



Misr University for Science and Technology

College of Engineering

Electronics and Communications Engineering Department

B. Sc. Final Year Project

Advanced Driver Assistance System (ADAS)

Project Team

Name:	ID:
Hatem Abdelhamid Saleh	91145
Haneen Salah Eid	85555
Ahmed Mohamed Fathy	95960
Abdulrhman Amr Mohamed	86519
Abdelrahman Mohamed Abdelrahman	91550
Youssef Mohamed Elmohamady	91293
Omar Hosny Mohamed	75002
Faysal Mohamed Hassan	95887
Toka Hamdy Sayed	91192
Mahmoud Mohamed Abd-El Mohsen	91350

Supervisor

Dr. Waleed Abd-Elshafi Ali Elshazly

Advanced Driver Assistance System (ADAS)

Advanced Driver Assistance Systems (ADAS) represent a pivotal advancement in automotive technology, aiming to enhance vehicle safety and overall driving experience. This abstract explores the key components, functionalities, and benefits of ADAS. ADAS integrates a multitude of sensors, cameras, and radar to contribute to the overall goal of reducing accidents, minimizing human errors, and improving road safety. The benefits of ADAS extend beyond safety improvements. By providing drivers with real-time information and assistance, ADAS aims to reduce the cognitive load on drivers, enhancing overall comfort and reducing driver fatigue. Additionally, as these systems continue to evolve, they play a crucial role in laying the foundation for autonomous driving technologies.

Our Project is specifically handling the following systems: Bump Detection, Precise Lane Tracking, Road Sign Interpretation, and Interactive Surface. Bump Detection, a crucial feature of ADAS, utilizes sensitive sensors, including accelerometers and gyroscopes, to detect irregularities and bumps on the road surface. These sensors measure sudden changes in acceleration and vehicle orientation, identifying potential road hazards such as potholes or uneven surfaces. Upon detecting a bump, the system assesses its severity and triggers appropriate responses to mitigate discomfort for passengers and reduce wear on the vehicle. The system can adjust suspension settings or provide real-time feedback to the driver, enhancing overall ride comfort and vehicle durability.

Precise Lane Tracking, an integral component of ADAS, utilizes advanced computer vision algorithms and sensors to monitor the vehicle's position within the lane. Cameras and sensor technologies assess lane markings and surrounding vehicles, ensuring accurate tracking even in complex road conditions. By continuously analyzing this data in real-time, the system provides feedback to the driver about the vehicle's position within the lane. If there is any deviation from the designated lane, visual and auditory alerts are generated, enhancing the driver's awareness of their driving behavior. These alerts are promptly displayed on the interactive surface Touch Screen, enabling immediate corrective action. Road Sign Interpretation, a key capability of ADAS, relies on sophisticated image processing techniques and Machine Learning (ML) algorithms. Through cameras and ML models, the system comprehensively scans road signs, including speed limits, stop signs, and directional markers.

The system's image recognition technology deciphers these signs in real time, extracting essential information to alert the driver promptly. When a relevant road sign is detected, the information is displayed on the interactive surface, ensuring the driver is informed about the current road conditions and regulations. The interactive surface with a graphical user interface (GUI) represents the pinnacle of user interaction within ADAS. Combining advanced projection technology with intuitive GUI design, this feature projects vital information directly onto the windshield. Drivers receive real-time feedback on ADAS operations, including obstacle detection, road sign interpretation, and navigation alerts. The touch-sensitive interface allows customization of system settings, immediate response to alerts, and seamless control over ADAS functionalities. Including obstacle detection, road signal interpretation and navigation alerts, the touch-sensitive interface allows for customization of system settings, instant response to alerts, and seamless control of co-driver functions.

Blind spot detection systems have become an indispensable safety feature in modern vehicles, designed to mitigate the risks associated with lane change maneuvers and reduce the incidence of accidents caused by blind spot accidents. This summary provides an overview of blind spot detection systems, including operating principles, key components, potential benefits. Adaptive cruise control systems are designed to maintain a safe and constant distance between the host vehicle and the vehicle in front, while also adapting the vehicle's speed to suit traffic conditions. These systems use a range of sensors, such as radar or lidar, to continuously monitor the distance and relative speed of vehicles ahead.