A Morphological Approach for Interactive Segmentation with the Color Tree of Shapes

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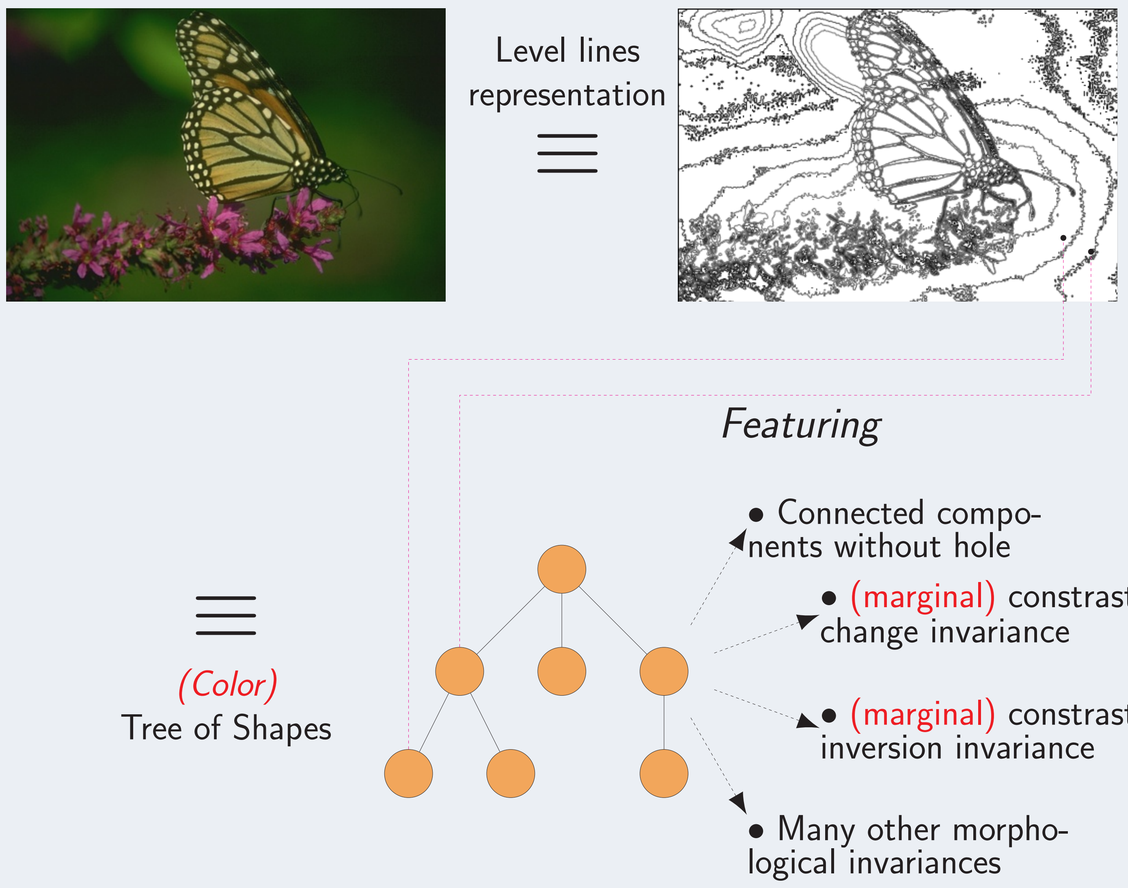
At a Glance

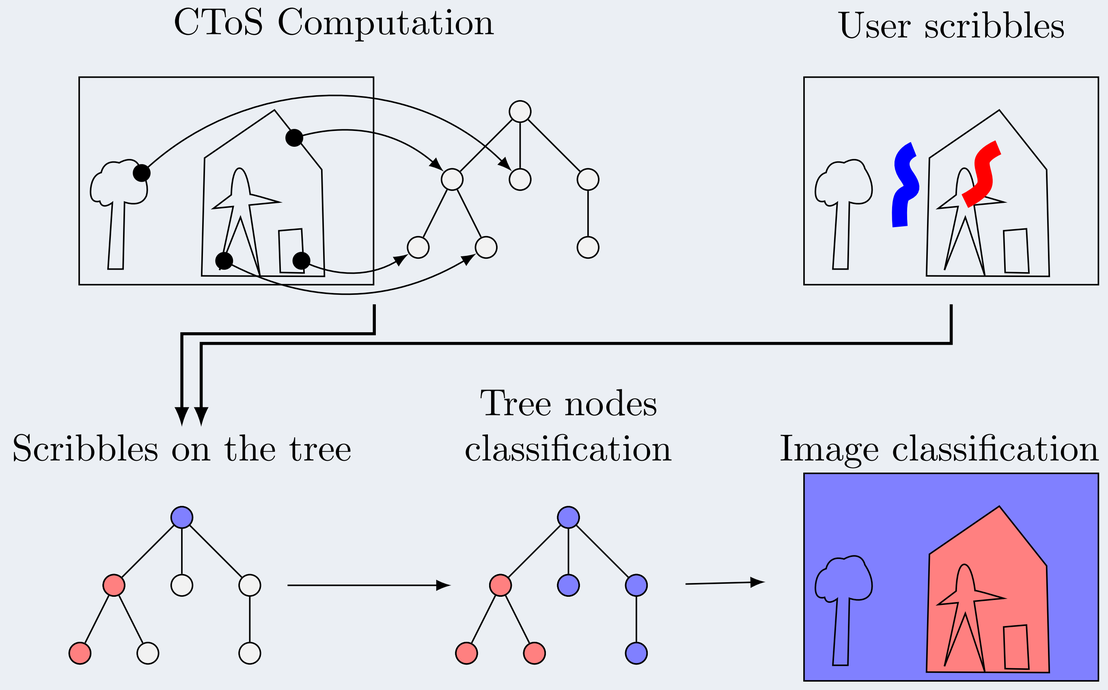
- **Motivation.**
  → The Tree of Shapes (ToS) provides a *high-level representation of images*. It is the tree of inclusion of the level lines.
  → The novel Color Tree of Shapes (CToS) extends the ToS for color images.
- **Objective.** Show the versatility, easy-to-use, efficiency of this new structure through an app.: the interactive segmentation.
- **Contribution.** A method that:
  - does not use any statistical learning,
  - requires few user scribbles,
  - uses *simple* tree processing algorithms.

About the (Color) Tree of Shapes

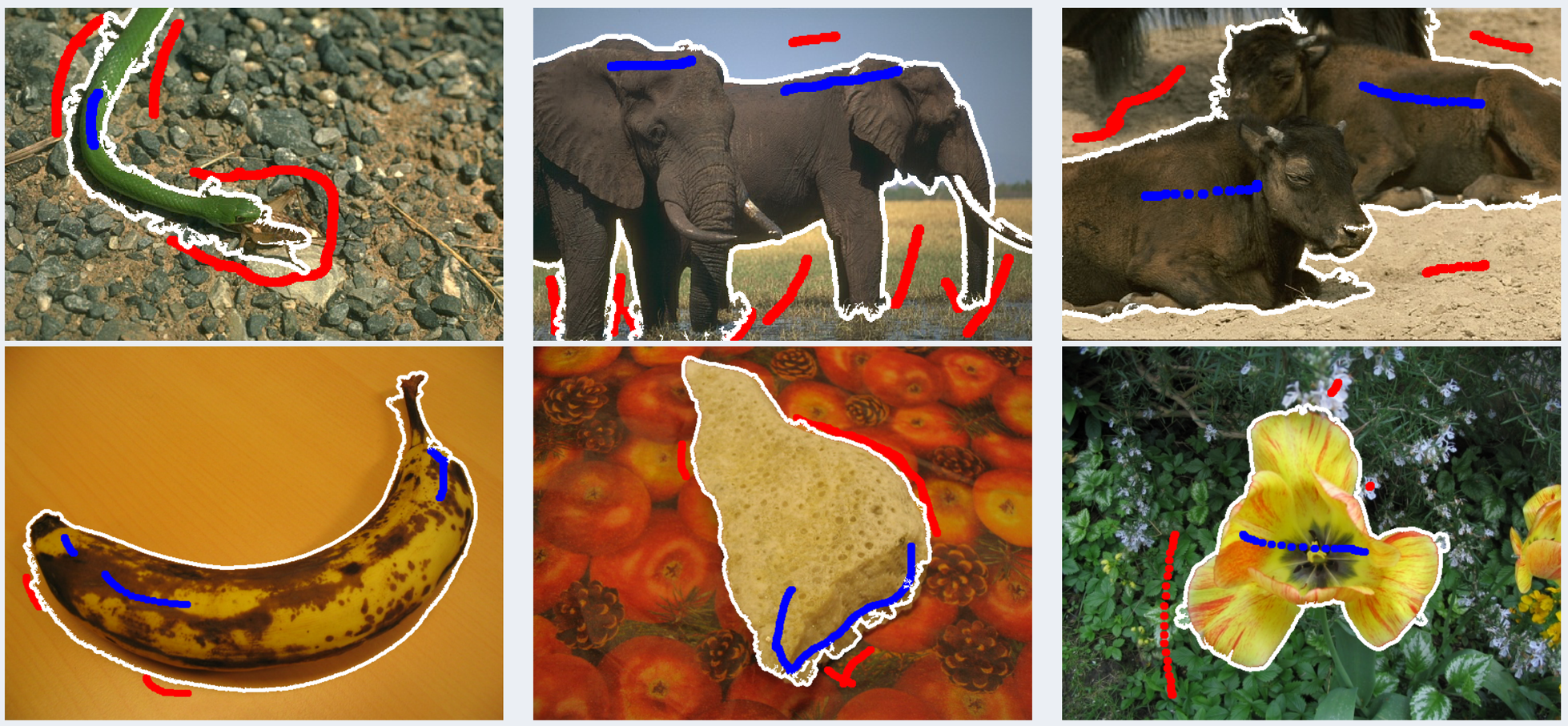


Method description

1. Compute the CToS $T(\mathbf{u})$ of the image $\mathbf{u}$,
2. Evaluate $T(\mathbf{u})$'s edges with the distance between nodes (distance between the average colors),
3. Transpose the user's scribbles on $T(\mathbf{u})$, it gives two seed sets of node for the foreground ($\mathcal{F}$) and the background ($\mathcal{B}$),
4. Classify every non-seed node as $\mathcal{F}$ or $\mathcal{B}$ by computing its distance to the seed nodes using $T(\mathbf{u})$'s topology, and retrieving the label of the closest seed node,
5. Reconstruct the image from the labels of $T(\mathbf{u})$,
6. Cleanup: keep significant foreground connected components only.



Some results



Object picking with our method. Red and blue user scribbles define the background $\mathcal{B}$ and the foreground $\mathcal{F}$ respectively. The white line is the computed $\mathcal{F}/\mathcal{B}$ boundary.

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[3] A. Dubrovina, et al. **Image editing using level set trees** In *Proc. of ICIP*, pp. 4442–4446, 2014.
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