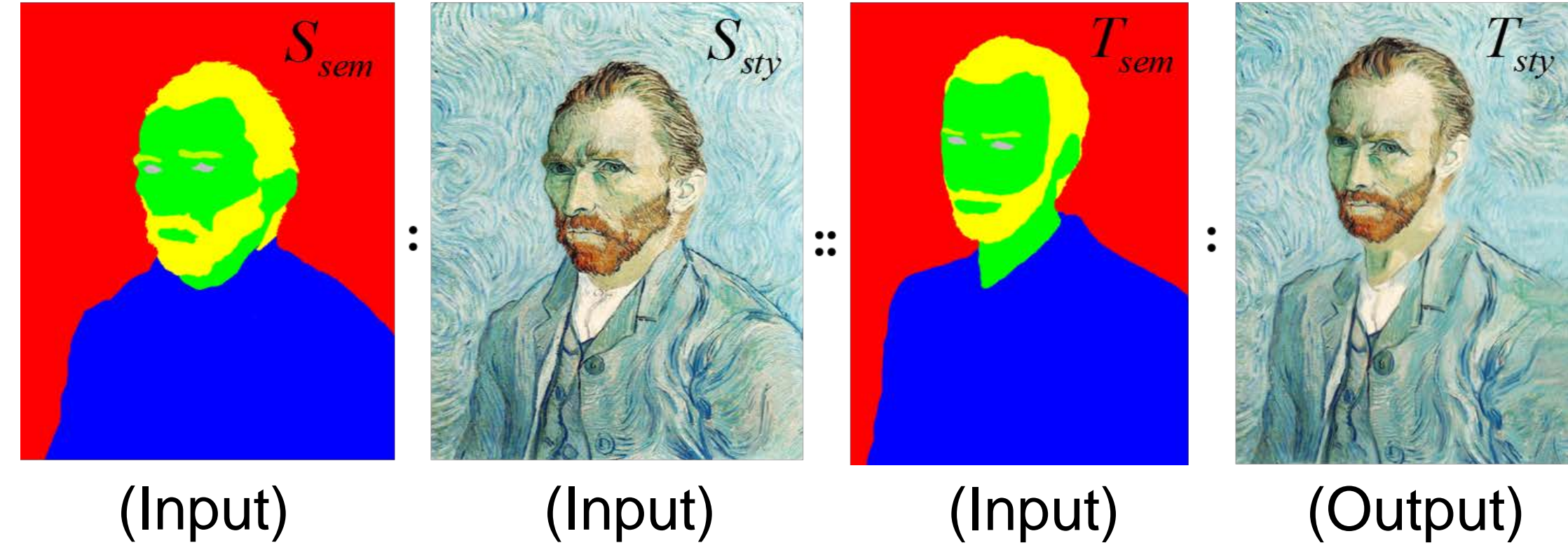


A Common Framework for Interactive Texture Transfer

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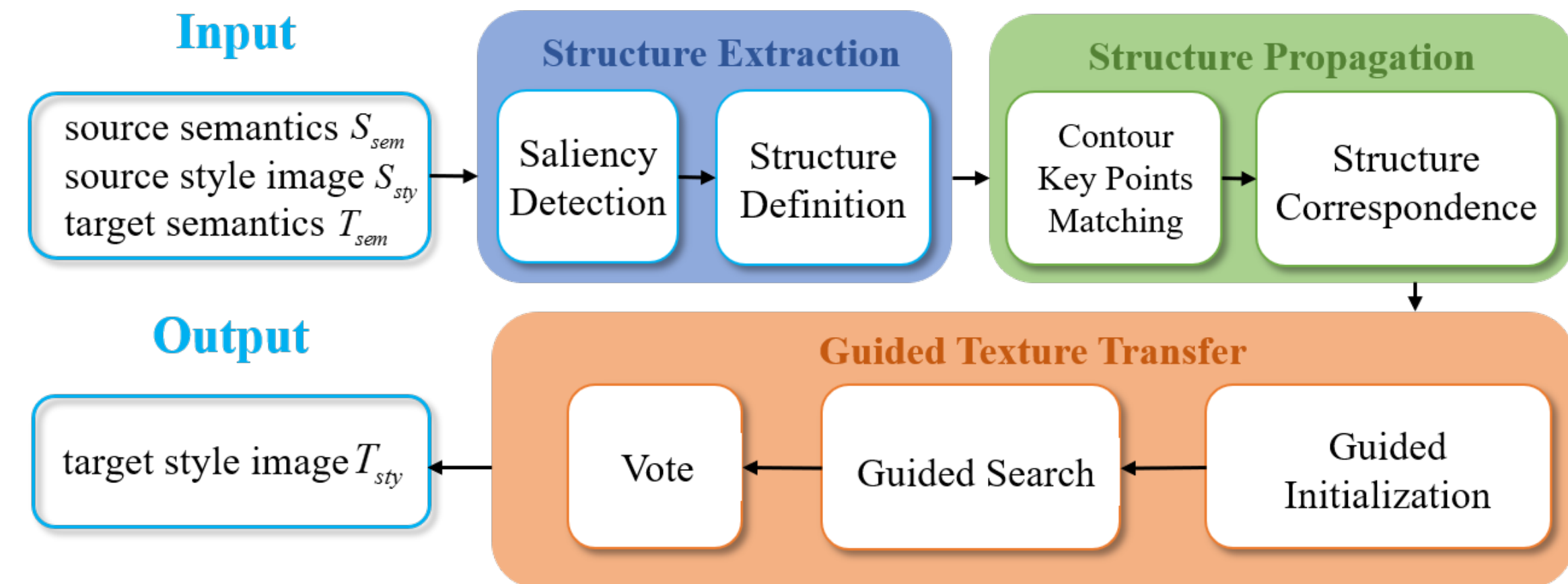
Motivation



The proposed common framework is capable of multiple challenging user-controlled texture transfer tasks:

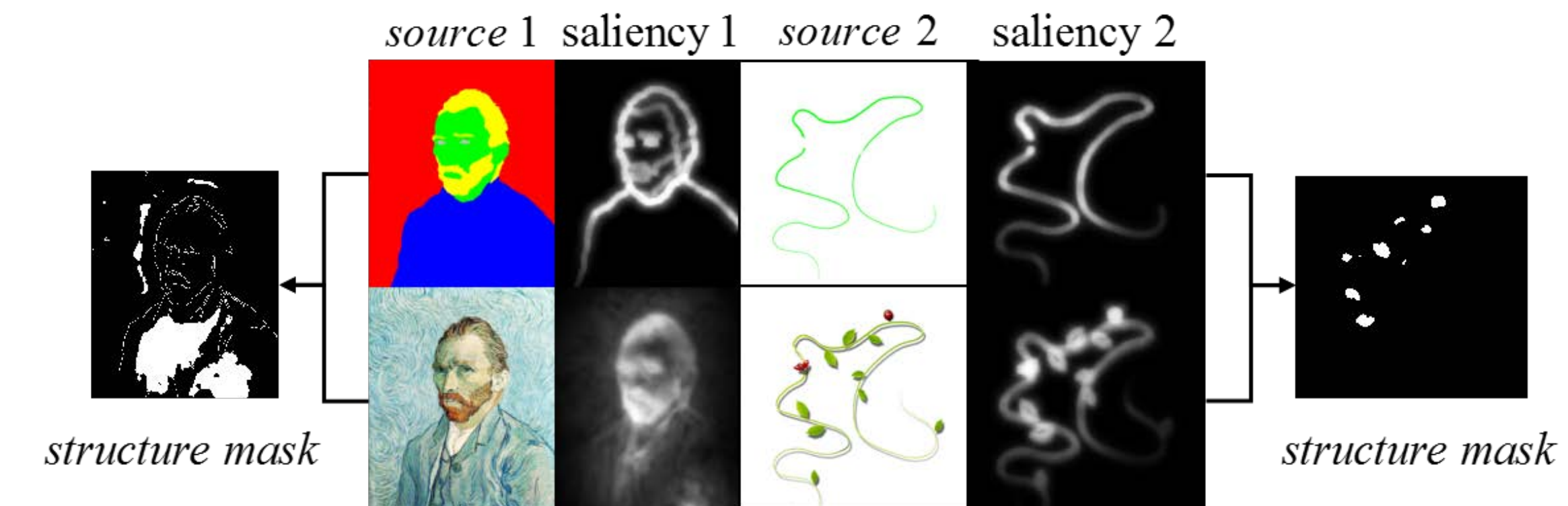
- (a) turning doodles into artworks
- (b) editing decorative patterns
- (c) generating texts in special effects
- (d) controlling effect distribution in text images
- (e) swapping textures

Framework

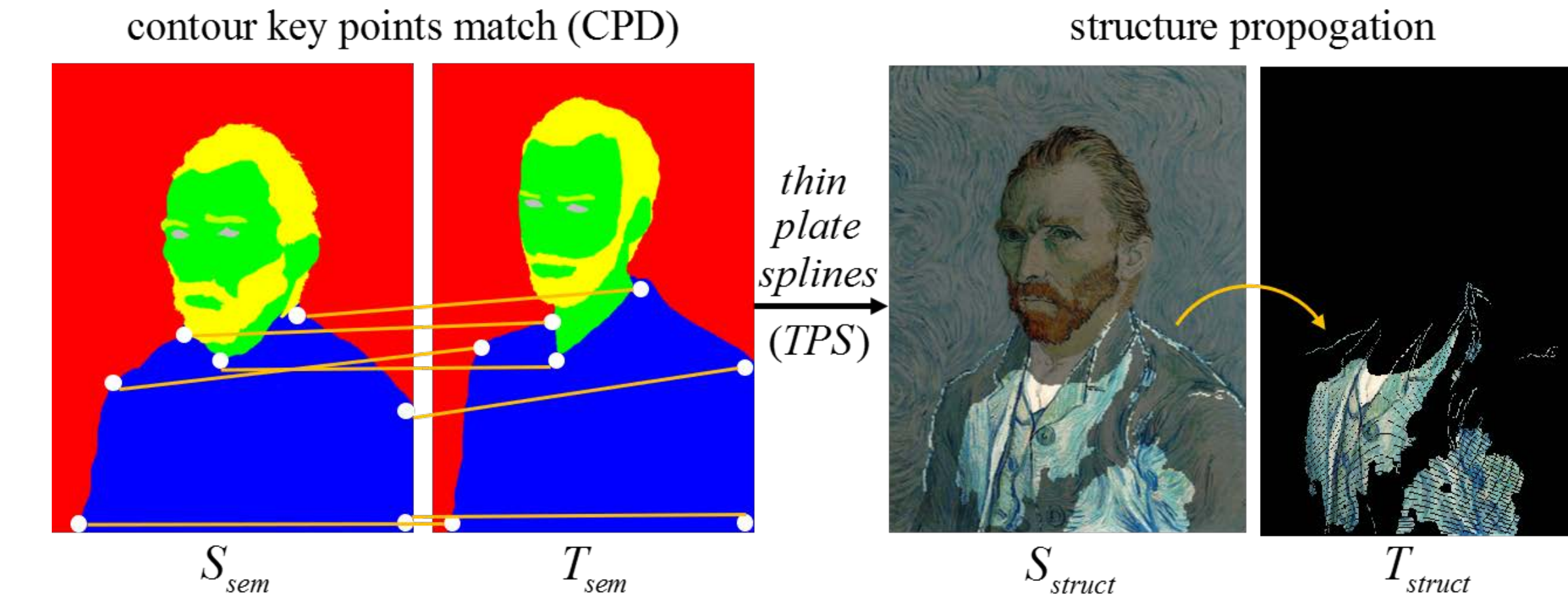


Methods

➤ Internal Salient Structure Extraction



➤ Structure Propagation



➤ Guided Texture Transfer

The goal is to synthesize the target stylized image using stylized textures in source. We pose this problem as a patch-based optimization task with the following energy function.

■ Energy function

$$E = \sum_{q \in T} \min_{p \in S} (\lambda_1 E_{sem}(p, q) + \lambda_2 E_{struct}(q) + E_{coh}(p, q))$$

$$\lambda_1 = \frac{l_e - l}{l_e - l_s} \beta, \quad l_s \leq l \leq l_e \quad \lambda_2 = \exp\left\{-\frac{1}{|\Omega'_{con}|} \sum_{\hat{c}p \in \Omega'_{con}} d(\hat{c}p, cp)\right\}$$

■ Semantic Guide

We define the semantic guidance term using L2-norm of two sampled patches in RGB space.

$$E_{sem}(p, q) = \|T_{sem}(N_q) - S_{sem}(f(N_p))\|^2$$

■ Structure Guide

We describe structure term as the similarity of the target structural patch and temporary stylized patch.

$$E_{struct}(q) = \sum_{i=0 \dots w^2-1} \frac{(T_{struct}(N_q^i) - T_{sty}(N_q^i))^2 \lambda(N_q^i)}{\tau(N_q)}$$

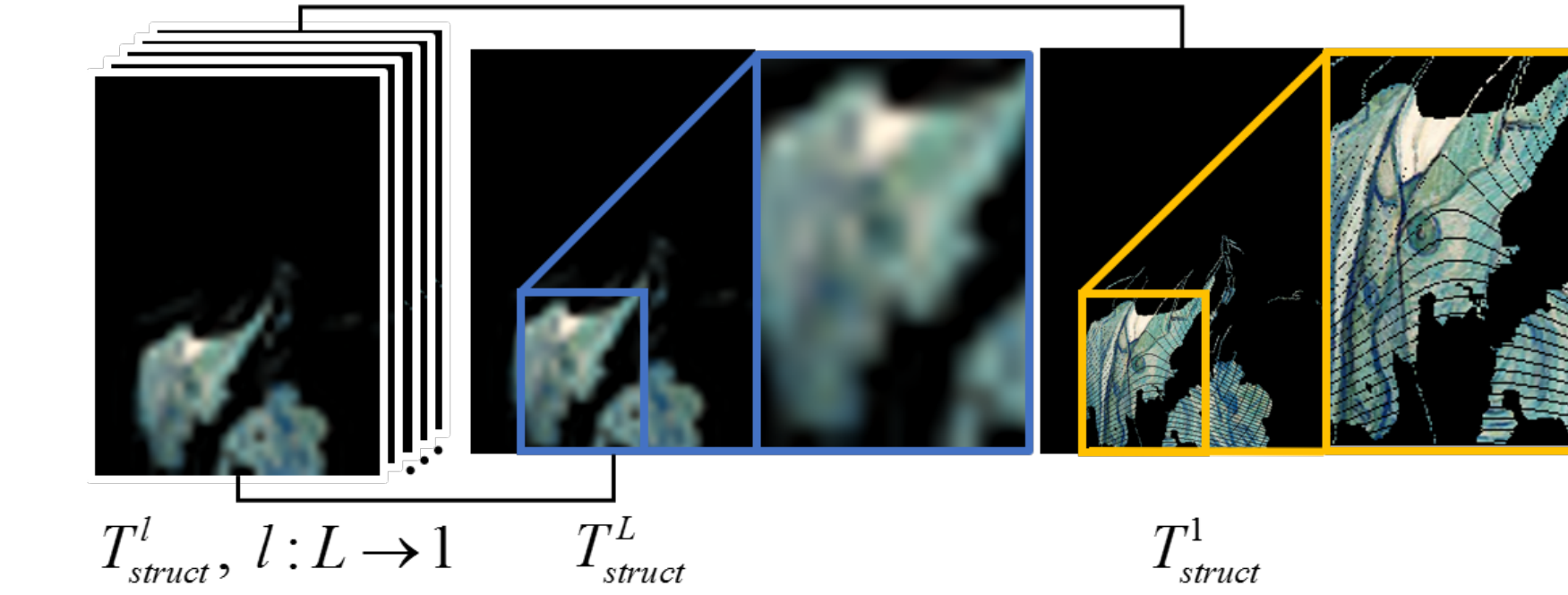
■ Coherence Guide

The coherence term aims to synthesize the target image using the consistent stylized textures in source.

$$E_{corhence}(p, q) = \|T_{sty}(N_q) - S_{sty}(f(N_p))\|^2$$

■ Function Optimization

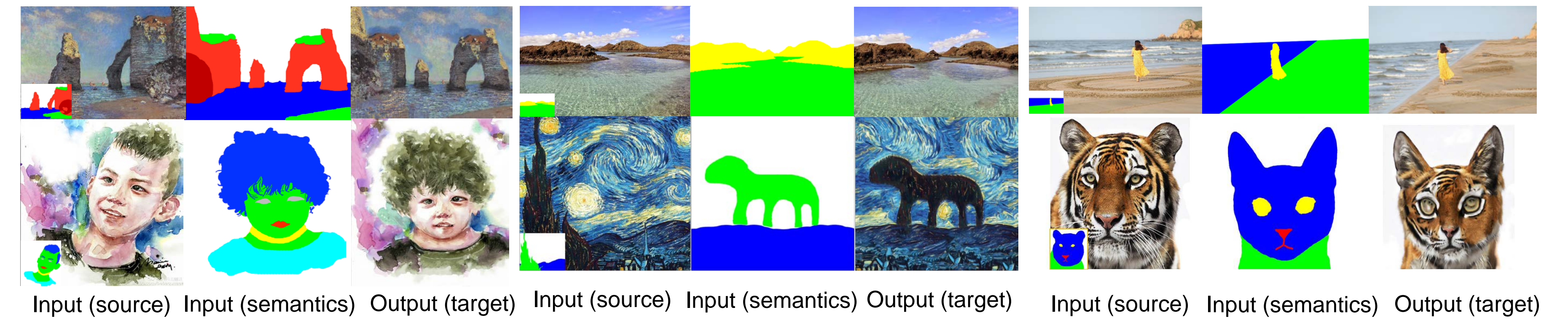
The energy function is optimized by EM-like iterations with two steps (guided search and vote) performed alternatively.



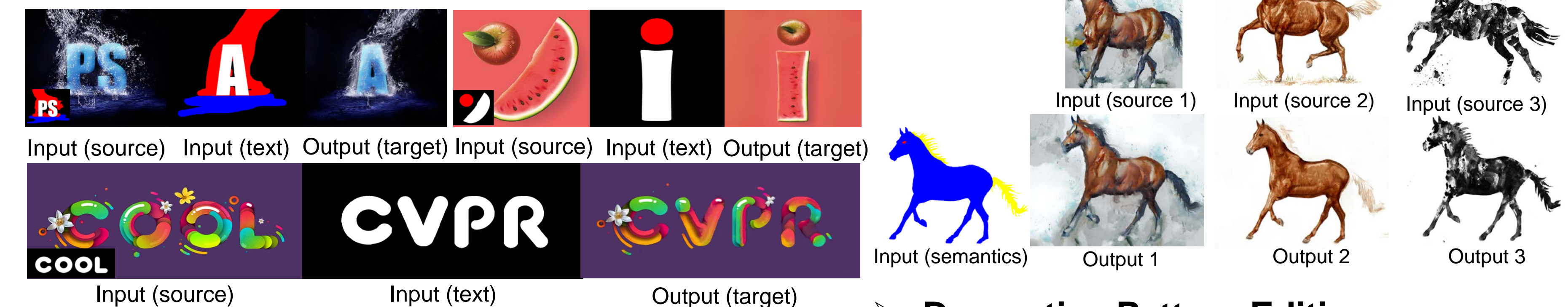
Guided Initialization → Guided Search ⇌ Vote
The multi-scale structure guidance is used for guided Initialization and search.

Results

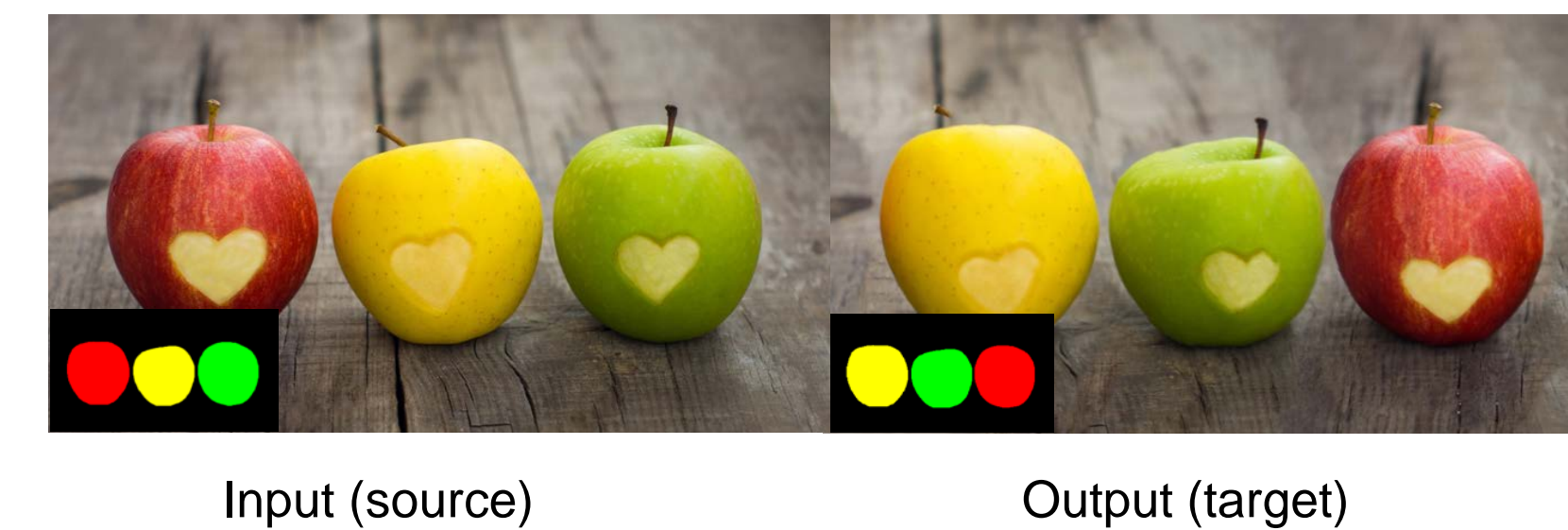
➤ Doodles-to-Artworks



➤ Special Effect Text Generation



➤ Texture Swap



➤ Decorative Pattern Editing

