Artistic Vision: Painterly Rendering Using Computer Vision Techniques

Project Id: 9

https://github.com/varun-balaji/painterly

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Main goal(s) of the project:

To take pixel images as input and recreate it as a painting-like image through the use of digital brush strokes. Users are able to manipulate parameters to effect segmentation, brush stroke characteristics, stroke size and stroke frequency.

Problem definition and process:

- **Segmentation:** Flood fill algorithm is used to segment the image.
- **Morphological Processing:** Iterations of opening and closing operations are used to smooth the segments and remove boundary artifacts.
- **Skeletonization:** A hybrid of distance transform for medial axis and Rosenfeld's parallel algorithm is used such that boundary distance information is preserved while a smooth, connected skeleton is obtained.
- **Tokenization and Grouping:** The ridge set that is obtained is grouped into tokens which consist of 10 pixels each. They are then grouped into brush strokes using the moment method.

- **Rendering Brush Strokes:** Quadrilaterals are generated and filled by utilizing normals calculated from differences in token centres.
- Underpainting and Brush Effects (additional)

Results of the project:

The output image is a painting-like recreation of the input image reminiscent of contemporary paintings with an abstract or sketchy quality.

Project Milestones and Expected Timeline:

1. Segmentation and Smoothing of image - Oct 14th
2. Ridge Set Extraction, Tokenizing and Grouping - Oct 31st
3. Rendering - Nov 6th
4. Presentation Slides, Extra Work and Buffer for Unfinished Work - Nov 11th
5. Underpainting and Brush Effects, Depth Information Extension (optional)

References:

Skeletonization: https://homepages.inf.ed.ac.uk/rbf/HIPR2/skeleton.htm