FAST: Fast Adaptive Silhouette Area based Template Matching

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1) Rectangle Covering

- Approximate silhouette with
  - Maximal accuracy
  - Minimal number of rectangles
- Approach
  - Greedily find next largest rectangular foreground region
- Accuracy is an adjustable parameter

2) Comp. of Joint Probability

- Joint Probability \( P \) =
  \[
  \log \prod_{R \in R} \prod_{x \in R_x} S(x) \\
  = \sum_{R \in R} \sum_{x \in R_x} \log S(x) \\
  = \sum_{R \in R} \left( I_S(u. l. corner) + I_S(l. r. corner) - I_S(l. l. corner) - I_S(u. r. corner) \right)
  \]
  \( S = \) segmentation of query image 
  \( I_S = \) intergral image of \( \log(S) \)

3) Template Hierarchy

- Hierarchical clustering using neural gas
- Distance measure based on common shape area
- Hierarchical matching is as usual
- Choose the child node, that matches best

4) Results

Our approach is \(~15\) times faster than Stenger's approach at a resolution of 1024x1024 pixels

For more results please see the paper