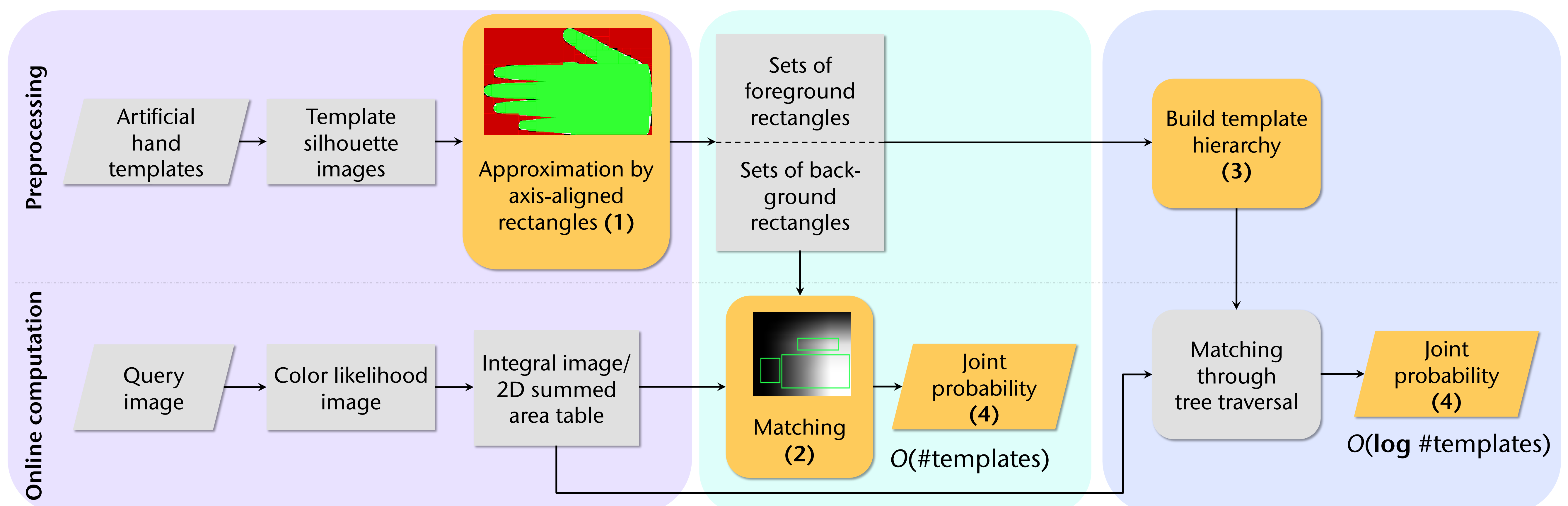


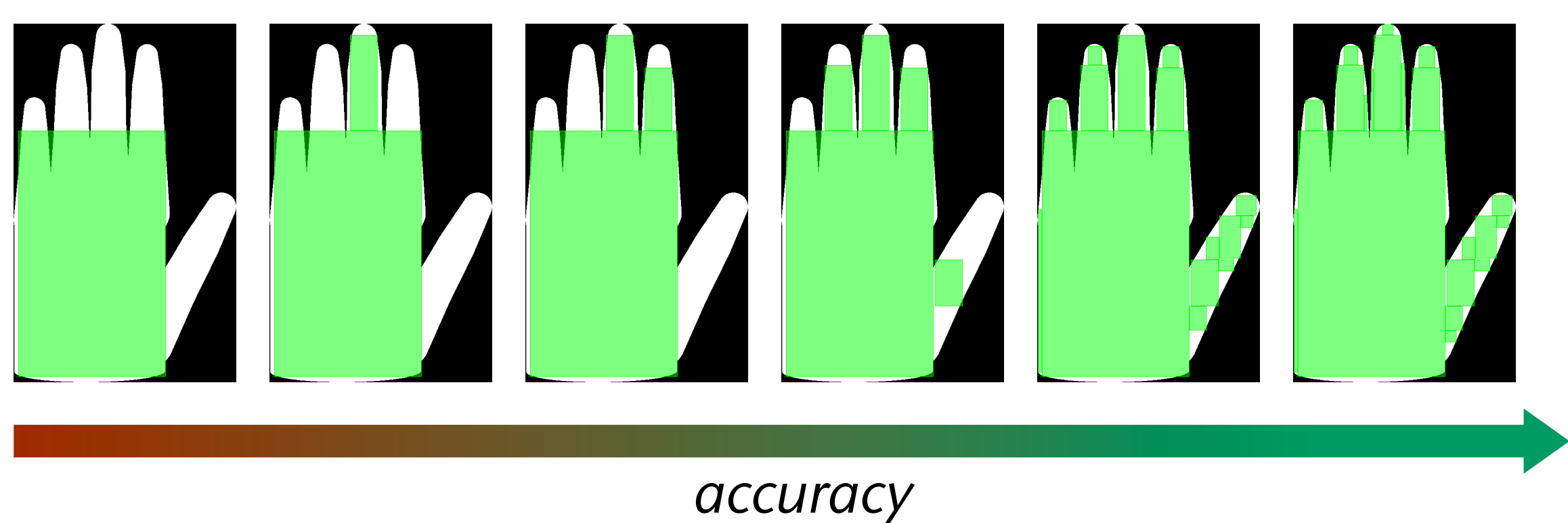
# FAST: Fast Adaptive Silhouette Area based Template Matching

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- Input:**
  - Query image
  - Set of templates
- Task:**
  - Find most similar template in query image
- Features for matching:**
  - Segmentation of query image
  - Silhouette area of templates



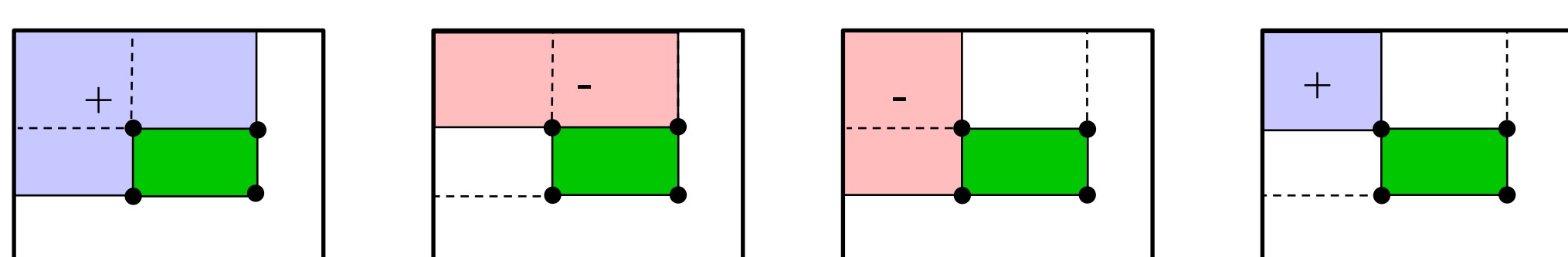
## 1) Rectangle Covering



- 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

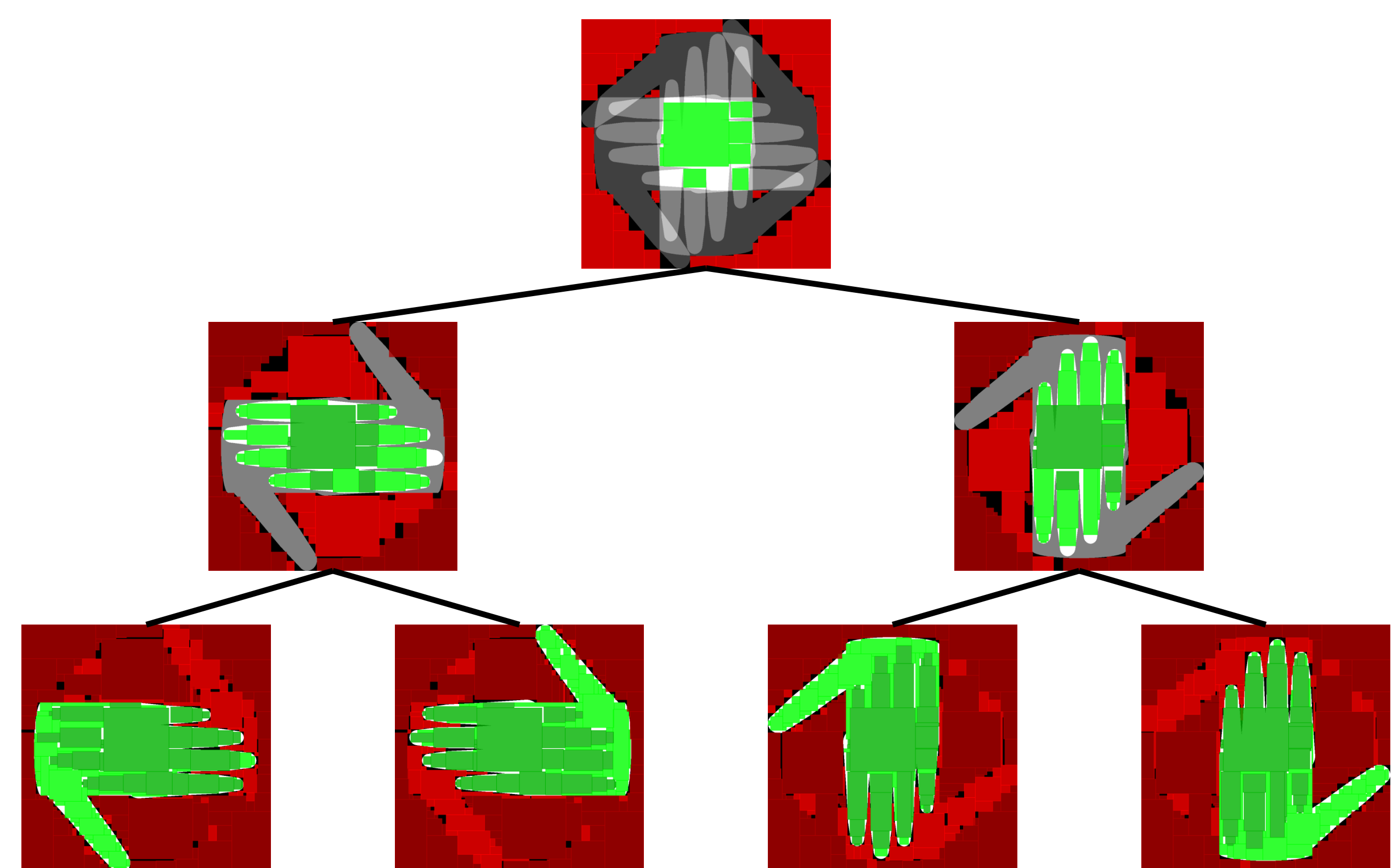


- Joint Probability  $P =$

$$\begin{aligned}
 & \log \prod_{R_i \in \mathcal{R}} \prod_{\mathbf{x} \in R_i} S(\mathbf{x}) \\
 &= \sum_{R_i \in \mathcal{R}} \sum_{\mathbf{x} \in R_i} \log S(\mathbf{x}) \\
 &= \sum_{R_i \in \mathcal{R}} \left( IS(\text{u.l. corner}) + IS(\text{l.r. corner}) - \right. \\
 & \quad \left. IS(\text{l.l. corner}) - IS(\text{u.r. corner}) \right)
 \end{aligned}$$

$S$  = segmentation of query image  
 $IS$  = integral image of  $\log(S)$

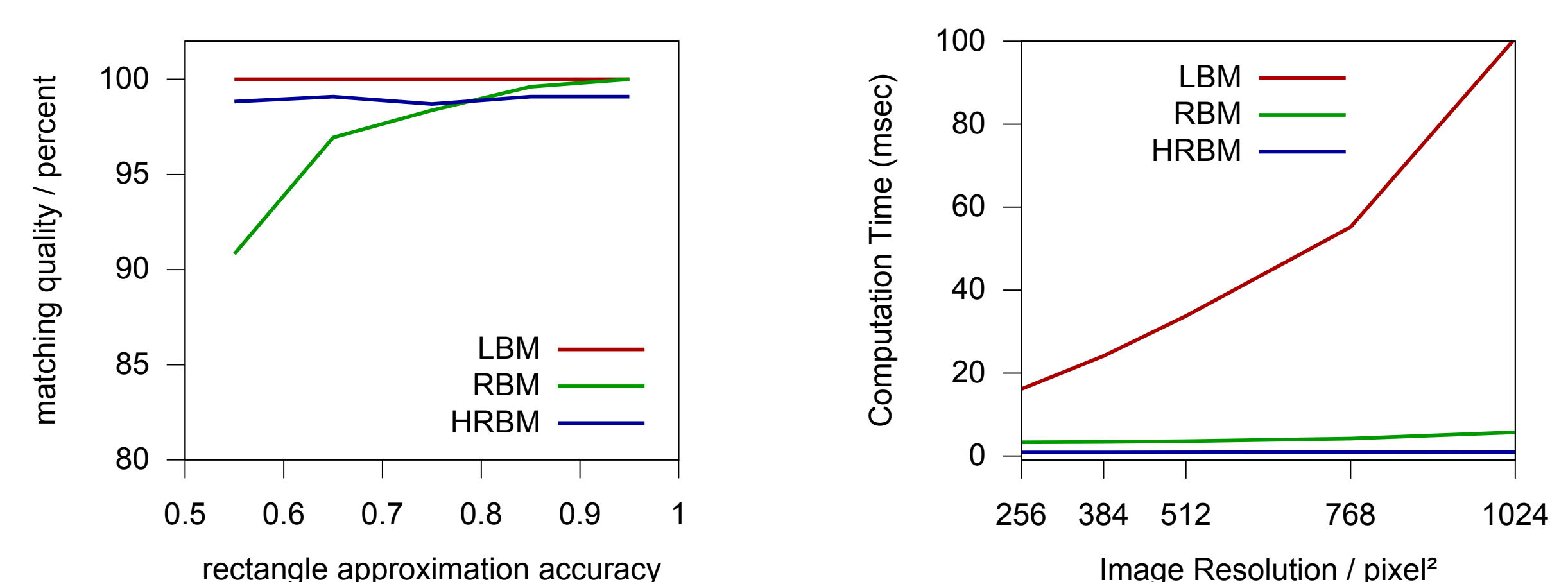
## 3) Template Hierarchy



- 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



LBM = Stenger's approach, RBM = our approach, HRBM = ours with hierarchy

For more results please see the paper