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EE 440

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Final Project Progress

1) What artistic effect do you want to achieve in your final project?

For my final project, I want to achieve the brush stroke-based oil painting (or painterly) effect. Since I am particularly fond of the Impressionist master Claude Monet and his *Water Lilies* (*Nymphéas*) series, I like the concept of stylising images as impressionist-esque. (As a side note, I highly recommend visiting the Musée de l'Orangerie in Paris.)

2) What method do you plan to use to achieve the goal?

To achieve this effect, I will implement the method detailed in Hertzmann's 1998 paper [1]. In general, the method applies curved brush strokes at decreasing brush radii (i.e. brush coarseness). The three painting layers are then superimposed. In Hertzmann's method, the brush strokes are aligned to the local gradient of the input image. Moreover, the brush strokes only paint regions of the rough sketch that differ from the original, blurred image. The painting rendering can also be controlled by the user with style parameters such as 'Impressionist' and 'Pointillist'. For example, these style parameters control the brush size, blur factor, opacity, and colour (hue, saturation, value, red, green, and blue) jitter.

Hertzmann's method is expanded upon by Hays and Essa's 2004 paper. However, they orient the brush strokes to the globally interpolated strongest gradients to achieve a higher quality painting [2]. I am curious to see the difference in results between these variant methods. I plan to allow the user to select which variant they wish to use. (If time allows, as a third variant I would hope to implement the method proposed by Kagaya et al. [3] in 2011. Compared to the other methods, this variant applies segmentation so different regions of the image can be painted with different style parameters.)

3) What's your current progress?

On Monday 27 November, I began implementing the method I described in 2). While I am still collecting all potentially helpful resources (e.g. papers and lecture notes) before beginning to heavily write code, I have general algorithmic idea on how to implement the method. Presently, I am leaning on coding in MATLAB because the GUI creator is easier to use.

References

[1] Aaron Hertzmann. 1998. Painterly rendering with curved brush strokes of multiple sizes. In *Proceedings of the 25th annual conference on Computer graphics and interactive techniques* (SIGGRAPH '98). ACM, New York, NY, USA, 453-460. DOI: http://dx.doi.org/10.1145/280814.280951

[2] James Hays and Irfan Essa. 2004. Image and video based painterly animation. In *Proceedings of the 3rd international symposium on Non-photorealistic animation and rendering* (NPAR '04), Stephen N. Spencer (Ed.). ACM, New York, NY, USA, 113-120. DOI: http://dx.doi.org/10.1145/987657.987676

[3] Mizuki Kagaya, William Brendel, Qingqing Deng, Todd Kesterson, Sinisa Todorovic, Patrick J. Neill, and Eugene Zhang. 2011. Video Painting with Space-Time-Varying Style Parameters. *IEEE Transactions on Visualization and Computer Graphics* 17, 1 (January 2011), 74-87. DOI: http://dx.doi.org/10.1109/TVCG.2010.25