

## **IAM@ImageCLEFPhotoAnnotation 2009: Naïve application of a linear-algebraic semantic space**

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This paper describes Southampton's submissions to the 2009 ImageCLEF photo annotation task. The task set the challenge of automatically annotating 13000 images with 53 annotation concepts. The allowable training data was limited to a set of 5000 images pre-labelled with the concepts. Southampton's submissions to the task used a previously developed annotation system, with a combination of visual term features created from local descriptors of salient interest regions.

For the task we used an annotation system based on the idea of constructing semantic spaces, which was developed previously at Southampton. Semantic spaces are vector spaces into which both visual features and annotation terms and images themselves can be placed. The space is structured such that images are placed near the visual features within them, but also near to any annotations that describe the image's content. Un-annotated images can be projected into the space on the basis of their features, and annotations assigned based on the geometric closeness in the space.

To represent the image content, we used a combination of different SIFT and Colour-SIFT features detected using the difference-of-Gaussian and MSER techniques. These features were converted into a visual term representation by applying vector quantisation using a codebook learnt from a hierarchical K-means clustering.

In terms of EER and AUC, the annotator performs reasonably well. However, it struggles when evaluated using the hierarchical measure proposed for the task, due to the way the annotation confidences are thresholded.