1. Large-Scale Localization

- Main challenges for large-scale localization:
  - Memory consumption
  - Global ambiguities in appearance

- Contributions:
  - Scalability by model compression
  - State-of-the-art performance in spite of quantization
  - Enforcing local uniqueness significantly boosts performance
  - Demonstrate benefits of known 3D / visibility structure
  - Analysis of failure cases caused by quantization

2. Localization with Hyperpoints

- Motivation: Approximate full (SIFT) descriptors by fine vocabulary (16M words [7])

- Enforce local instead of global uniqueness → Features match to hyperpoints

- Disambiguation using image retrieval: Select co-visible matches & estimate pose

3. Exploiting Known Visibility Relations

- Recover votes lost to quantization

- Match expansion: Better handle view quantization

4. Pose Estimation & Re-ranking

- Discard bad poses: Exploit limited viewpoint invariance

- Effective inlier count [5]: Penalize inlier distribution

5. Experimental Evaluation

- San Francisco [4]
  - 1.06M database images, 803 query images
  - SF-0 3D model [6]: 30M points, 149M descriptors, 611k images
  - Building IDs as ground truth, location recognition task
  - Evaluate recall @ 95% precision

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- Evaluate recall @ 95% precision

References


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**http://www.cvg.ethz.ch/research/large-scale-localization**

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