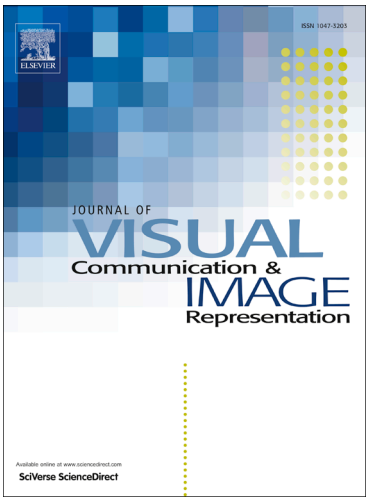

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Semi-supervised Learning on Large-scale Geotagged Photos for Situation Recognition

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Abstract

Photos are becoming spontaneous, objective, and universal sources of information. This paper explores evolving situation recognition using photo streams coming from disparate sources combined with the advances of deep learning. Using visual concepts in photos together with space and time information, we formulate the situation detection into a semi-supervised learning framework and propose new graph-based models to solve the problem. To extend the method for unknown situations, we introduce a soft label method that enables the traditional semi-supervised learning framework to accurately predict predefined labels as well as effectively form new clusters. To overcome the noisy data which degrades graph quality, leading to poor recognition results, we take advantage of two kinds of noise-robust norms which can eliminate the adverse effects of outliers in visual concepts and improve the accuracy of situation recognition. Finally, we demonstrate the idea and the effectiveness of the proposed models on Yahoo Flickr Creative Commons 100 Million.

Keywords: evolving situations, semi-supervised learning, new label discovery, ℓ_1-norm, capped norm, outlier elimination

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