

# Context Coherency for Object Categorization

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## Abstract

The paper proposes a formulation of context coherency and uses it to generate semantically meaningful groupings by discovering salient image regions and their contexts. The proposed framework consists of four stages. First, a visual vocabulary from a set of labelled training images is learnt. Second, a context space which is inspired by Hyperspace Analogue to Language model is constructed using the visual vocabulary. This space captures the context of each word of the vocabulary by gathering spatial co-occurrence statistics. Third, using the context space, a learning scheme based on Kendall's Coefficient of Concordance (KCC), and multiple partitions of the training set is applied to jointly discover the visual words that satisfy the **Contextual Coherency Constraint** and their contexts. The discovered visual words and their contexts describe a semantic grouping. Fourth, word frequency histogram of each image is weighted by the discovered semantic groupings to generate a weighted frequency histogram for each image called 'Contexture'. Finally, images are classified by using a voting based scheme, which use contextures of images for similarity computation. Qualitative and quantitative experimental analysis is performed on publicly available benchmark data sets. We obtained competitive performance with respect to current approaches. In addition, we also tested the performance of our framework on a more challenging Large Scale Concept Ontology for Multimedia (LSCOM) data set which contains 128 high level concepts.

*Key words:* Context, Image Classification

*PACS:*

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