

Sensor Fusion-Quiz

1. Which statement best describes a *sensor* in the context of autonomous vehicles?

- A. A device that detects environmental changes and converts them into readable signals
- B. A device that only measures electrical signals
- C. A computer that makes decisions based on predefined rules
- D. A component that stores GPS maps

2. Why do autonomous vehicles rely on *multiple* sensors rather than just one?

- A. No single sensor satisfies all perception requirements; sensors have complementary strengths
- B. Multiple sensors are cheaper than a single high-quality sensor
- C. Regulations require at least five sensors per car
- D. Single sensors cannot be powered continuously

3. Which grouping correctly matches *sensor category* to *examples*?

- A. Exteroceptive → Cameras, LiDAR, Radar; Proprioceptive → IMU, wheel encoders
- B. Exteroceptive → IMU, wheel encoders; Proprioceptive → Cameras, LiDAR
- C. Positioning → Radar, Ultrasonic; Exteroceptive → GPS/GNSS
- D. Proprioceptive → Cameras, GPS; Positioning → LiDAR

4. In the AV pipeline, *perception* is described as which of the following?

- A. The first and most safety-critical stage
- B. The final stage that handles actuation
- C. A non-critical stage performed offline
- D. An optional stage used only for HD mapping

5. What is the *primary goal* of sensor fusion?

- A. To combine data from multiple sensors for a more accurate and reliable environment understanding
- B. To reduce the number of sensors required
- C. To eliminate the need for localization

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D. To replace machine learning models

6. Which perception tasks are *directly supported* by sensor fusion according to the slides?

A. Object detection, semantic segmentation, and localization

B. High-definition map creation only

C. Battery management and thermal control

D. Path planning and motion control

7. Which description best characterizes a *Convolutional Neural Network (CNN)* in AV perception?

A. A specialized neural network for images/spatial data that learns features like edges→shapes→objects

B. A neural network designed for signals processing only

C. A rules-based engine for lane keeping

D. A mapping algorithm for GPS/GNSS

8. How does *multi-modal perception* (Sensor Fusion + AI) improve robustness?

A. By allowing sensors to back each other up in poor lighting, weather, or partial sensor failure

B. By enabling AVs to use a single sensor at a time so each can operate independently

C. By reducing the need for redundancy by prioritizing the highest-quality sensor

D. By replacing physical sensors entirely with software-based predictions

9. What is the primary advantage of using a Deep Neural Network (DNN) in autonomous vehicle perception?

A. It learns complex, hierarchical patterns from large datasets, enabling tasks like object and lane detection

B. It removes the need for sensor calibration

C. It only requires a single sensor input to function correctly

D. It can replace all traditional machine learning models without training

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10. In the context of autonomous vehicles, what is the primary role of Artificial Intelligence (AI)?

- A. To perform human-like tasks such as seeing, recognizing, and interpreting the environment
- B. To replace all sensors with predictive algorithms
- C. To only control vehicle speed and braking systems
- D. To store high-definition maps for navigation