



Abstract

This study investigates the driving behaviour on freeways (i.e. accelerations and lane changes). The drivers are asked to drive on a road stretch (where their driving is video recorded) and to comment on the motivation for their actions eventually. This way, also occasions where the drivers decide not to make an action are studied. Four distinct types of strategies were found: speed leading, speed leading with overtaking, lane leading, and traffic leading. Moreover, the process, speeds and distances for mandatory lane changes, i.e. onto the motorway from the merging lane, from the left to the right upstream of the exit, and from the right lane to the merging lane when exiting are found. The strategies found in this study can be implemented in traffic simulation programs, possibly changing the traffic flow patterns.

Test drives

- Recording of drive on video
- Speed in view
- 10 participants
- Interview and discussion on driving directly afterwards, based on video

Route

- Short warm up in urban environment
- Approximately 2 times 5.5 km on freeway
- Route instructions by navigation system
- Fuel station between on-ramp and off-ramp

Introduction

- Microscopic traffic models are used to predict traffic measures
- Current models:
 - 1) desired speed setting parameter
 - 2) lane change model
- Interaction between speed and lane changing
- Possible different flow patterns

Strategies

1) Speed leading

- Settle for a speed and keep it
- Change to left if slower driver ahead
- Change to right if lane is empty

2) Speed leading with overtaking

- Settle for a speed and keep it while at the right
- Change to left if slower driver ahead
- When overtaking, increase speed
- Reduce speed to original speed

3) Lane leading

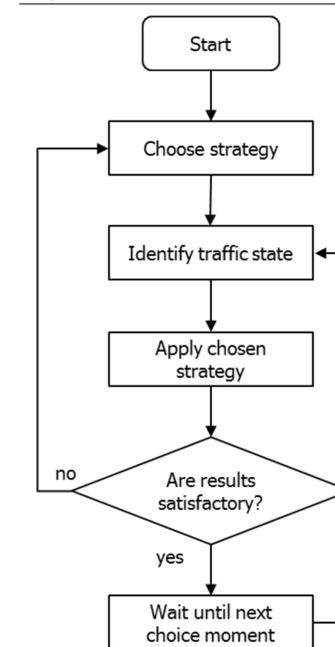
- Settle for a lane
- Adapt speed to the vehicles in that lane
- Speeds will be higher than in the lane right of the chosen lane

4) Traffic leading

- No desired lane or speed
- Hidden ideas on relative speed, e.g. joining the faster ones or the slower ones
- Remarkably, relative faster drivers may drive (absolutely) faster in busier conditions, since there is a higher probability of finding someone with a high desired speed

Findings

Driver ID	Speed leading	Speed leading with overtaking	Lane leading	Traffic leading
1	•	•		
2	•			
3		•		
4	•		•	•
5	•			•
6			•	
7		•		
8	•			
9	•			
10			•	



Other findings

- 1) Speed of merging differs per driver and per location
- 2) Length of use of the merging lane differs (too few drivers for proper statistical testing)
- 3) Drivers are in the right lane on average 1000m (range 300-3000m) before the 300m merging lane starts
- 4) Peak hour lane (hard shoulder running) not understood by many participants

Conclusion

- Four distinct driving strategy on freeways implementable in microscopic simulation models found
- Most of existing traffic simulation models consider only speed leading
- On-going research: more test-drive participants, radar-equipped car for measuring surrounding traffic
- The derived data can be applied to discover driver distribution over various strategies and calibrate the corresponding behaviour model