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University Students' Cognition of the Campus Town Represented in their Sketch Maps

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Abstract:

A cognitive map is a representative expression of an individual's cognitive map knowledge, where cognitive map knowledge is an individual's knowledge about the spatial and environmental relations of geographic space (Kitchin, 2001). Assessing the correspondence between the real world and sketch maps is a major analysis methods (Tversky, 1981). In addition, Schwering et al. pointed out that sketch maps are incomplete, generalized and schematic.

Our target area is around Noda Campus, Tokyo University of Science, Japan, where infrastructure such as a canal, railways and major streets could be elements of reference (Figure 1). In such an area, incompleteness, generalization and schematization could be observed more clearly. The purpose of this study is to capture the characteristics of the spatial cognition of university students' familiar area by examining the distortion of the scale of sketch maps.

Twenty-six university students were asked to draw a sketch map of the area around the campus and the nearest railway station (Table 1). The elements drawn on the sketch maps were mapped on an accurate map on GIS. Then the drawing ratio of each element was calculated after the elements drawn by the students were overlayed. In addition, we distinguish roads within <districts> from roads on <paths> by creating buffers around the roads drawn by each student (Figure 3). Here, <district> is an area where a dense network of roads is drawn spread over, and <path> is a road which is drawn solely. We then calculated length scaling ratio of each road based on the length of the road in front of the railway station that was drawn by all the students.

Dates	August 14-23, 2024		
Attributes of students	**Gender**	**Age**	**Background**
	male: 18, female: 8	teen: 4 , twenties: 22	architecture: 22, information science: 2, physics: 2
Paper size	A3 (297mm x 420mm) (When the paper width is not enough, another A3 paper can be added.)		
Time for drawing	20 minutes		

Table 1. Overview of the survey

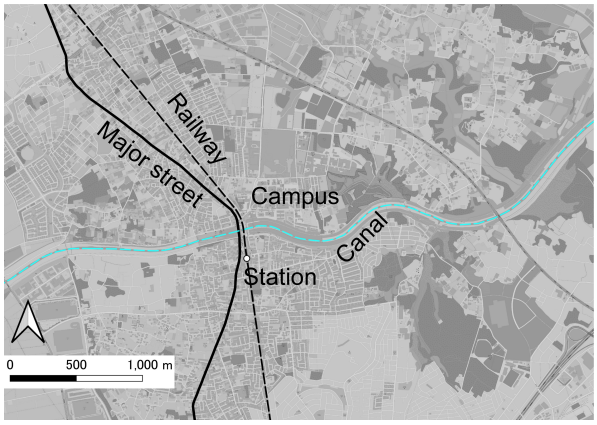
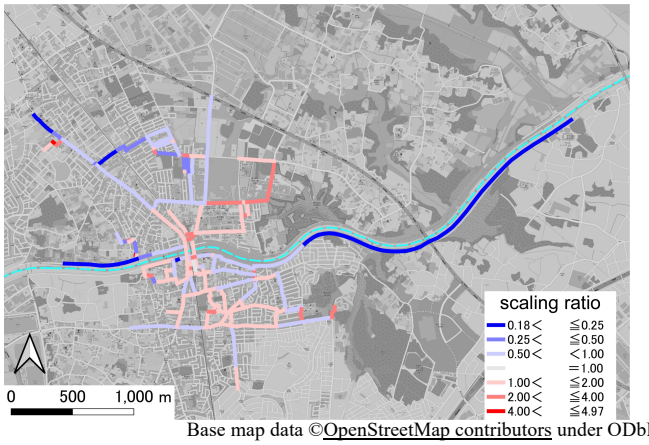


Figure 1. Target area



Base map data ©OpenStreetMap contributors under ODbL

Figure 2. Scaling ratio of road length

Our major findings are as follows:

1) The roads drawn by students can be divided into roads within <districts> and roads on <paths>. The length of the roads within <districts> tended to be expanding, while some roads on <paths> such as roads along the canal and the major street tended to be reducing (Figure 2). There was a significant difference between the length scaling ratio of roads within <districts> and that of roads on <paths>.

2) The students tended to draw not only stores and restaurants, but also houses along the roads within <districts>, while they tended to draw only stores and restaurants along the roads on <paths>. Since the students might stop by stores and restaurants, but don't stop by houses, it suggests that the buildings along the roads within <districts> are recalled as a part of townscape, while the buildings along the roads on <paths> are recalled with their uses. This also indicates that the level of generalization differs between <district> and <path>.

3) The order of the buildings drawn along the roads on <paths> was correct, even when the distance between buildings was not accurate (Figure 4). It suggests that building uses are stored in relative order. This indicates that a schematization of order along roads occurred.

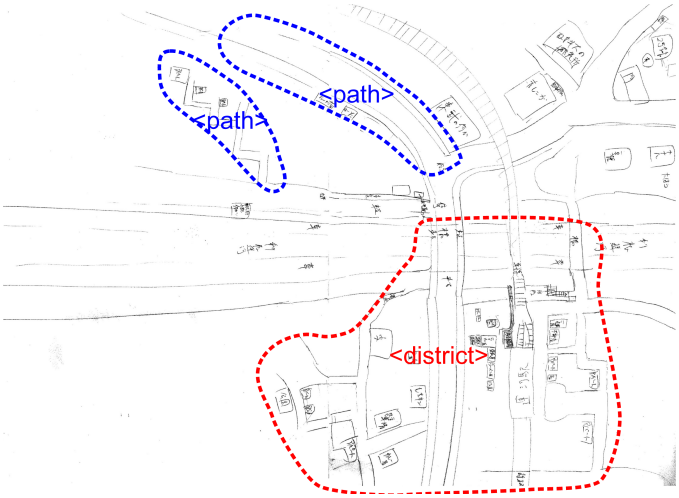


Figure 3. Distinguishing roads within <districts> from roads on <paths>

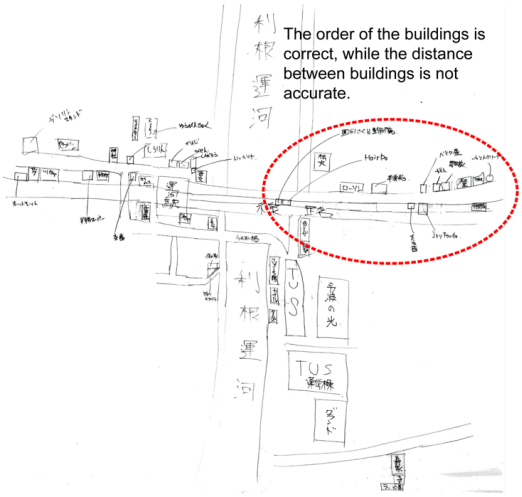


Figure 4. The order of the buildings and the distance between buildings

Acknowledgements

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