Preserving Urban Cultural Heritage with Deep Learning: Color Planning for Japanese Merchant Towns

Authors : Dongqi Li, Yunjia Huang, Tomo Inoue, Kohei Inoue

Abstract : With urbanization, urban cultural heritage is facing the impact and destruction of modernization and urbanization. Many historical areas are losing their historical information and regional cultural characteristics, so it is necessary to carry out systematic color planning for historical areas in conservation. As an early focus on urban color planning, Japan has a systematic approach to urban color planning. Hence, this paper selects five merchant towns from the category of important traditional building preservation areas in Japan as the subject of this study to explore the color structure and emotion of this type of historic area. First, the image semantic segmentation method identifies the buildings, roads, and landscape environments. Their color data were extracted for color composition and emotion analysis to summarize their common features. Second, the obtained Internet evaluations were extracted by natural language processing for keyword extraction. The correlation analysis of the color structure and keywords provides a valuable reference for conservation decisions for this historic area in the town. This paper also combines the color structure and Internet evaluation results with generative adversarial networks to generate predicted images of color structure improvements and color improvement schemes. The methods and conclusions of this paper can provide new ideas for the digital management of environmental colors in historic districts and provide a valuable reference for the inheritance of local traditional culture.
Keywords : historic districts, color planning, semantic segmentation, natural language processing
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