City-View Image Location Identification by Multiple Geo-Social Media and Graph-Based Image Cluster Refinement

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City-View Image Location Identification by Multiple Geo-Social Media and Graph-Based Image Cluster Refinement☆

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Abstract

"What is this" and "where am I" are two common questions that arise when people travel abroad. Recently, landmark image identification has shown great promise for the addressed problems, where most previous approaches are either visual-based or location-based. However, regarding city-view image location identification, there could be a number of buildings in a close proximity. Moreover, it is common that photos were taken indoors. The conditions may degrade the performance of previous approaches. To remedy the deficiencies, this paper unifies visual features, geo-tags, and check-in data, based on cross-domain social media, for city-view image location identification. Besides, this paper shows an effective and memory-efficient implementation based on sparse coding, where a new dictionary selection approach is presented. Further, this paper proposes a location-aware graph-based regrouping approach, leveraging spanning graph construction, on clusters of photos to refine clustering results. Experimental results show the improvement over the baselines (location-based, visual-based, etc.)

Keywords: Check-in Data, Geo-tagged Image, Image Location Identification, Social Media, Sparse Coding

1. Introduction

Generally, "what is this" and "where am I," are two of the most common questions that arise when people travel abroad. Sometimes it is hard to find the answers, especially when there is a language barrier. Recently, the fast growth of mobile devices and their inherent sensors, such as GPS and cameras, has been attracting millions of users and motivating the development of mobile-related services. Among the services, landmark image identification offers a promising solution for the addressed problems. Given a photo, landmark image identification typically matches the photo with photos of landmarks using features and/or tags of these photos. Afterwards, the text- and geo-tags of the photo of landmark that is the most similar to the given photo

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