Semantic-Aware Image Screening

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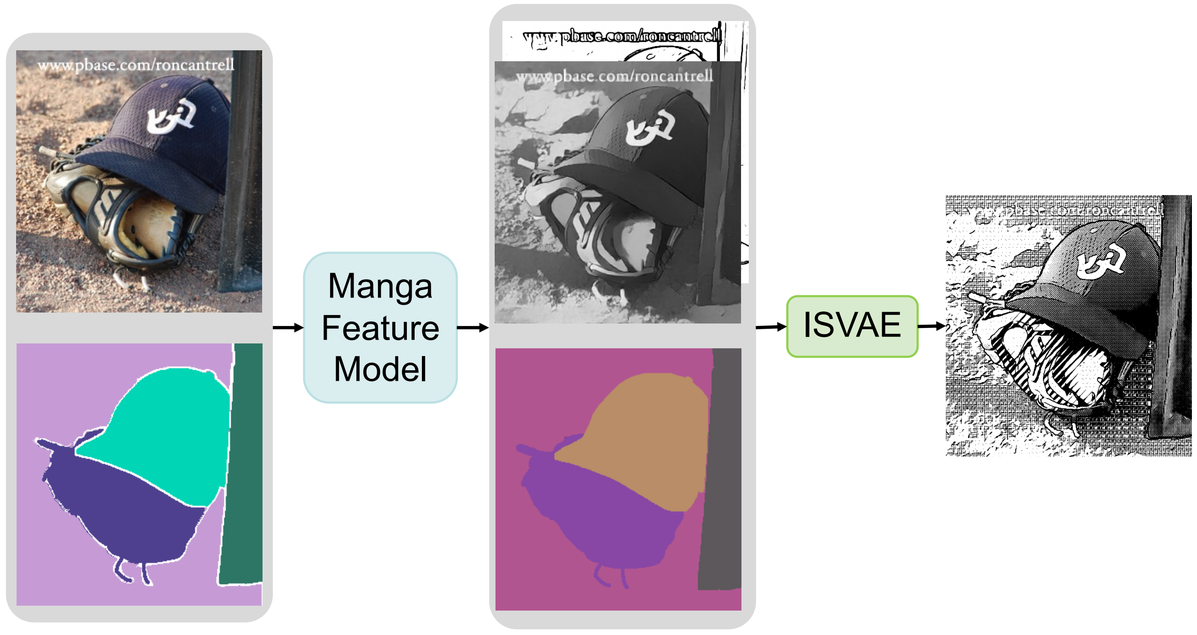
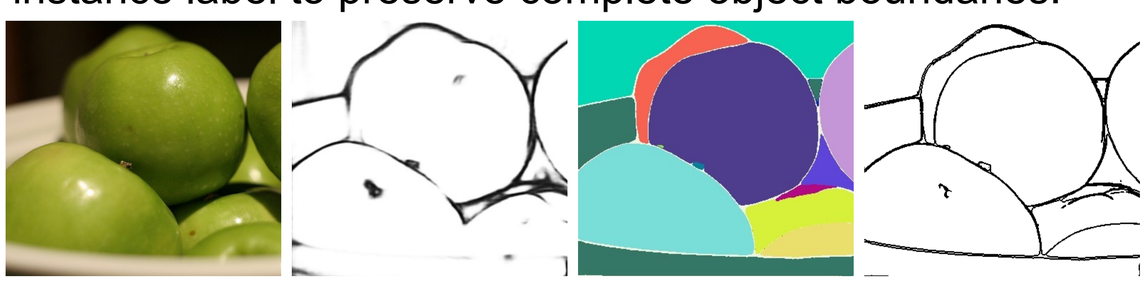
Manga artists often draw manga backgrounds based on real photographs. But it is mostly done by hand, due to the semantically poor and type-uniform results of existing methods. We present a method to generate bitonal manga backgrounds from color photographs with respect to the semantics. Our goal is to preserve three factors: *color distinguishability*, *semantic distinguishability*, and *screentone consistency*. To achieve that, we screen images based on a generated tone map with color distinguishability and a tone variety map with distinguishability among different semantics and consistency over the same semantics. Also, we generate a line map with complete boundaries along semantics objects for better visualization.



We train a manga feature model to generate line map, tone map and tone variety map which can further synthesize the bitonal manga appearance with an interpretable manga model (ISVAE).

Supervision on line map and tone map

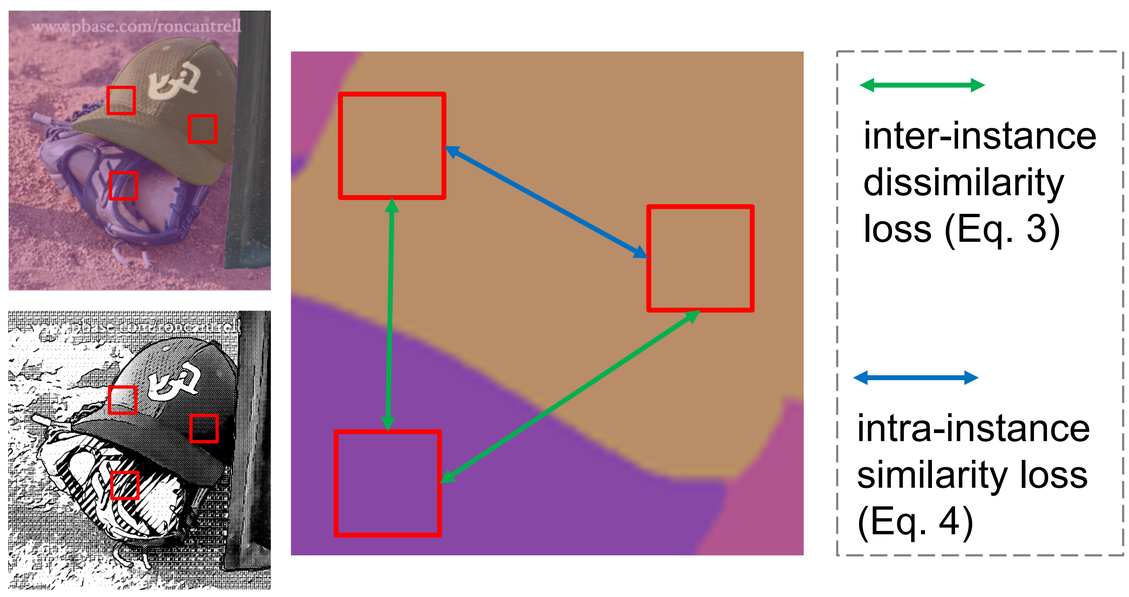
Some instance boundaries cannot be extracted with existing methods. We refined the extracted edge with the instance label to preserve complete object boundaries.



Manga usually uses patterns with brighter tone to show visual contrast. We encouraged the tone map to conform to the images after image contrast enhancement.

Unsupervision on tone variety map

We design two specific loss terms: *inter-instance dissimilarity loss* and *intra-instance similarity loss* to encourage generating tone variety map with semantic distinguishability and screentone consistency.



Our method can generate screened manga from color photographs with distinguishability of different semantic objects. Diverse screened results can be generated by rotating the tone variety features.