

Traffic Control with Inter-vehicle Traffic Signals and Road Signs

Partner: National Institute for Land and Infrastructure Management

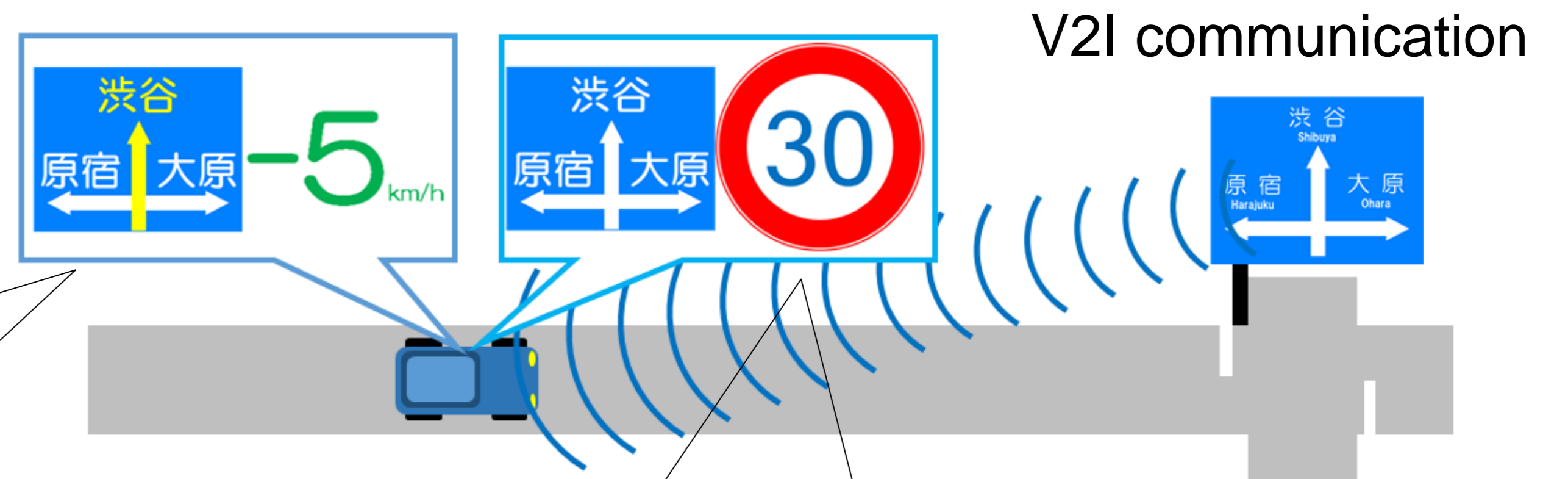
Purpose

In-vehicle traffic signs (VTS) were commercialized as a solution to prevent drivers from missing road signs during driving. This study investigates effects of the VTS on the driving performances.

In-vehicle traffic signs

Speed Sensitive Type VTS

Display the road sign considering the travelling speed and registered destination.

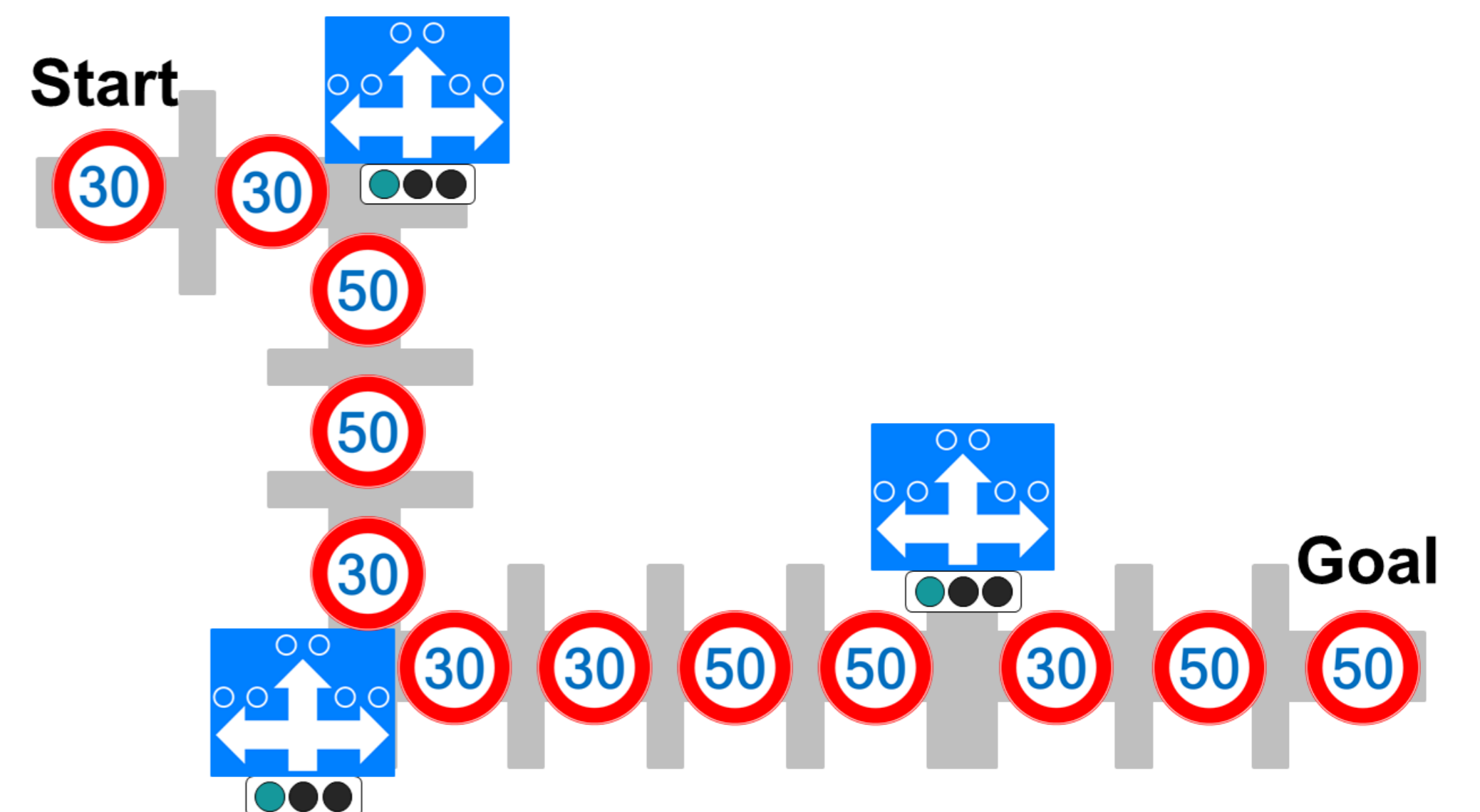
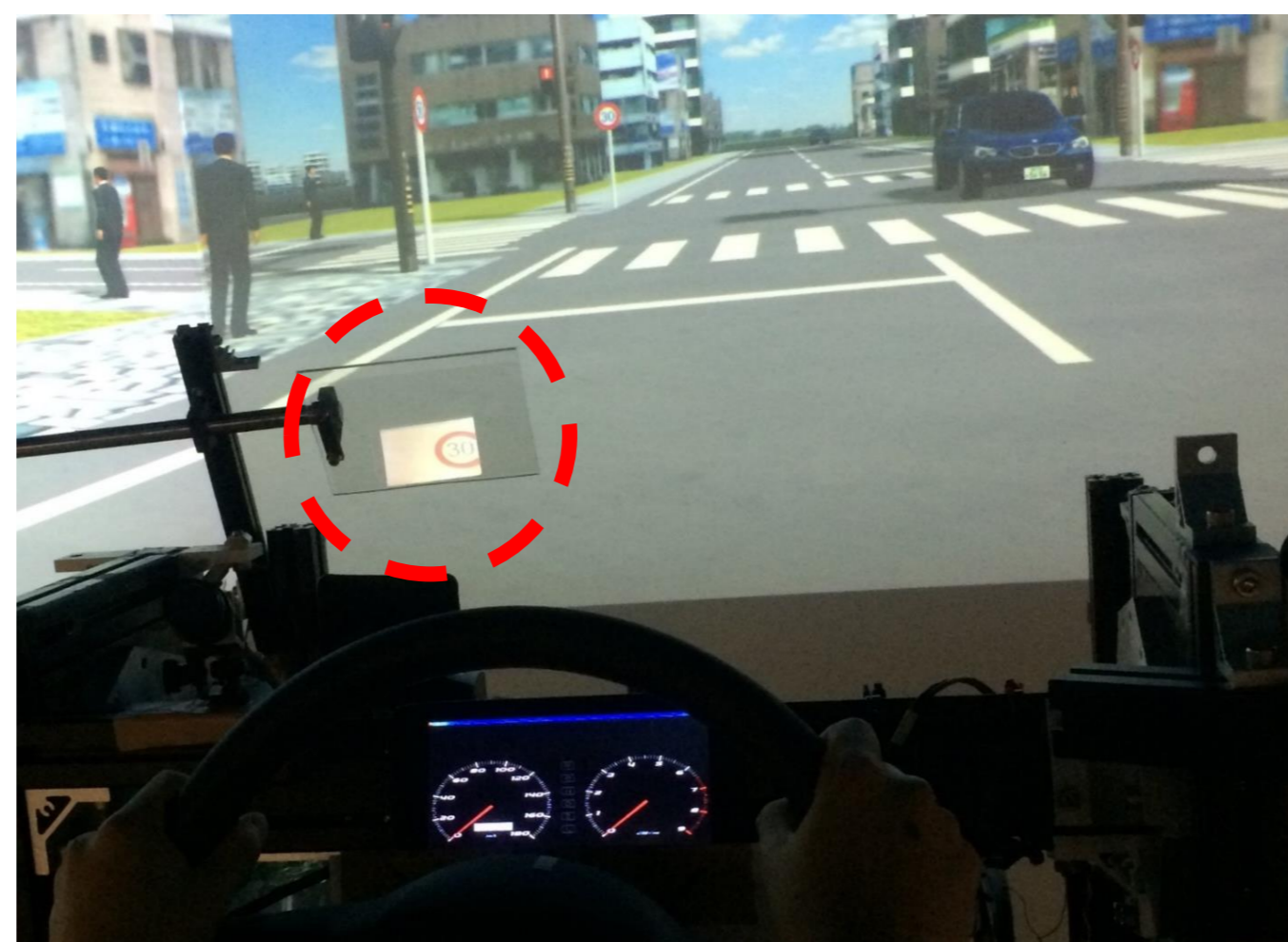


Regular Type VTS

➤ Display the road sign as it is.

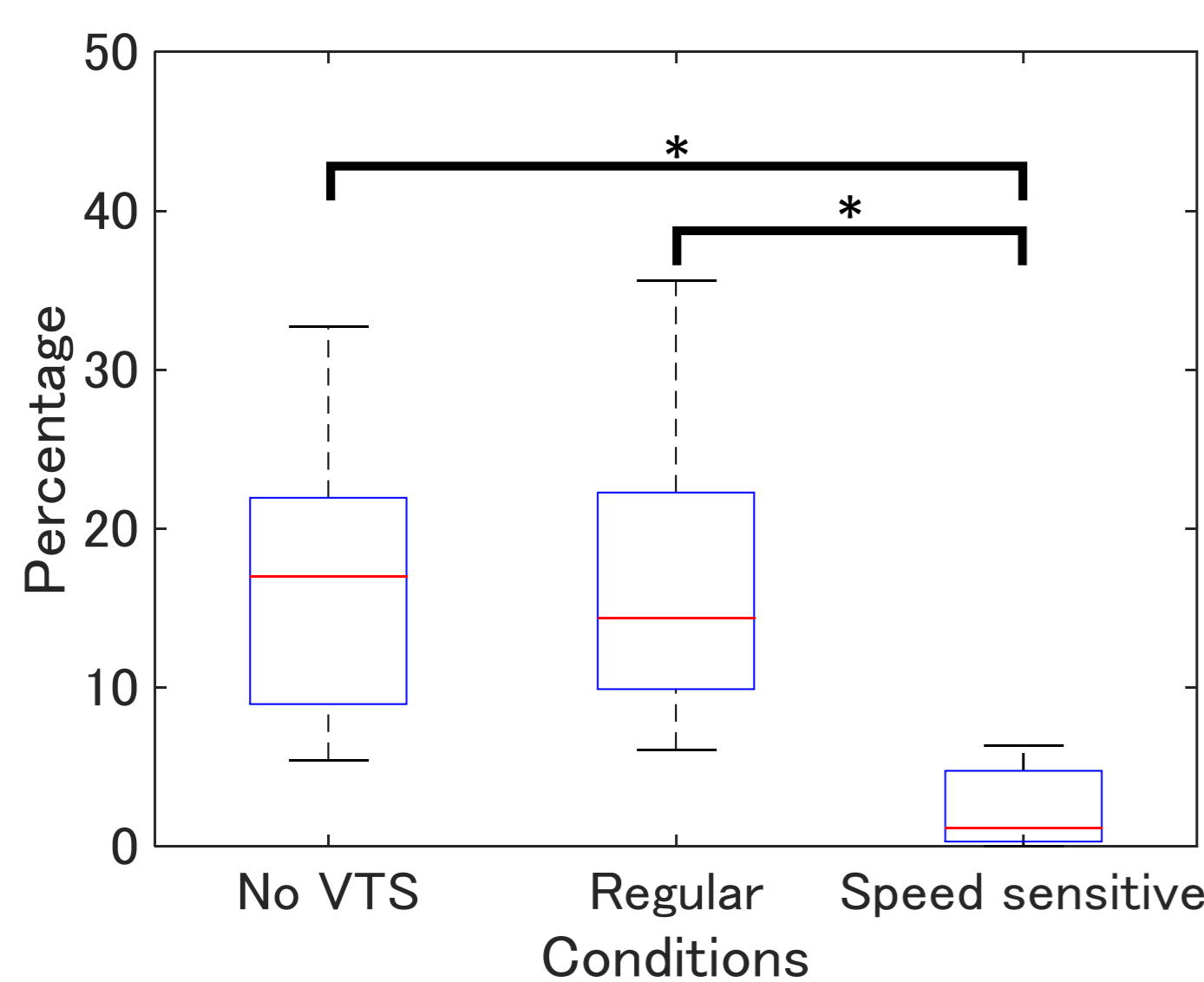
Experimental conditions

- Driving task
Destination: Shibuya
Drive according to the road signs
- Experimental environment
Driving simulator (DS)
Head up display (HUD) to present the in-vehicle road signs
- Subjects: 11



Results

Percentages of time to gaze at the speedometer during driving were compared among the three conditions: without VTS; with regular type VTS; and speed sensitive type VTS. The following figure shows that the speed sensitive type VTS achieves the lowest percentage.



Percentages of time to gaze at speedometer (*:p<0.05, ANOVA).

Index of excess speed, which is a criterion of safety, was defined as the following formula. The excess speed from the speed limit was integrated for the whole driving period, and the value was divided by the integral of the speed limit for the entire driving period. The index was compared among the three conditions: without VTS; with regular type VTS; and speed sensitive type VTS. The following figure shows that the speed sensitive type VTS achieves the lowest value of the index.

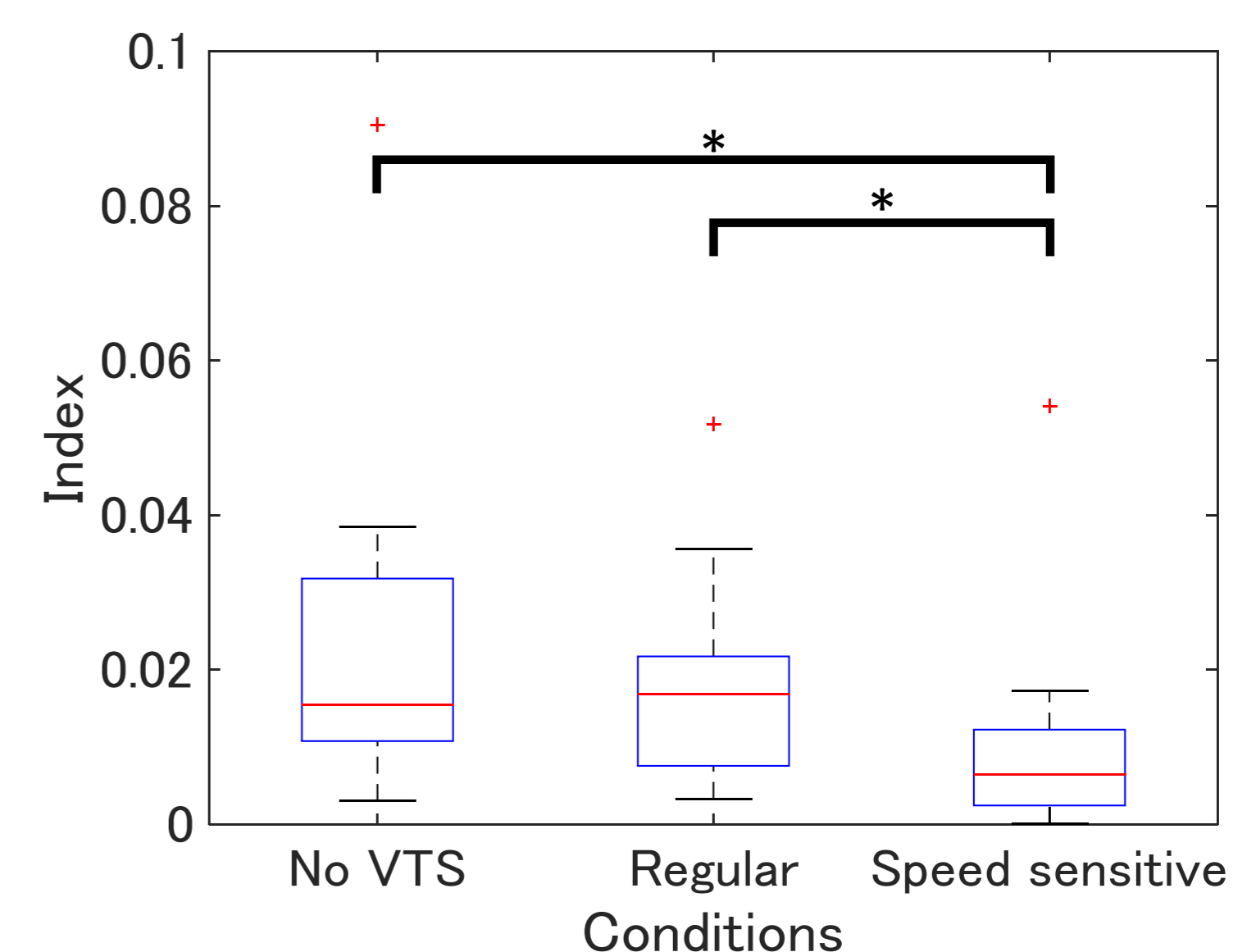
$$I = \frac{\int \{U(e)|e|\} dt}{\int v_{limit} dt},$$

where

$$e = v - v_{limit},$$

$$U(x) = \begin{cases} 1 & (x \geq 0) \\ 0 & (x < 0) \end{cases},$$

and where
 v : speed, v_{limit} : speed limit.



Indexes of excess speed (*:p<0.05, ANOVA).

Publications

Masui T., Shimono K., Zheng R., Nakano K., 2015, Effects of Display Traffic Signs inside the Cabin on the Driving Behavior, The 13rd ITS Symposium, 3-4 Dec, Tokyo Japan.

Nakano K., Masui T., Shimono K., Zheng R., Kaizuka T., 2016, Effect of Displaying Road Signs inside a Car on Driving Behavior, JSAE Annual Congress (Spring) Proceedings, 014, 25-27 May, Yokohama Japan.