F&D

AUTONOMOUS DRIVING

WHAT IS F&D

The F&D Autonomous Driving System is a virtual autonomous driving platform that simulates a vehicle capable of navigating complex scenarios without human intervention.

Our most important design element is energy efficiency. Unlike traditional navigation systems, our system considers energy consumption during decision-making. Trajectories are generated to minimize unnecessary acceleration, braking, and sharp steering maneuvers, resulting in smoother and more efficient driving behavior.

ARCHITACTURE

Our system follows a layered and modular architecture based on the classic sense–plan–act logic. This structure allows each subsystem to be developed, tested, and improved independently.

At the highest level, the system is composed of three main subsystems: Perception, Planning, and Control.

WHAT F&D WILL TRY TO DO

1. Smart Navigation & Path Planning
   - Energy-Aware Routing: System calculates the most energy-efficient path.
   - Dynamic Re-routing: If a planned route is blocked, it computes an alternative path.
   - Node Validation: The vehicle must visit pre-defined nodes within the simulation environment.

2. Advanced Perception & Vision
   - Real-time Recognition: The vision pipeline must process camera frames to detect lane markings and traffic signs accurately.
   - Meaningful Classification: The system must classify obstacles.
   - Traffic Sign Obedience: The system recognize traffic signs.

3. Precision Driving & Lane Discipline
   - Lane Keeping: The vehicle must be within lane boundaries.
   - High-Frequency Control: The control system must execute steering and throttle commands with a maximum tracking error of only 0.25 meters.
   - Autonomous Parking: Upon reaching a parking zone, the system must execute the maneuvers to park the vehicle within the limits.

4. Safety & Reliability Standards
   - Emergency Braking: In the event of blokage, the vehicle must do emergency stop within a distance of 0.30 meters.
   - Collision Avoidance: The system must achieve a 80% success rate of avoiding collisions.
   - Sensor Accuracy: Distance estimation from camera must maintain an error margin of 20%

TAYLAN KAYALI

CAN SOYSAL

TAHA UGAN

MUSTAFA CEM HÜR

ÇAĞRI ŞANLI

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OUR WEBSITE