Cartoonifying An Image

By

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GOAL

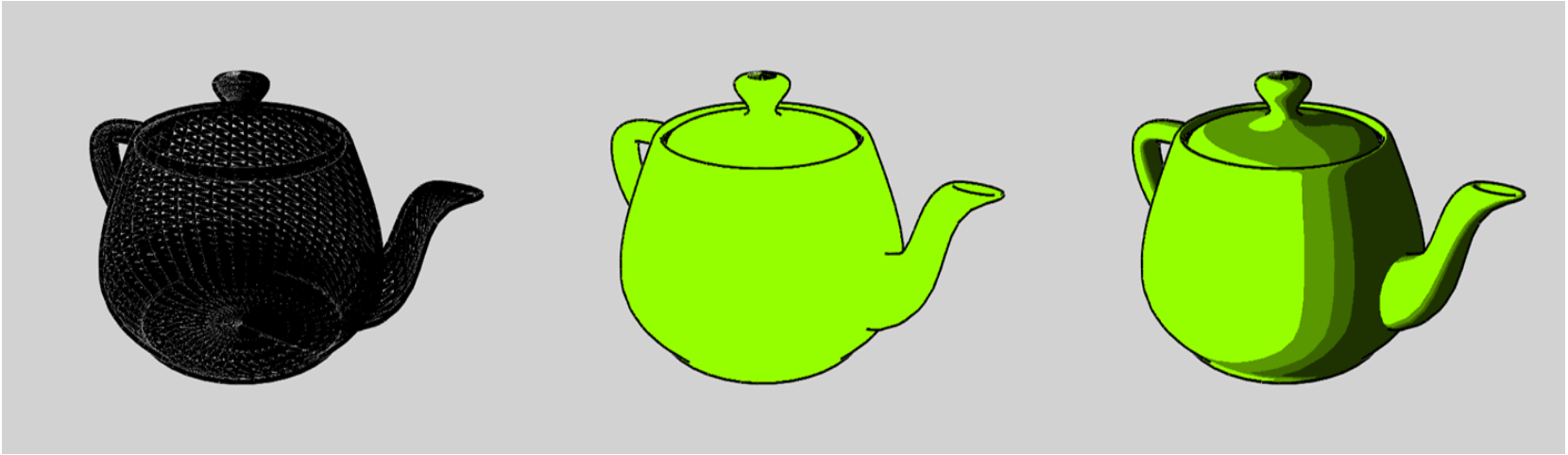
- To convert a real image to a cartoon image so as to make them look hand drawn

- To implement various methods used in 'cel-shading' to achieve the effect of cartoonized images and to compare their efficiency

CEL-SHADING

- It is a type of non-photorealistic rendering
- It converts a 3 dimensional real image into a flat image as if it were drawn by a pen or brush
- This effect is widely used in video games and movies where certain objects are made to look like cartoons

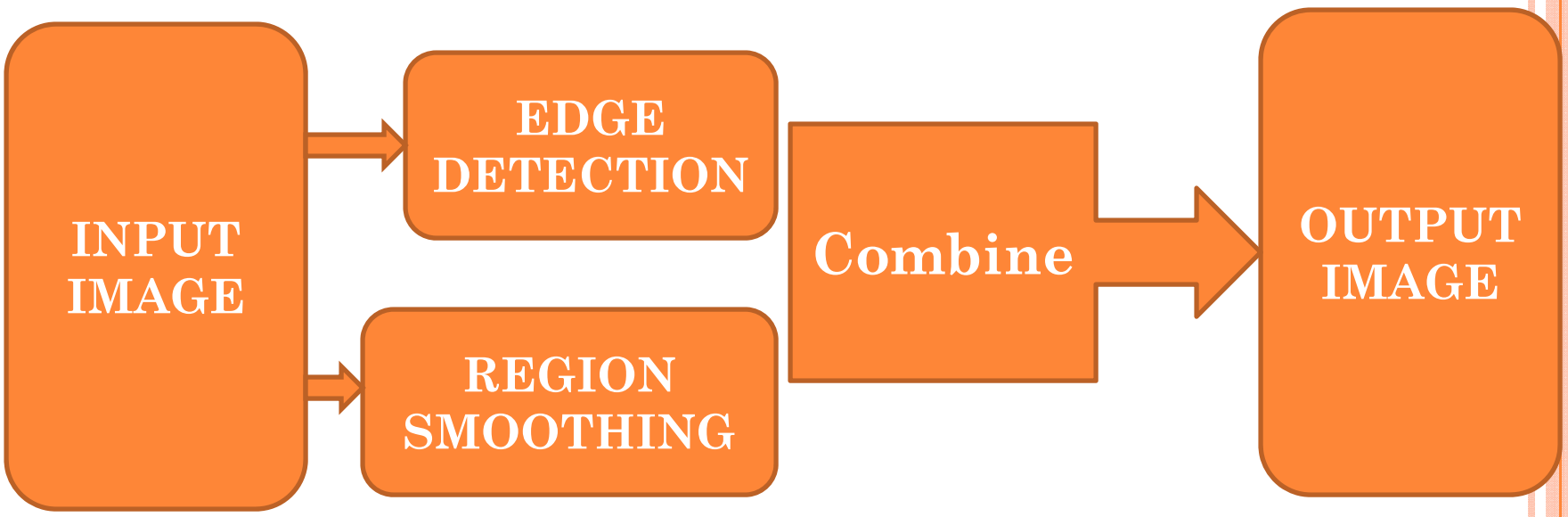
EXAMPLE OF CEL-SHADING



The Utah teapot rendered using cel-shading

(Nicolas Sourd, 15 March 2007)

General Algorithm



EDGE DETECTION

- There are various methods used for edge detection
- Some of the more commonly used methods are –

    1.Canny edge detection

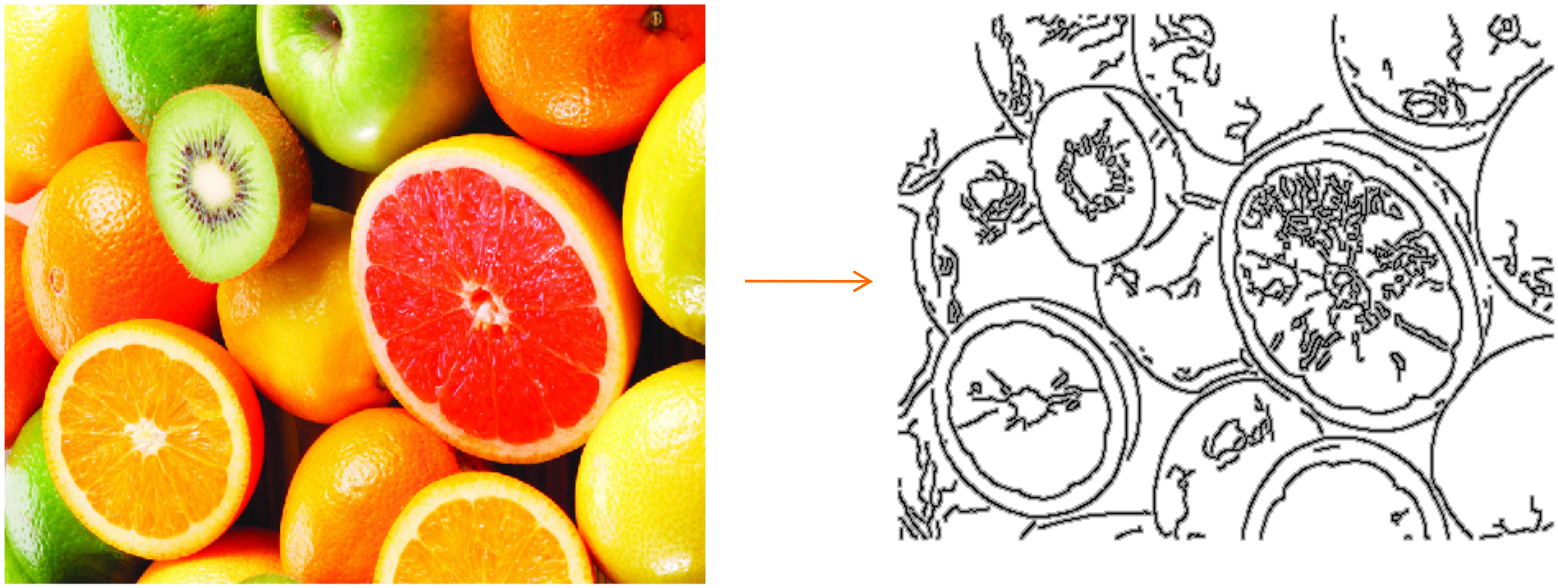
    2. Sobel edge operator

    3. DoG (Difference of Gaussian)

Region smoothening

- Region smoothing removes all the shades and color boundaries which can be considered as insignificant (like shades due to variation of light)
- The different methods used for region smoothing are
    1. Mean shift filter
    2. Bilateral filter

CANNY EDGE DETECTION



Canny edge operator is used on the input image ‘fruit.jpg’ .

DoG (Difference of Gaussian)

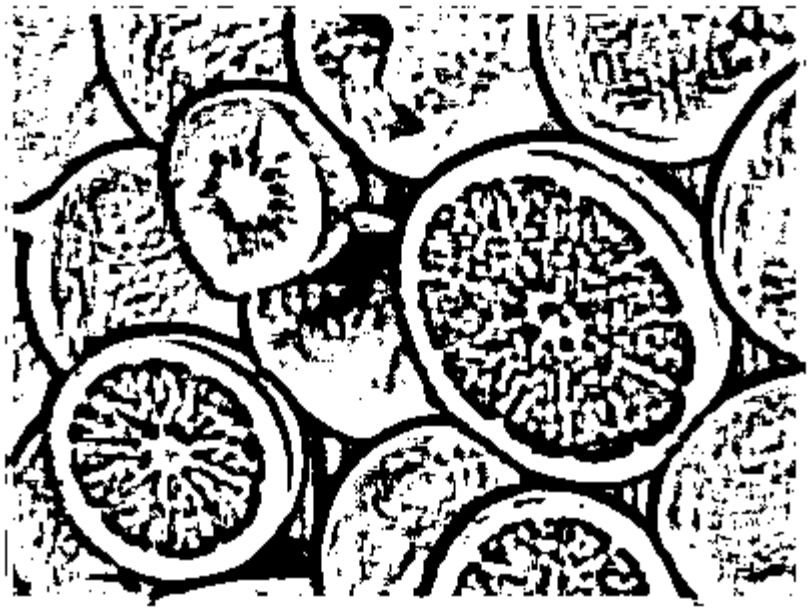


Image of the complement of the image after being operated by the DoG

The DoG operator is applied on the input image in order to enhance the edges. Results of the DoG are better than the Canny operator.

MEAN SHIFT FILTER

For the purpose of region smoothing, the mean shift operator is tried first. The color regions are considerably smoothened but it still contains features and shades which are not really necessary for the purpose of cartoon effect.

Bilateral Filter

On applying the bilateral filter, the colored regions are smoothened out more uniformly as compared to the mean shift filter.

For the final cartoon effect, the DoG edge image is combined with the smoothened image obtained from applying the bilateral filter to the original image.

Final Cartooned Image

CONCLUSION

- The main tasks when it comes to developing a cartoonized image are edge detection and region smoothing.
- Of the edge detection techniques analyzed in the project, the DoG (Difference of Gaussian) gives better results as compared to the Canny edge detector.
- Region smoothing can be achieved by Mean shift filtering or by Bilateral filtering. The smoothing effect of the bilateral filter is far better than the Mean shift filter.

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THANK YOU!