

A multi-agent traffic simulation model to predict the impact of automated driving systems on safety

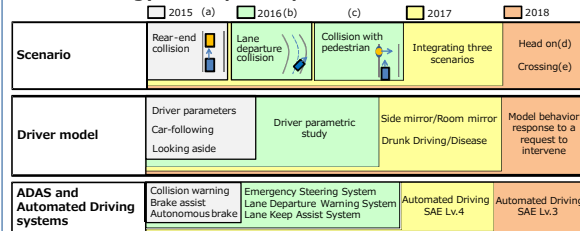
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Project aim

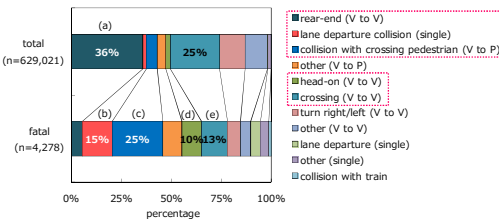
Automated driving systems are being developed, promoted and implemented. These systems are expected to contribute to achieve the Japanese government target to become the safest automobile transportation society in the World. The aim of this project is to develop a multi-agent traffic simulation methodology applicable to predict the potential safety improvements of different automated driving systems.

Development of a multi-agent traffic simulation methodology

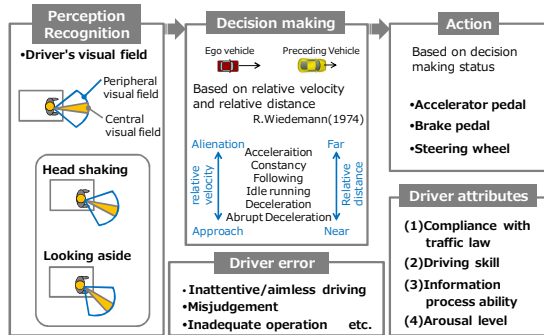
Methodology development plan



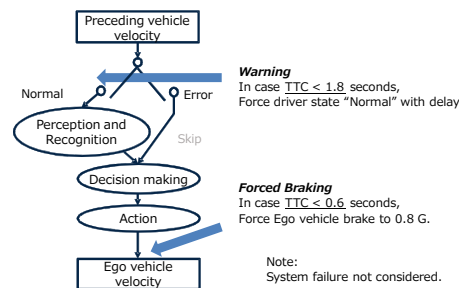
Targeted accident types (Japan, 2013)



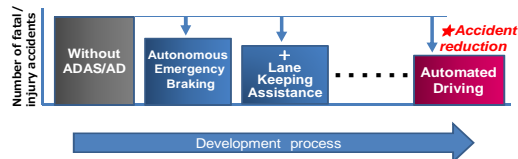
Diver model



Decision making simulation logic



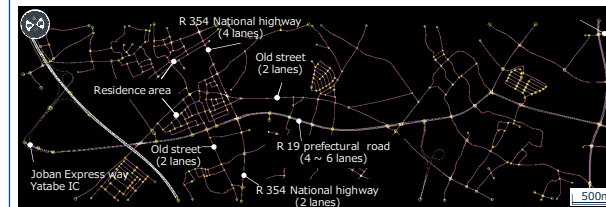
Safety impact assessment



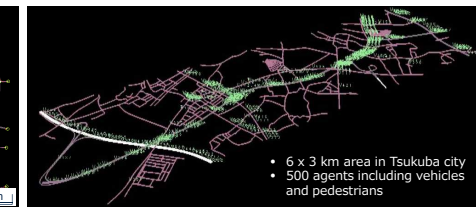
Simulation to predict the impact of automated driving systems on safety

Simulation setup

Road network and static infrastructure



Multi-agent dynamic traffic flow

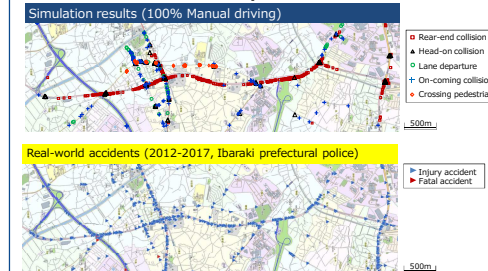


Technology penetration scenarios

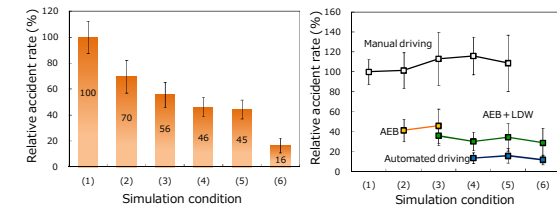
Simulation Scenarios	(1)	(2)	(3)	(4)	(5)	(6)
Manual driving	100 %	50 %	25 %	25 %	25 %	
Autonomous Emergency Braking		50 %	25 %			
Lane Keep Assist System			50 %	50 %	25 %	25 %
Automated Driving				25 %	50 %	75 %

Simulation results

Accident occurrence spots



Relative accident rates



The results should be treated considering the assumptions adopted in the calculations

Novel multi-agent traffic simulation software developed and applied to a 6 x 3 km area in Tsukuba city. Over a simulated period of time including more than 500 agents (vehicles, drivers and pedestrian), the software can simulate and identify at least five types of accidents.

Different automated driving technology penetration scenarios can be set to estimate the potential impact of different technologies on safety.