

Practice questions for WSN

Branch: CCE and CSE

Semester: 7th

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1. For a wireless sensor network (WSN) that keep track on movement of terrorist behind the wall then suggest the design specifications in terms of
 - (a) Discuss the type of application for the given WSN.
 - (b) The sensors used for the measurement.
 - (c) The input data used among RSS, CSI, ToF.
 - (d) Type of modulation technique and detection mechanism.
 - (e) Preferred network architecture such as centralized or distributed.
 - (f) Suggest the most suitable type of function to be used among different types of in-network processing functions.
 - (g) Find the approximate energy overhead required by considering the data transmission rate of R bits/sec and a coding rate of R_{code} to transmit n -bits from transmitter to receiver.
 - (h) Suggest whether the network requires improved lifetime not.
 - (i) Suggest whether sensor based or sensor less approach is essential for this WSN.
 - (j) Discuss the type of mobility for the given network.
 - (k) Suggest about the programming paradigm for the network.
 - (l) Is this network following cross-layer optimization, if yes then justify how the cross-layer optimization is achieved.
 - (m) Frame the event as a database and provide the query to retrieve event data.

2. For a WSN that keep monitoring the air quality of an indoor seminar hall. Suggest the design specifications in terms of
 - (a) Discuss the type of application for the given WSN.
 - (b) The sensors used for the measurement.
 - (c) Type of modulation technique.
 - (d) Preferred network architecture such as centralized or distributed.
 - (e) Suggest the most suitable type of function to be used among different types of in-network processing functions.
 - (f) Find the approximate energy overhead required by considering the data transmission rate of R bits/sec and a coding rate of R_{code} to transmit n -bits from transmitter to receiver.
 - (g) Suggest whether the network requires improved lifetime or not.
 - (h) Discuss the type of mobility for the given network.
 - (i) Suggest about the programming paradigm for the network.
 - (j) Is this network following cross-layer optimization, if yes then justify how the cross-layer optimization is achieved.
 - (k) Frame the event as a database and provide the query to retrieve event data.
 - (l) Construct a component timer and clock for such network with possible interfaces.
3. For a WSN used for flood monitoring system
 - (a) Discuss the type of application for the given WSN.
 - (b) The sensors used for the measurement.
 - (c) Whether the data requires periodic monitoring, or an efficient MAC protocol is required for heavy data burst.
 - (d) Preferred network architecture such as centralized or distributed.
 - (e) Suggest the most suitable type of function to be used among different types of in-network processing functions.

- (f) Find the approximate energy overhead required by considering the data transmission rate of R bits/sec and a coding rate of R_{code} to transmit n -bits from transmitter to receiver.
 - (g) Suggest whether the network requires improved lifetime not.
 - (h) Discuss the type of mobility for the given network.
 - (i) Frame the event as a database and provide the query to retrieve event data.
4. For a WSN that identify the number of chairs for sitting arrangement in a park. Considering very few seats are available in the large geographic area of the park.
- (a) Discuss the type of application for the given WSN.
 - (b) The input data used among RSS, CSI, AoA, ToF.
 - (c) Which MAC protocol is suitable for this application?
 - (d) Whether a radio or non- radio wireless communication is preferred.
 - (e) Preferred network architecture such as centralized or distributed.
 - (f) Suggest whether the network requires improved lifetime not.
 - (g) Discuss the type of mobility for the given network.
 - (h) Suggest whether sensor based or sensor less approach is essential for detecting the seats.
5. For a WSN that identify the number enemy aircraft entering in certain space for border applications.
- (a) Discuss the type of application for the given WSN.
 - (b) The input data used among RSS, CSI, AoA, ToF.
 - (c) Type of modulation technique.
 - (d) Preferred network architecture such as centralized or distributed.

- (e) Suggest whether the network requires improved lifetime not.
- (f) Whether the data requires periodic monitoring, or an efficient MAC protocol is required for heavy data burst.
- (g) Suggest whether sensor based or sensor less approach is essential for detecting these aircrafts.
- (h) Suggest about the number of sensors required (more or less).

6. Discuss about the following for WSN.

- a. Network lifetime
- b. Energy scavenging
- c. Event mobility
- d. Adaptive fidelity
- e. Function approximation and edge detection
- f. Frequency stability
- g. Dynamic voltage scaling
- h. Carrier sense multiple access
- i. Wakeup radio
- j. Event-based programming
- k. Split-phase programming
- l. Agent-based networking
- m. WSN tunnelling
- n. Communication vs computation
- o. Timer interface
- p. Component based programming
- q. Centralized vs distributed network paradigm
- r. Overlay networks
- s. Scalability in WSN
- t. Robustness of WSN
- u. Aggregation in in-network processing

- v. Data-centric vs address-centric paradigm
- w. Gateway in WSN
- x. Wave propagation phenomenon (diffraction, scattering, and doppler fading)
- y. Flat fading vs fast fading
- z. Co-channel vs adjacent channel interference
 - aa. Rayleigh vs Rice fading
 - bb. DSSS vs FHSS
 - cc. Carrier and frame synchronization
 - dd. Equalization techniques
 - ee. Dynamic modulation scaling
 - ff. Pure vs Slotted ALOHA
 - gg. Hidden vs Exposed terminal problem in CSMA
 - hh. Idle listening vs Collision problem for MAC
 - ii. Schedule-based vs Contention-based MAC protocols
 - jj. FEC vs ARQ techniques
 - kk. Non persistent vs Persistent CSMA
 - ll. Periodic wakeup vs Wakeup radio
 - mm. STEM-B vs STEM-T