# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A++ Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

# UNIT IV: INTRODUCTION TO AUTOMATED, CONNECTED AND INTELLIGENT VEHICLES

TOPIC: **Present Advanced Driver Assistance System Technology Examples**

# Advanced Driver Assistance System (ADAS) Technology Examples

## Adaptive Cruise Control (ACC)

- **Functionality**: Automatically adjusts the vehicle's speed to maintain a safe distance from the car ahead.
- **Key Features**:
  - Uses radar and cameras to monitor the distance and relative speed of vehicles.
  - Adjusts acceleration and braking to ensure consistent spacing.
- **Benefits**:
  - Reduces driver fatigue on long trips.
  - Enhances highway safety.

## Lane Keeping Assist (LKA) & Lane Departure Warning (LDW)

- **Functionality**:
  - **LKA**: Actively steers the car back into the lane if it drifts.
  - **LDW**: Alerts the driver when the car starts to veer out of its lane.
- **Key Features**:
  - Utilizes cameras to detect lane markings.
  - Issues audible, visual, or haptic alerts for LDW.
  - Applies corrective steering or braking for LKA.
- **Benefits**:
  - Reduces accidental lane departures.
  - Minimizes potential collisions caused by distractions or drowsiness.

## Automatic Emergency Braking (AEB)

- **Functionality**: Detects potential collisions and applies brakes to avoid or mitigate impacts.
- **Key Features**:
  - Combines radar, cameras, and sensors to monitor surroundings.
  - Can recognize vehicles, pedestrians, and cyclists.
- **Benefits**:
  - Significantly reduces rear-end collisions.
  - Improves pedestrian safety.

# Blind Spot Detection (BSD)

- **Functionality**: Monitors blind spots and alerts the driver of approaching vehicles.
- **Key Features**:
  - Uses radar sensors on the rear bumper.
  - Provides alerts via dashboard indicators or side mirror lights.
  - Can integrate with lane change assist systems.
- **Benefits**:
  - Enhances driver awareness.
  - Prevents accidents during lane changes.

## Traffic Sign Recognition (TSR)

- **Functionality**: Identifies and displays traffic signs on the dashboard.
- **Key Features**:
  - Uses forward-facing cameras to recognize signs such as speed limits and warnings.
  - Can work in tandem with ACC to adjust speed automatically.
- **Benefits**:
  - Helps drivers adhere to traffic regulations.
  - Reduces speeding-related incidents.

## Parking Assistance Systems

- **Functionality**: Assists or automates parking maneuvers.
- **Key Features**:
  - Includes rearview cameras, ultrasonic sensors, and 360-degree cameras.
  - Provides visual and auditory guidance for parallel or perpendicular parking.
  - Advanced systems can fully automate parking.
- **Benefits**:
  - Simplifies parking in tight spaces.
  - Reduces risk of minor collisions.

## Driver Monitoring Systems (DMS)

- **Functionality**: Monitors driver attentiveness and issues alerts when signs of drowsiness or distraction are detected.
- **Key Features**:
  - Utilizes cameras and sensors to track eye movement, head position, and hand activity.
  - Issues alerts via sounds, vibrations, or dashboard messages.
- **Benefits**:
  - Enhances driver safety.
  - Prevents accidents caused by inattention.

## Night Vision Enhancement

- **Functionality**: Improves visibility in low-light conditions.
- **Key Features**:
  - Uses infrared cameras to detect objects beyond the reach of headlights.
  - Displays enhanced images on the dashboard or windshield.
- **Benefits**:
  - Detects pedestrians and animals at night.
  - Reduces nighttime driving hazards.

## Cross-Traffic Alert

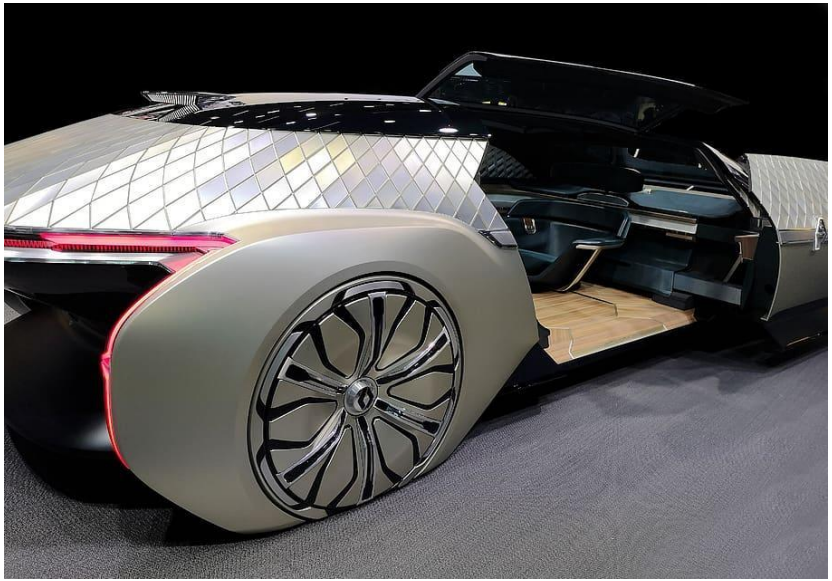
- **Functionality**: Warns the driver of approaching vehicles when reversing or at intersections.
- **Key Features**:
  - Rear sensors and cameras monitor side traffic.
  - Issues visual and auditory warnings.
- **Benefits**:
  - Prevents collisions in parking lots and driveways.
  - Enhances safety during reversing maneuvers.

## Vehicle-to-Everything (V2X) Communication

- **Functionality**: Enables communication between vehicles, infrastructure, and other road users.
- **Key Features**:
  - Shares real-time data on road conditions, traffic, and hazards.
  - Enhances coordination with smart city infrastructure.
- **Benefits**:
  - Optimizes traffic flow.
  - Improves safety by providing early warnings of hazards.

## Conclusion

ADAS technologies represent a significant leap forward in automotive safety and convenience. By incorporating sensors, cameras, and advanced software, these systems not only make driving safer but also pave the way for fully autonomous vehicles in the future.



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