23CSE209:PYTHON PROGRAMMING

VISION-BASED LANE DETECTION AND OBSTACLE-AWARE DECISION MAKING IN AUTONOMOUS DRIVING

Zeroth Review Presentation

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PROBLEM DEFINITION

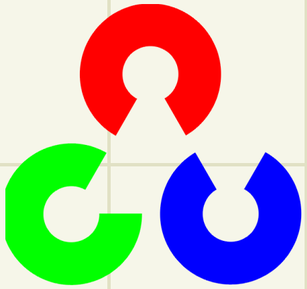
- Safe navigation is critical in autonomous driving.
- Existing depth sensors (LiDAR, depth cameras) provide accuracy but are costly and less viable for small-scale systems.
- Monocular vision lacks depth information, reducing reliability in obstacle detection.
- Stereo vision combined with computer vision offers a cost-effective way to estimate depth and detect obstacles.

METHODOLOGY

INPUT:
FRONT-REAR CAMERA ON

OUTPUT:
DETECTED OBSTACLES AND SAFE PATH LANE

PYTHON PACKAGES:



LANE DETECTION, IMAGE PROCESSING

YOLOv5

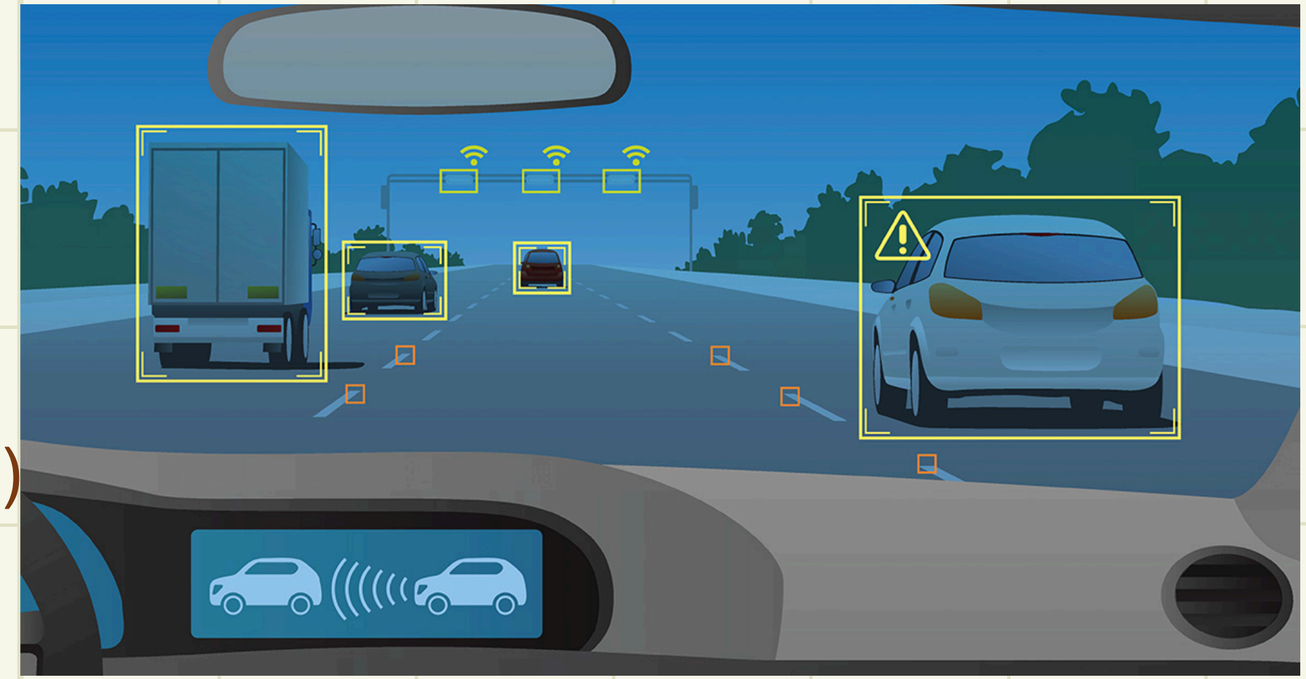
DYNAMIC OBJECT DETECTION

PROCESSING ALGEBRA

VISUALIZATION. TRANSITION PATH

EXPECTED OUTCOME

- Processed video with overlays:
- Lane markings.
- Bounding boxes for vehicles/obstacles.
- Decision text (e.g., “Continue Straight” / “Change Lane Right”)
- Demonstration of basic autonomous driving decision system.



APPLICATION AREAS

- Advanced Driver Assistance Systems (ADAS).
- Autonomous vehicles (lane keeping, collision avoidance).
- Intelligent Traffic Monitoring.
- Robotics navigation in road-like environments.

REFERENCES

- OpenCV Lane Detection Tutorials.
- H. Gajjar, “A comprehensive study on lane detecting autonomous car using computer vision,” Expert Systems with Applications, vol. 230, 2023

THANK YOU