**Motivation**
- Pose graph generation is **slow** in SfM. Especially, in global SfM.
- This is due to the „accept-or-reject“ strategy of two-view estimations.

Many RANSAC iterations are spent on non-matchable image pairs.

**Global Structure-from-Motion Pipeline**

**New components:**
- Image pair revisiting (re-ordering) strategy.
- A*-based pose estimation on *scaled* paths.
- Expected inlier ratio update.

**Image Pair Re-ordering Strategy**
- Traditional “accept-or-reject” strategy.
- Always the most-likely-to-match image pair is selected for RANSAC.
- Only a few iterations in RANSAC, determined by the expected inlier ratio.
- Inlier ratio is prior comes from a deep network.

**Expected Inlier Ratio (Bayesian) Update**
- Given a prior inlier ratio $\mu_0 \in [0, 1]$ for each image. Function $k(\mu_0)$ is the RANSAC iter. number.
- The random number of all-inlier-samples $N_{\text{all}}$ in $k(\mu_t)$ follows a binomial distribution.
- Usual conjugate prior is a beta distribution with params. $a(t)$ and $b(t)$, where

\[
\text{Expectation in t-th iter.: } \mu_t = \left( \frac{a(t)}{a(t) + b(t)} \right)^{1/m} \quad \text{Variance: } \nu_t = \left( \frac{a(t)}{a(t) + b(t)} \right)^2 \left( a(t) + b(t) + 1 \right)
\]

**Real-world Experiments**

**Dataset:** 13 scenes from 1DSfM (614366 pairs).

Run-times projected to a single CPU core.

**Results:**
- 8 times speed-up only with re-ordering.
- 27 times speed-up both with re-ordering and A*.
- Similar number of final inliers and pose-graph edges.

**Conclusion:**
- With the same accuracy,
- we achieve an order-of-magnitude speed-up, by
- a clever image pair re-selection / re-ordering strategy