Matching Features Correctly through Semantic Understanding

Motivation

Image-to-image feature matching has quadratic complexity and is slow.

We use semantic segmentation as additional information to:

- match only reliable features and only
- within small subsets, preserving the quality on the same level.

Method

Our semantic descriptor on top of SURF features [1] for every point is designed to be discriminative and robust to noise.

Predicting which features are matchable

- Much time is spent on matching the points that do not have a correct match (e.g., are on the sky or a moving object).
- We predict the ones that are not likely to match correctly and leave them out before matching.

Matching semantically close features

- For every pair of features, compute the Hamming distance between their binary diagrams and match only the ones with a low distance.

Results

- 2x faster with better precision
- 8x faster with 16% precision loss

Random forest classifier

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