

Vehicle Cut-in Detection Using IDD

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PS-8 Session



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Agenda

- Pre-requisites
- Problem statement
- Current solutions
- Research focus
- Success Criteria



Pre-requisites

- This problem statement requires competence in the below
 - Concepts in machine learning
 - Programming skills (Python)
 - Deep learning – train/validate/test with data

Problem Statement

- Current State-Of-The-Art (SOTA) solutions for automotive collision avoidance work by:
 - Vehicle detection
 - Distance estimation
 - Time-to-collision(TTC) calculation (using vehicle speed data from GPS or Engine)
- They then warn the driver or apply the brakes (if supported) when the TTC drops below a predefined threshold
- This method has one limitation:
 - The vehicle needs to be in front of the driver to be detected
 - Vehicles that abruptly cut into the driver's path typically are not considered for collision avoidance

Gaps

- In Indian driving conditions, vehicles cut into the driver's path
 - May or may not signal their "lane" change
- Lanes may or may not exist
- Vehicle may only partially appear in front of the driver
 - Sufficient for a collision, insufficient for actual vehicle detection

Research Focus

- Perform the below using the IDD dataset
 - <http://idd.insaan.iiit.ac.in/>
 - Use any extra data from other sources to augment training ML models
- Detect and tag objects as soon as they appear partially or fully in front of the driver
- Estimate distance and TTC
- Provide a warning when the TTC is below a predefined threshold
 - Recommended 0.5-0.7 secs

Success Criteria

- A working ML model for detecting cut-in
- 99%+ true positives for cut-in detection
- Create a 3-page report on the technical approach, issues faced and results

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