

Advanced Driver Assistance System (ADAS)

Farida
Waheed

Omar Atif

Rahaf
Ashraf

John
Fawzy

Ritaj
Mahmoud

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Project Overview

The ADAS project is designed to enhance vehicle safety and driving experience through a variety of features. These include:

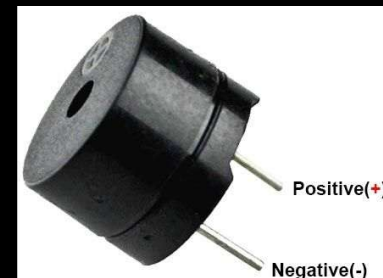
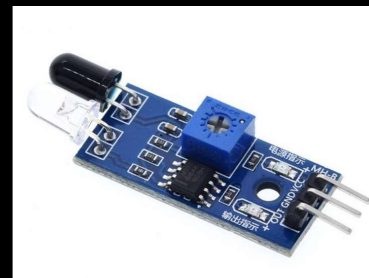
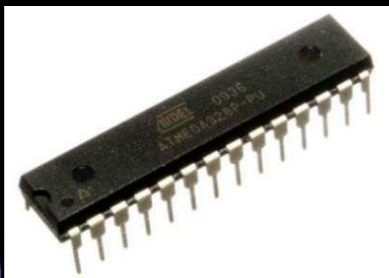
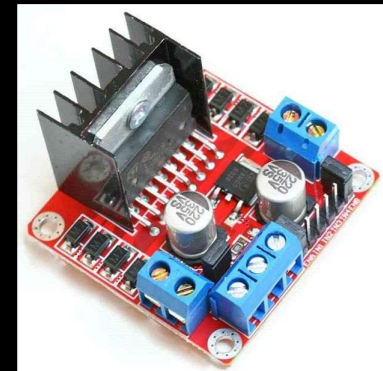
- 1 Adaptive Cruise Control (ACC)
Maintains a safe distance from the vehicle in front.
- 2 Lane Departure Warning (LDW)
Alerts the driver if the vehicle deviates from its lane.
- 3 Automated Emergency Braking (AEB)
Automatically applies the brakes to avoid collisions.
- 4 Lane Keeping Support (LKS)
Helps the driver stay within the lane by automatically adjusting the vehicle's direction.

Each feature is implemented using various sensors and actuators, including ultrasonic sensors, infrared (IR) sensors, a buzzer, and motor drivers.



Key Components

- Microcontroller: ATmega series, the brain of the system.
- Ultrasonic Sensor: Measures the distance between the vehicle and obstacles.
- IR Sensors: Detect lane boundaries.
- Buzzer: Provides audio alerts to the driver.
- Motor Driver: Controls the direction and speed of the vehicle's motors.
- LCD Display: Shows real-time information and alerts to the driver.



Features and Functions

Adaptive Cruise Control (ACC)

Objective: Automatically adjusts the vehicle's speed to maintain a safe distance from the vehicle ahead .

How It Works:

- Uses the ultrasonic sensor to measure the distance to the vehicle in front.
- If the distance is less than 10 cm, the vehicle stops..
- Displays "Obstacle detected!!!" or "Cruising..." on the LCD depending on the situation.

Lane Departure Warning (LDW)

Objective: To alert the driver if the vehicle deviates from its lane.

How It Works:

- Utilizes IR sensors to monitor lane boundaries.
- If the vehicle drifts to the left or right lane, the system activates the buzzer and displays a warning message on the LCD.
- The message indicates whether the vehicle is departing from the left or right lane.

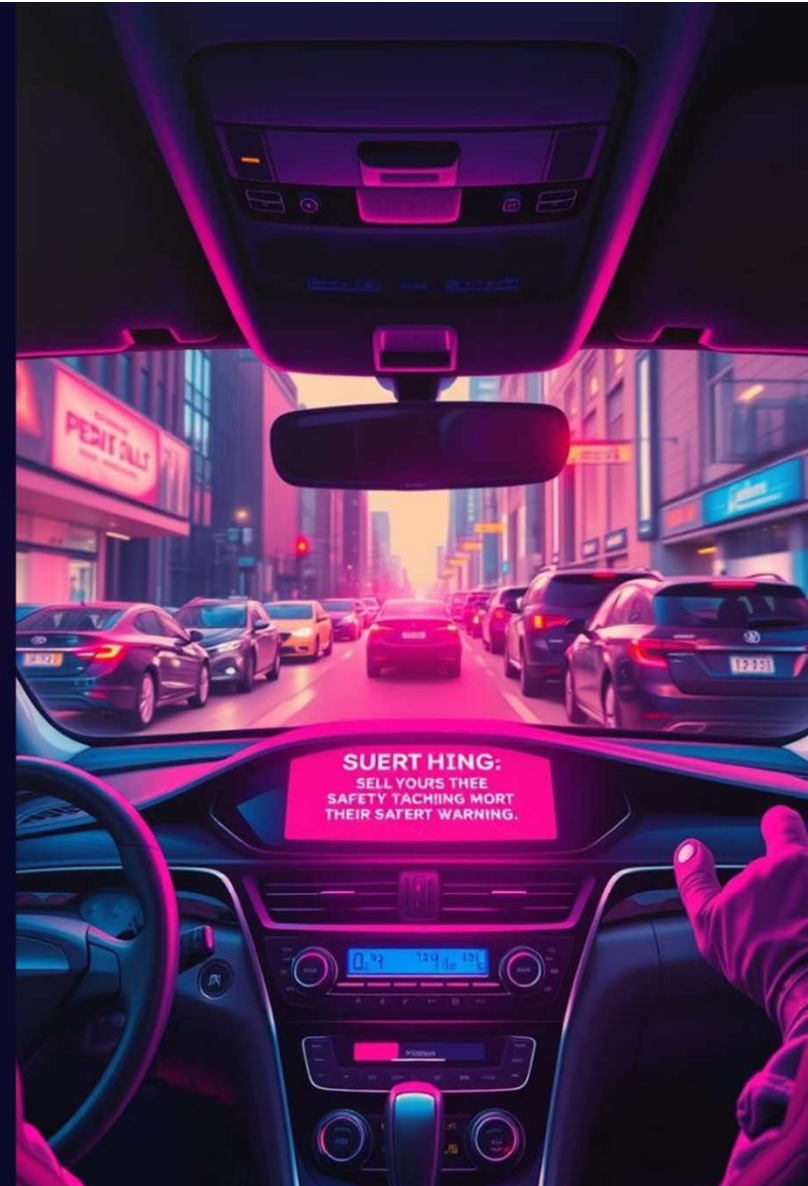


Automated Emergency Braking (AEB)

Objective: Automatically applies the brakes in critical situations to avoid a collision.

How It Works:

- Uses the ultrasonic sensor to measure the distance to an obstacle.
- If the distance is less than 5 cm, the vehicle stops, the buzzer sounds, and "Emergency Braking!!!!!" is displayed on the LCD





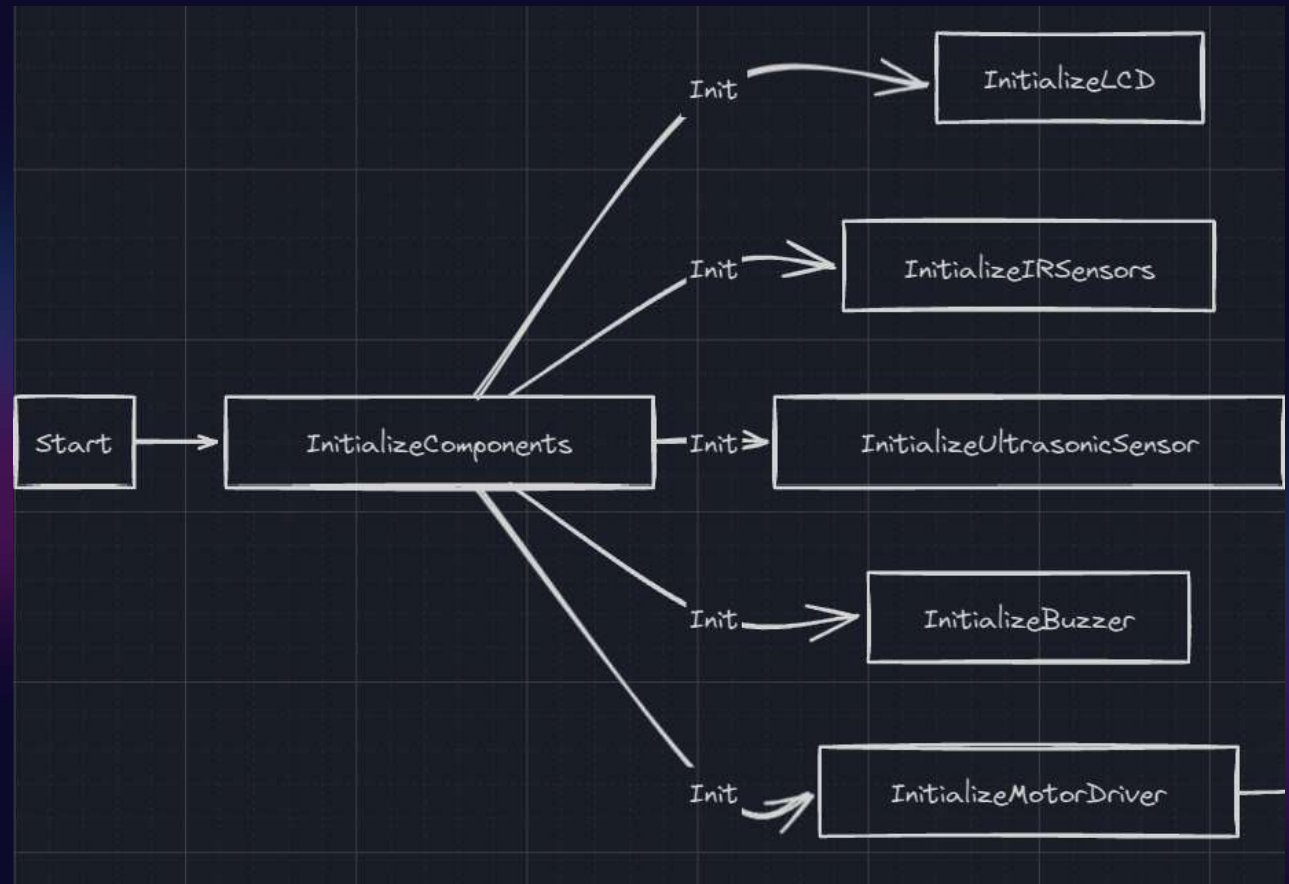
Lane Keeping Support (LKS)

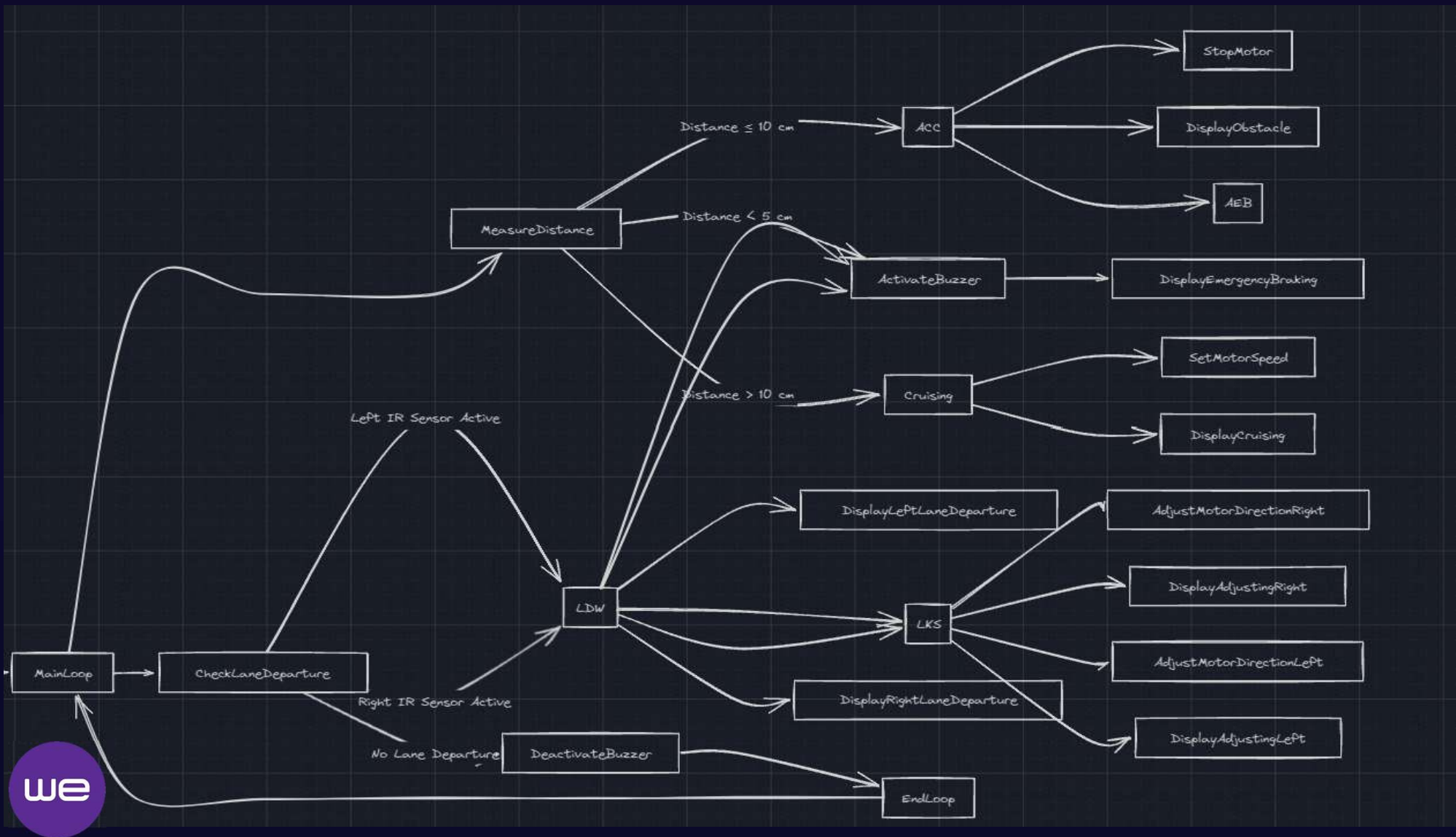
Objective: Helps the driver to stay within the lane by automatically adjusting the vehicle's direction.

How It Works:

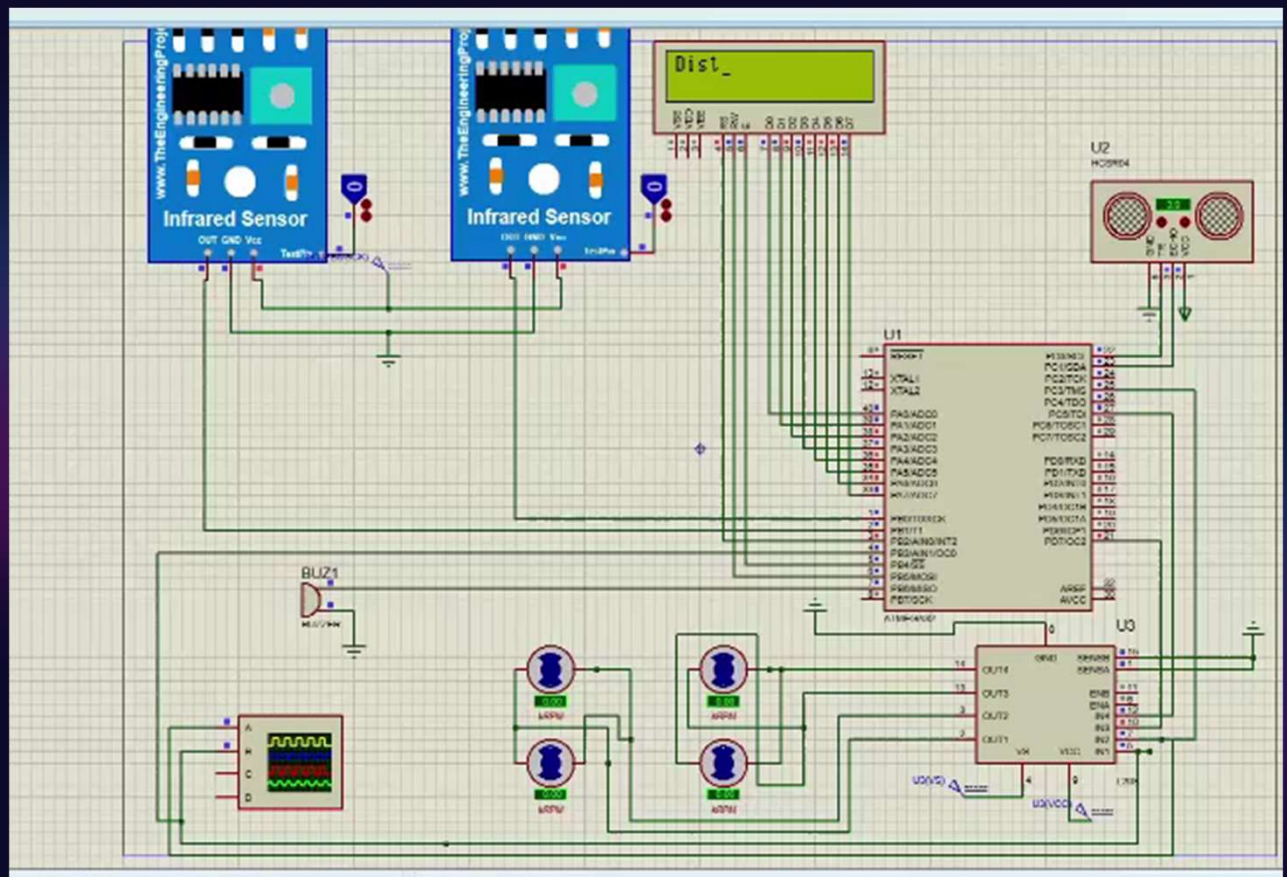
- IR sensors detect lane departures.
- The motor driver adjusts the vehicle's direction to keep it within the lane, displaying messages like "Adjusting right..." or "Adjusting left..." on the LCD.

Flowchart

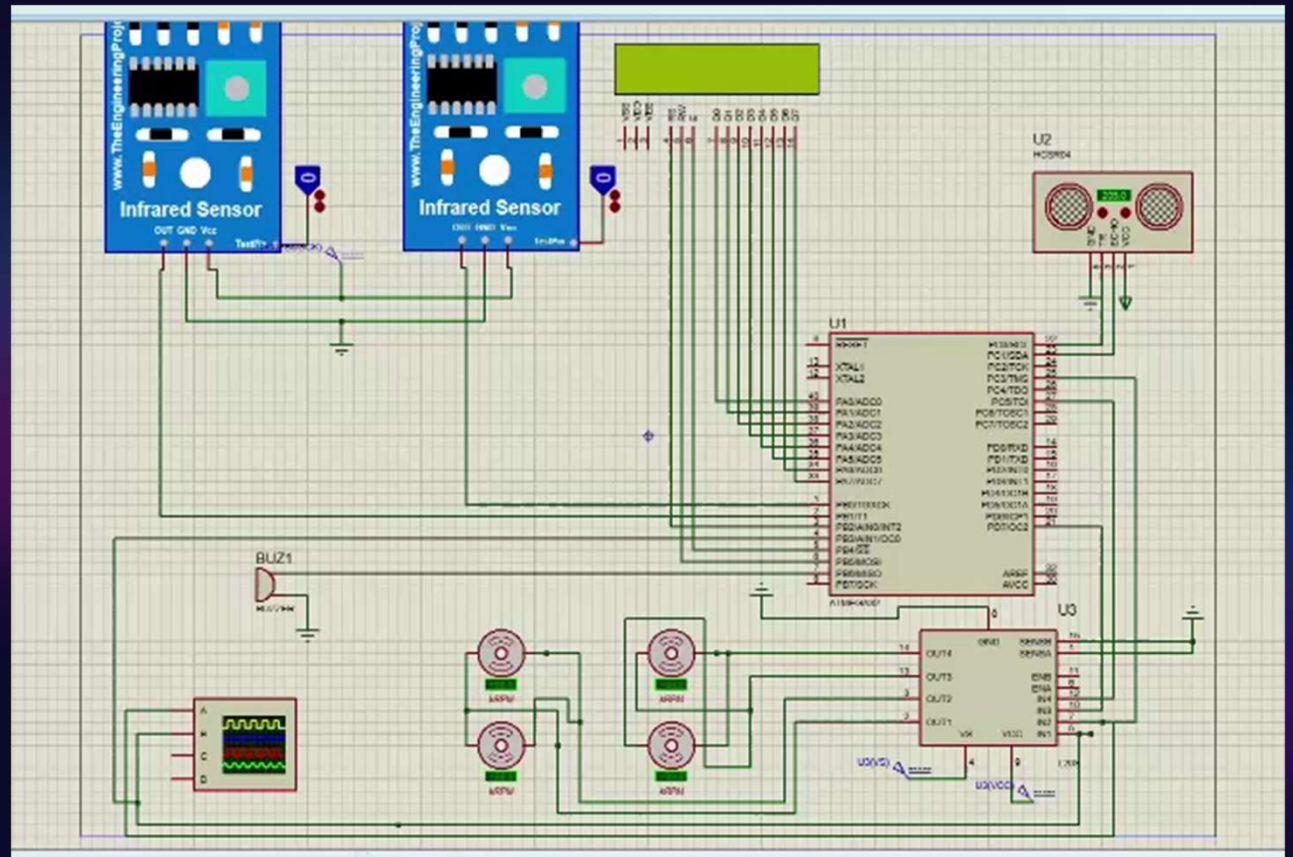




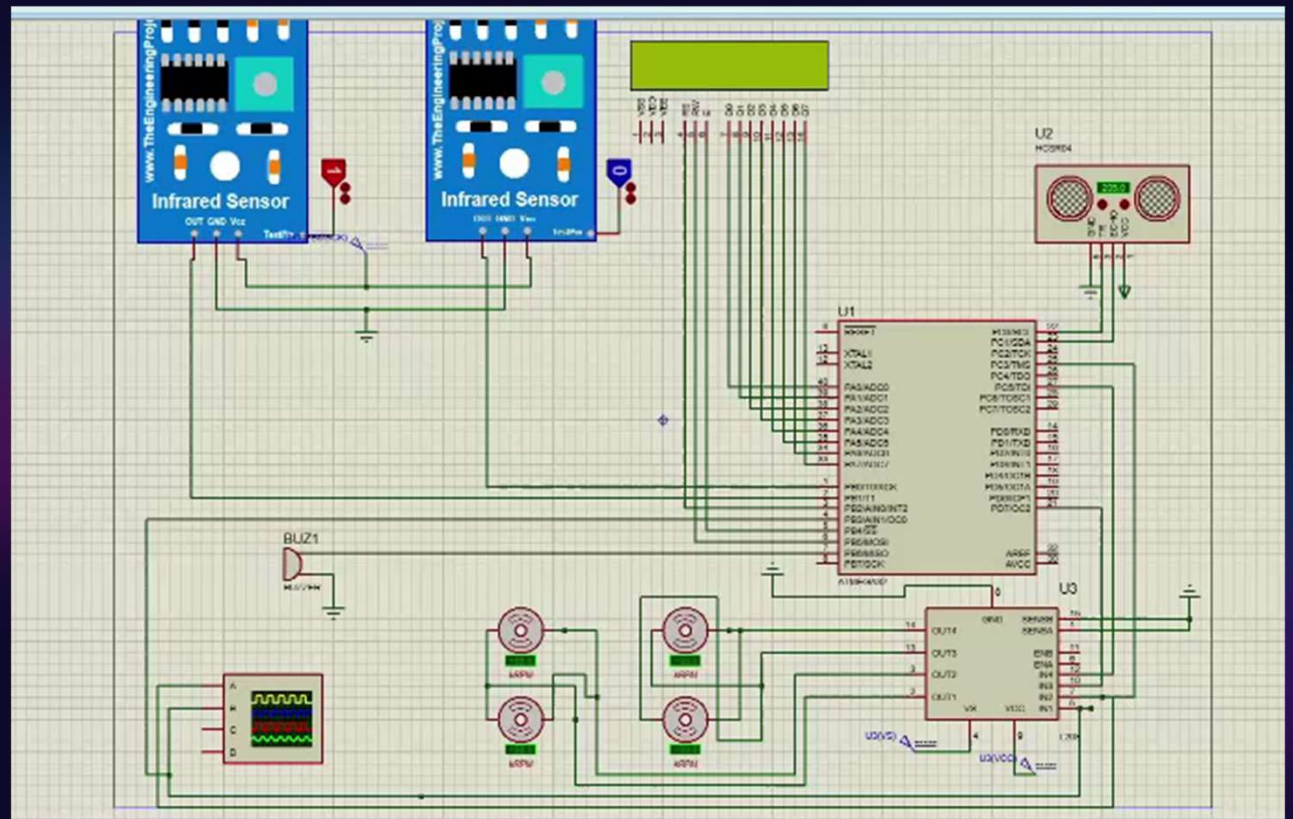
SIMULATION



SIMULATION



SIMULATION



Conclusion

The ADAS project integrates cutting-edge technologies to enhance driving safety and assist the driver in maintaining control of the vehicle. By combining distance measurement, lane detection, and automated responses, the system aims to significantly reduce the risk of accidents and improve overall driving experience.



Thank You

- Thank you for your attention.

