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FACULTY OF EGINEERING AND TECHNOLOGY

WSN (MCS-033)

LECTURE -3

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OUTLINE

- WSN Applications
- WSN Architecture and Protocol Stack
- Components of a node of a WSN
- Power consumption of a node to receive or transmit messages.
- WSN having a star topology
- WSN having with multihop communication.
- Challenges and Constraints
- ISO-OSI protocol stack for WSNs
- MCQ
- Reference

WSN Applications

1. Military or Border Surveillance Applications
2. Environmental Applications
3. Health Care Applications
4. Home Intelligence
5. Industrial Process Control
6. Agriculture

Physical Sources of Distortion

The wireless channel distorts signals transmitted from a transmitter node. The cause of this distortion can be classified into four main phenomena .

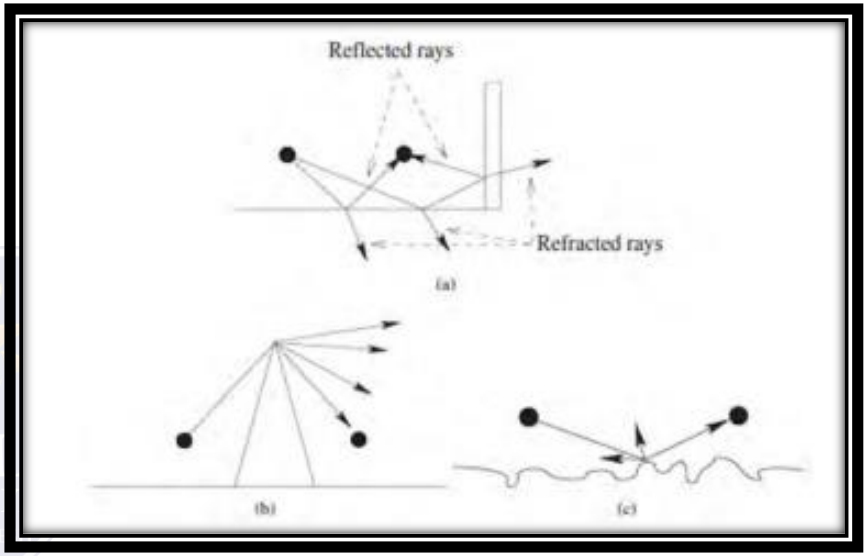
1 Attenuation (Path Loss)

The term refers to the reduction in power density (attenuation) of the electromagnetic wave as it propagates through space as function of the distance. The attenuation is proportional to the distance travelled by the wave over the space.

2 Reflection and refraction

When a signal wave is incident at a boundary between two different types of material, a certain fraction of the wave is absorbed by the material, whereas another fraction bounces off the surface, which is called reflection. Depending on the properties of the two materials, a certain fraction of the wave may also propagate through the boundary, which is called refraction. Reflection and refraction are usually observed on the ground or the walls of a building as shown in Figure. More generally, these phenomena occur in case of obstructing objects with large dimensions compared to the wavelength. As a result the signal received at the antenna of the receiver node may fade based on the constructive or destructive effects of multiple waves that are received.

Physical Sources of Distortion



3. Scattering

Signal waves do not generally encounter obstacles with perfect boundaries. Instead, when a signal wave is incident at a rough surface, it scatters in random directions as shown in Figure 2.1(c). This phenomenon is also encountered in case of a radio wave traveling through a medium containing many small (compared to the wavelength) objects, which influence the propagation.

4. Diffraction

The term refers to the phenomena that occur when an electromagnetic wave propagates through sharp edges such as the tip of a mountain or a building or surfaces with irregularities. As shown in Figure 2.1(b), this causes the sharp edge to act as a source, where new secondary waves are generated giving rise to a bending of waves around and behind the obstacle. In effect, the original signal strength is distributed to the new generated waves.

MCQ

1. Ethernet frame consists of _____

a) MAC address

b) IP address

c) Default mask

d) Network address

2. What is start frame delimeter (SFD) in ethernet frame?

a) 10101010

b) 10101011

c) 00000000

d) 11111111

3. MAC address is of _____

a) 24 bits

b) 36 bits

c) 42 bits

d) 48 bits

4. What is auto negotiation?

a) a procedure by which two connected devices choose common transmission parameters

b) a security algorithm

c) a routing algorithm

d) encryption algorithm

REFERENCES

- https://www.kth.se/social/files/5431a388f276540a05ad2514/An_Introduction_WSNS_V1.8.pdf