# 論文 / 著書情報
# Article / Book Information

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（博士課程）

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# 論 文 要 旨

THESIS SUMMARY

| 系・コース：<br>Department of, Graduate major in | Civil and Environmental Engineering 系 コース | 申請学位（専攻分野）：<br>Academic Degree Requested | 博士<br>Doctor of (Engineering) |
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要旨（英文 800 語程度）

Thesis Summary (approx.800 English Words )


This paper is titled "Analyzing Pedestrians' Perception of Security during Actual Walking: The Effects of Built Environment and Spatial Configuration on EEG Pattern.", and consists of six chapters.

Chapter 1, "Introduction," describes the background, purpose, and structure of this paper. The purpose of this paper is to clarify the influence of the urban environment and spatial structure on Japanese pedestrians' sense of security while walking by recording the brain wave patterns of pedestrians while actually walking using a wearable electroencephalograph.

Chapter 2, "Literature Review," reviews existing research on the effects of the urban environment on anxiety about crime, the effects of spatial structure on feelings of security, and subjective feelings of security. Few studies have investigated the influence of urban environment and spatial structure on pedestrian perception during actual walking, and EEG, one of the most accurate and advanced methods for measuring pedestrian perception, is still widely used. It shows the issues of existing research, such as what has not been done yet.

Chapter 3, "Methodology," provides an overview of the selected indicators of the urban environment and spatial structure, an overview of the wearable electroencephalograph used, the streets in front of Aobadai and Tama Plaza Station, which were selected as the research target areas, and an overview of the experimental procedure. After that, we show a data processing method for obtaining brain wave data from a wearable electroencephalograph to be used in alpha wave asymmetry analysis and band-based analysis.

In Chapter 4, "Alpha Asymmetry Analysis," the analysis results for both Aobadai and Tama Plaza study areas show that low-rise housing in urban environments has a significant negative impact on nighttime alpha asymmetry values. It has a significant positive impact on pedestrians' sense of security, and the analysis results for each area show that low-rise housing has a positive impact on pedestrians' sense of security at night in Aobadai and during the day in Tama Plaza. is made clear. In addition, the mediation of spatial structure has a negative effect on the sense of security at night in Aobadai and during the day at Tama Plaza, and the connectivity of roads has a positive effect on the sense of security during the day at Tama Plaza. It shows. Furthermore, he analyzed whether there was a significant difference in alpha asymmetry values between street sections with and without past crimes. This indicates that there is a possibility that it will not affect people's feelings.

In Chapter 5, "Bandwidth Analysis," alpha waves generally have little correlation with indicators of the urban environment and spatial structure, while some beta waves, which are associated with anxiety, have a significant correlation with spatial structure indicators. It is revealed that there is a negative relationship with integration value, a positive relationship with betweenness, a positive relationship with centrality, a negative relationship with connectivity, and a negative relationship with street lighting in the urban environment.

Chapter 6, "Conclusions," summarizes the conclusions of this paper and outlines future challenges.

In summary, this paper uses a wearable electroencephalograph to analyze pedestrians' sense of security during actual walking, mainly based on alpha wave asymmetry values. It has been clarified that it is affected by the intermediary nature of roads, and the connectivity of roads. This paper develops a method to analyze pedestrians' sense of security during actual walking using wearable electroencephalography, and clarifies that the urban environment and spatial configuration influence pedestrians' sense of security during actual walking. The paper achieved results that will contribute to improving the sense of security for pedestrians in the future, and will make a major contribution in engineering.


備考 ： 論文要旨は、和文 2000 字と英文 300 語を 1 部ずつ提出するか、もしくは英文 800 語を 1 部提出してください。

Note : Thesis Summary should be submitted in either a copy of 2000 Japanese Characters and 300 Words (English) or 1copy of 800

Words (English).

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