

Visual Information Cognition of Signboards Using Driving Simulator- Focusing on Signboard Colors

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Introduction

Visual information carriers such as signs and signboards might be rendered ineffective owing to improper designs or interference with the surrounding objects, especially in urban regions. The objective of this study is to improve the efficiency of visual information carriers by investigating human behavior during cognition of visual information while driving. In this study, we recorded human behavior during signboard cognition in a driving simulation experiment. We focused on the change in the cognition process with a change in visual aspects of signboards, such as shape, color, and value (i.e., brightness).

Methods and Experimental Conditions

This research involved three experiments: an experiment on actually designed signboards (exp.1); an experiment on simplified color signboards (exp.2); and an experiment on grayscale signboards (exp.3). In exp.2 and exp.3, two Landolt rings were displayed on the signboards, wherein the reading behavior of subjects driving a vehicle in a simulated environment was examined.

Several target signboards were tested in each simulation experiment. While driving at constant speed, subjects were asked to press the recording button three times: when they spot something that seems like the target signboard, when they are sure of having spotted the target signboard, and when they are able to read the contents of the signboard. Distances between the signboard and the subject, i.e., observer, in these three cases are referred to as detection distance, confirmation distance, and legible distance, respectively.

Results

Results of the driving simulation in exp.1 showed that signboards with a low value and high chroma tended to be detected and confirmed sooner (fig.1).

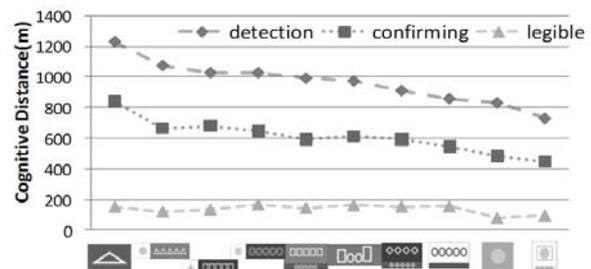


Fig.1: Result of ex.1 The company names and logos written on the signboards in exp.1 are not shown in this graphic for confidentiality reasons but were used in the experiment.

Results of exp.2 showed that both the chroma and the value of the signboard significantly affected the detection and confirmation distances; the signboard value has a greater effect, with an approximately ten times larger coefficient than chroma. Results of exp.3 are shown in fig.2. Two color of the sky were displayed in exp.3: N8 and N6, according to the Munsell color system. We found that the detection and confirmation distances are more strongly related to the differences in the value between signboards and the sky

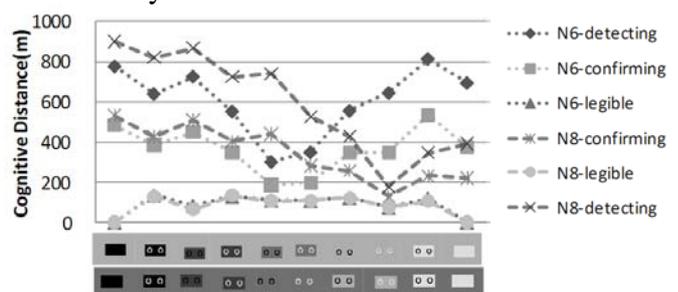


Fig.2 Result of exp.3.

Conclusion

We found that human behavior during signboard cognition was mainly influenced by the relative difference in signboard values. In future studies, we intend to provide more realistic experimental conditions and focus on the relation between this cognition behavior and surrounding conditions, such as heights and colors of buildings in the street.