Problem
• Assigning relevant tags to query images based on their visual content

Challenges
• Finding the most relevant tags among many possible ones.
• There are tags that do not occur frequently in the dataset.
• Images that share many tags may conceptually be very different.

Drawbacks of Existing Methods
• Addition of images and tags requires retraining the models.
• ad-hoc feature fusion approaches are usually taken.

Our Contributions
• A query-specific model (no global training!)
• A natural solution to feature fusion
• Handling dataset imbalance through weighted NMF formulation
• O(n) test-time complexity
• Straightforward extension for sub-linear test-time complexity

Experimental Results
• Datasets: Corel5K and ESP Game
• Evaluation metrics: Precision, Recall and N+

Qualitative Results
Predicted tags in green appear in the ground truth while red ones do not.

Effect of Weight Matrices (W and T)

Recovering Tags of Query (Testing)
1. Project query’s feature vectors on corresponding basis matrices U
2. Approximate V(Query) of query by averaging over F different V(Tag)
3. Predict score of different tags by computing U(Query) × (V(Query)) T
4. Select relevant tags with the highest scores

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NMF-KNN: Image Annotation using Weighted Multi-view Non-negative Matrix Factorization
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