a piece of information from one place to another by electronic technology is only the use of electronic systems to connect with life which is changing constantly.

Furthermore, the ability to communicate with people has evolved significantly since Guglielmo Marconi was the first who established the radio’s ability to provide continuous contact with the ships sailing on the English Channel in 1897, and since that time new wireless communications services have been adopted by people throughout the whole world.

Finally, a brief history of the evolution of the wireless communications throughout the world could be useful in order to appreciate the enormous impact that communication Services will have on all population over the next several centuries. It is also useful for a new user to the wireless

communication systems field to understand the huge impact that people is making in the development of new communications systems, services, and technologies.

Literature review

The goal of many experts and communications technology people was to find some way to transfer messages over long distances without the need for wires, this dream became true in 1901 when Juliimo Marconi and two of his colleagues on a hilltop in Newfoundland listening in to a reception, and they have heard Morse code, which represents barely letter X, moved the reference to a distance of 1700 miles from Cornwall in England, and represented the first successful transition to wireless. The success of this called the establishment of Marconi technology for wireless communication.

However, wireless did not generate a high return from a commercial point after the ship Titanic disaster in 1912, While the ship was sinking, the radio operator sent a distress signal on the ship through Tlgrafha wireless Carpithia captured ship that was nearby, and these signals had saved the life of the last 700 of the passengers on Titanic’s 2200, and after this disaster, shortly called the need for all institutions to provide the large vessels marine radios, and this experience has led to the invention of Marconi radio. By 1922 the number of radio stations that provide broadcast live on 564 stations, today transmitted to us thousands of radio stations and multiple programs.

Moreover, wireless communications are based on modern technology and the computer is one of the main elements of this technology. Nowadays, the

vast majority of schools usually equipped with computer labs to teach computer skills to their students, it is no longer unfamiliar to the student in first grade to have some knowledge of basic background about the computer.

With the computers within a few seconds you can access information anywhere around the world. Today services come with opportunities to learn new information and new data for homes through wireless communications.

Definitions of Wireless Communications

“ Wireless technology is a truly revolutionary paradigm shift, enabling multimedia communications between people and devices for many locations.” By Andrea Goldsmith

“ Wireless communications is a broad and dynamic field that has spurred tremendous excitement and technological advances over the last few decades.” By Andrea Goldsmith

Wireless Communications Protocols in Wi-Fi Wireless

It is known that the process of wires and wireless communications in computer networks are subject to specific rules to control the reception of information properly and without any loss or time delay during the exchange of that information. For example, the internet is working through a set of protocols known as TCP/IP and wireless networks to connect to specific protocols and particularly a collection of protocols of 802. 11 and a Bluetooth protocols which is the most known of them .

- 802. 11g Protocol is latest version of the protocol 802. 11b, it also work on the 2. 4 GHz frequency, the speed of transferring the data in this protocols is 54Mbps, and the devices that work through that protocols can work through the previous 802. 11b protocol as well. However, it is preferable to link the wireless network by more than one protocol.
- 802. 11a Protocol work through 5 GHz frequency which makes it less vulnerable to interference from the LNB or any other devices, but the cost of this is greater than any other systems.
- The Bluetooth Protocol is transmits data at low speed at 1Mbps and within no more than 10 meters. Also, it works through the left 2. 4 GHz.
- 802. 11n Protocol is the protocol`s future, which has not been approved so far. It is expected to achieve the speed of data transfer within a distance of 100Mbps,

Wireless networks

Wireless local area networks have supplemented or replace the wired networks in many places. For example, homes, business or campuses. Many new applications including wireless sensor networks, smart homes, and remote telemedicine are emerging from research ideas to actual systems.

The explosive expansion of wireless systems has come with the proliferation of laptop and palmtop computers and this suggest a bright future for wireless networks.

Technical issues

To enable wireless applications in the future, many technical challenges must be addressed and these challenges have been developed across all aspects of system design.

Wireless local area networks LANs support high speed data transmissions with in a small region for example, campus or small building as users moves from place to place. Wireless devices that access these LANs are typically stationary or moving at pedestrian speeds.

Wireless LANs can have either a star architecture, with wireless access points or hubs placed throughout the coverage region, or a peer-to-peer architecture, where the wireless terminals self-configure into a network.

Dozens of wireless LANs companies and products appeared in the early 1990s to capitalize on the “ pent-up demand” for high speed wireless data. These first generation wireless LANs were based on propriety and incompatible protocols.

Wide Area Wireless Data Services

To high percentage of mobility users, this could provide many wireless data over a large coverage area. A geographical region in these systems is usually serviced by base stations placed on the top of towers, rooftops or mountains. The base stations can be connected to a back-bone wired network or from a multi-hop and hoc wireless network.

Broadband Wireless Access

It gives a high-rate in wireless communications between a specific access point and multiple stations. These systems were initially proposed to help interactive video service to the home; however the application then shifted to providing high speed data networks for both homes and business.

Satellite Networks

Commercial satellite systems are another major component of the wireless communications infrastructure. Narda Satellite Networks could be a good example. It is a manufacturer of high-quality military and commercial satellite communications equipment.

Low-cost, low-power Radios: Bluetooth and ZigBee

It becomes feasible to embed radios into more types of electronic devices, because they have decreases their cost and power consumption which can be used to create smart homes, sensor networks, and many other applications. Two radios have emerged to help and support this trend: Bluetooth and ZigBee.

1-Bluetooth radios give short range of connections between wireless network devices and basic networking capabilities. The Bluetooth normally based on a tiny microchip inside a radio transceiver which is built into some digital devices. Bluetooth is mainly for short-range communication. Take an example, from a laptop to nearby printer or from a cell phone to a wireless headset which is common used by many people nowadays.

2- ZigBee " The ZigBee radio specification is designed for lower cost and power consumption than Bluetooth its specification is based on the IEEE 802. 15. 4 Standard". I. Poole 2004

Finally, the main benefit of using the ZigBee is to provide radio operation for months or years without the need to recharging it.

Ad Hoc Wireless Networks

It can be defined as a collection of wireless mobile nodes that self-configure to form a network without the aid of any established infrastructure as show in the figure below

The Merriam-Webster dictionary lists two relevant definitions for Ad Hoc Wireless Networks:" formed or used for specific or immediate problems", and " fashioned from whatever is immediately available".

These definitions show us main benefits of ad hoc wireless networks. Firstly, they can be adapted to specific applications; second, they can be produced from any networks nodes that could be available. Ad Hoc wireless networks have another important benefit as well. They can avoid the installation, cost and maintenance of network infrastructure.

An overview of the basic application for ad hoc wireless networks, as applications it usually look for many of the requirements of the design. I will concentrate on the following applications: data networks, home networks and device networks.

1- Data network

Ad hoc wireless data networks basically helps in exchanging the data between laptop computers, palmtops, personal digital assistants (PDAs), and other information devices. These data networks generally divided into three main categories based on the coverage area: LANs, MANs, and WANs (for " local", " metropolitan", and " wide" area networks.

2- Home networks

Home networks is basically help to support communication between many devices like PCs, laptops, PDAs card-less phones, security and monitoring systems and entertainment systems anywhere in and around the home etc. Home networks could enable smart rooms that sense people movement and adjust light and heating consequently, as well as “ aware homes” this feature network sensors and computers is for assistant living for elderly people or those with disabilities.

3- Device networks

It provides a short-range wireless connections between devices, such networks are primarily intended to replace problematic cabled connections with wireless connections. “ The main technology derivers for such networks are low-cost low-power radios with networking capabilities such as Bluetooth, ZigBee and ultra wide-band or UWB; the radios are integrated into commercial electronic devices to provide networking capabilities between devices”. J. Haartsen 2000.

Conclusion and Discussion

A new wireless communication technology has been presented. Some People might argued that