Landmark-Aware Map Deformation Using Graph Drawing Techniques

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Abstract. Recently, we can enjoy easy access to various kinds of web mapping services such as Google Maps, which provide us with automatically created maps with accurate geographic information. On the other hand, hand-drawn maps have been still popular because they allows us to naturally focus our attention to specific areas of interest in the map by properly distorting their geographic information. In this paper, we present a method of emphasizing geographical feature areas through the geographical deformation while respecting their spatial relations in the original map. For this purpose, we employ graph drawing techniques, which effectively provide aesthetic spatial layouts of nodes by taking into account their mutual connectivity. In the proposed method, representative geographical features and their mutual relations are associated with nodes and edges in the graph representation, respectively, so that we can arrange them on the 2D screen space in a visually plausible manner using the conventional force-directed algorithm. The feasibility of the present approach is demonstrated by applying the algorithm to an example geographical map, where the distorted map successfully puts more emphasis on a specific set of feature areas.

Keywords. map deformation, image distortion, graph drawing, Hatsusaburo Yoshida, Delaunay triangulation