جامعة المستقبل
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كلية العلوم

قسم الانظمة الطبية الذكية

المحاضرة الاولى

INTRODUCTION ABOUT WIRELESS TOPOLOGIES

المادة : Wireless Body Sensor Networks

المرحلة : الثالثة

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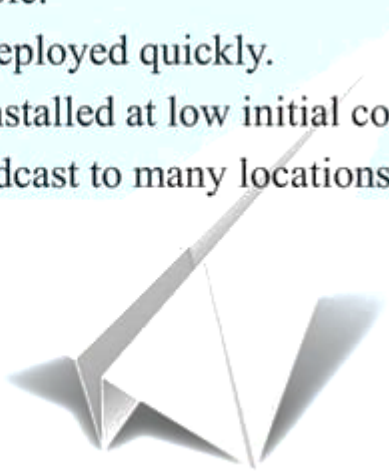
Introduction

What is a wireless network?

- A technology that enables two or more entities to communicate without network cabling.
- wireless networking today is about where broadcast radio was in the late 1920s. The use of wireless technology is quickly becoming the most popular way to connect to a network. Wi-Fi is one of the many available technologies that offer us the convenience of mobile computing.

Needs Of Wireless Networks

- Mobile communication is needed.
- Communication must take place in a terrain that makes wired communication difficult or impossible.
- A communication system must be deployed quickly.
- Communication facilities must be installed at low initial cost.
- The same information must be broadcast to many locations.



How Wireless Networks Work

Wireless networks work by using radio waves to transmit data between devices, such as smartphones, laptops, and routers, without the need for physical cables .

Main Parts:

- Router: The main device connected to the internet.
- Wireless Devices: Devices like phones and laptops that connect to the router.

How It Works:

- The router sends out radio signals (e.g., 2.4 GHz or 5 GHz).
- Devices pick up the signal and connect using a password.
- Data moves back and forth between the devices and the internet.

Communication:

- Devices send requests (e.g., open a website).
- The router sends the request to the internet and brings back the result.

Security:

The connection is encrypted (e.g., WPA2/WPA3) to keep data safe and block unauthorized access.

Wireless Networks:

- A **wireless network** is any type of computer network that uses wireless data connections for connecting network nodes.

- **Wi-Fi (Wireless Fidelity)**
- **Bluetooth**

Bluetooth

- ***Bluetooth*** is a specification (IEEE 802.15.1) for the use of low-power radio communications to link phones, computers and other network devices over short distances without wires.

Wi-Fi (**Wireless Fidelity**)

- Wi-Fi is a wireless networking technology that allows computers and other devices to communicate over a wireless signal.
- **Wi-Fi**, is a local area wireless technology

Wi-Fi Technology

- Wi-Fi networks use radio technologies to transmit and receive data at high speed

- IEEE 802.11 b
- IEEE 802.11 a
- IEEE 802.11 g

IEEE 802.11 b

- Introduced in late 1999
- 4-6 Mbps (actual speed)
- Most Popular
- Least Expensive
- 100 – 150 feet range
- Operates at 2.4GHz radio spectrum
- Interference from mobile phones and bluetooth devices which can reduce the transmission speed.

IEEE 802.11 a

- Introduced in 2001
- 15 – 20 Mbps (Actual speed)
- 50 – 75 feet range
- More Expensive
- Operates at 5 GHz (less popular)
- Not compatible with 802.11b

IEEE 802.11 g

- Introduced in 2003
- 54 Mbps speed
- Compatible with 'b'
- 100 – 150 feet range
- Combine the feature of both standards (a , b)
- 2.4 GHz radio frequencies

Comparision of Wired & Wireless Network

Wired Networks	Wireless Networks
Installation of wired network is so Difficult.	1. Installation is Easy to Installation
Time of Instalation is more.	2. Time of installation is less.
Reliability is high	3. is Reasonably high
Speed & bandwidth are high & l00mbps	4. Speed & bandwidth are low & 54mbps

ADVANTAGES OF WIRELESS NETWORK

- Speed.
- Cost.
- Centralized Software Management .
- Resource Sharing.
- Electronic Mail.
- Flexible Access.
- Workgroup Computing.

DISADVANTAGES OF WIRELESS NETWORK

- Server Faults Stop Applications Being Available
- Network Faults Can Cause Loss Of Data.
- Network Fault Could Lead To Loss Of Resources.
- User Work Dependent Upon Network

Applications

- Cable replacement for peripherals
- Mobile extension of wired networks
- Fixed wireless between homes and businesses and the Internet
- Mobile access to the Internet from outdoor areas

Conclusion

- In high-density urban area there may be multiple networks like MPLS, Metro Ethernet, fibre networks, ADSL. There may WiMAX is a technology for providing high speed access to rural areas. It can provide Copyright to IJIRCCE DSL like speeds.
- Various terrain types such as hills with a rather high density of trees, moderate tree density, flat area with a low tree density can dictate the use of WiMAX technology Radio Waves are unpredictable and may go beyond the coverage area of the premises. Some parts of the coverage area may not get the radio waves.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