

A Distortion of Cognitive Space and Setting of Evacuation Route

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This study aims to extract the "distortion" in the urban space by taking out the cognitive space of the city resident as a cognitive map and clarifying the difference between the resident's perception of the town and the real space. The purpose of this study is to propose an evacuation route and evacuation site setting method at the time of disaster based on this distortion. This is to present materials for verifying the evacuation routes and evacuation places currently set based on the physical distance.

Streets that are frequently used daily, streets brightly where people want to travel, and streets with many friends often feel close to each other. Conversely, streets with few acquaintances, lonely streets and dark streets often feel long and distant. This is called the psychological distance in the cognitive space. In this study, we try to clarify the relationship between such distortion of cognitive space, distance, and spatial element, and the knowledge for setting each evacuation route.

In this study, GIS analysis is performed based on data obtained from cognitive map surveys for children, on the stage of development by age. First, we analyze the frequently used streets and roads such as school roads and drawing elements to understand the structure of children's cognitive space. In addition, we focus on the spatial shape and color in the psychological space, and grasp the structure of the cognitive space in the height direction such as road gradient and terrain. Then, by combining these results, the distortion between the child's cognitive space and the real space in the three-dimensional space is grasped.

Then, the current evacuation plan setting status is investigated, and the method of setting evacuation routes and evacuation places is mainly examined for the target area.

The questionnaire survey was conducted in July and August 2019 for children and their parents in the Kansai region. In December, a cognitive map survey was conducted for the elementary schools. The result of analyzing the distortion in everyday life based on the obtained data, the difference between cognitive objects between adults and children and the distortion of planar expressions based on these differences were extracted. We also found the differences of cognitive space by the places of residence. By the experiments, the relationship between road attributes, such as green spaces and pavements, and attributes have been also shown.

Keywords: distortion, cognitive space, GIS, distance, street