

# Non-Photorealistic Rendering: Impressionist Effects

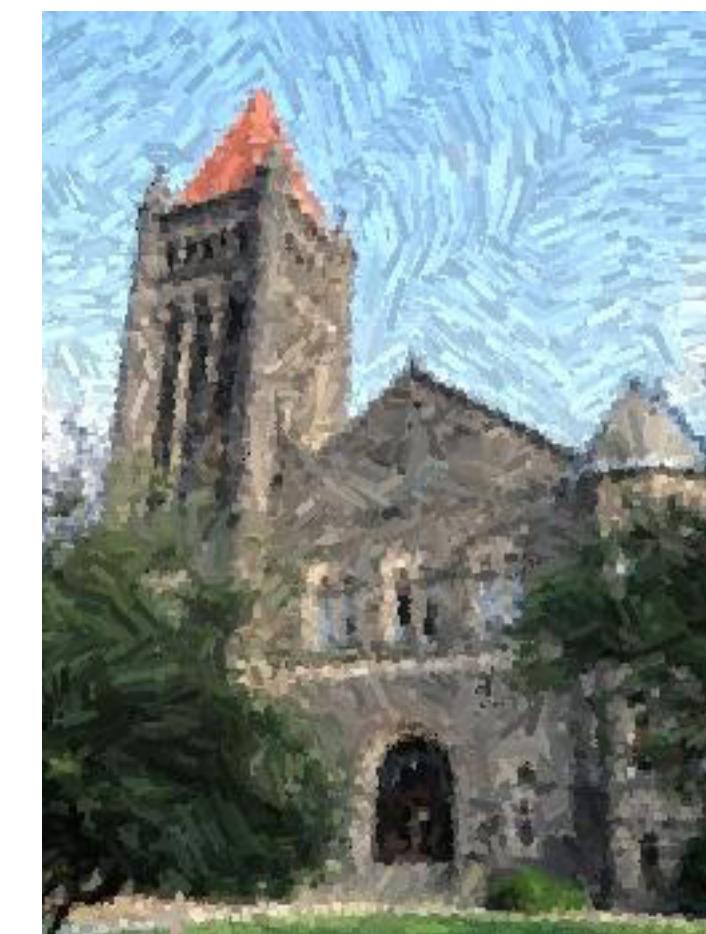
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## Problem

Convert existing 2D images into images that look like impressionist paintings.



A Photo of the Altgeld Hall



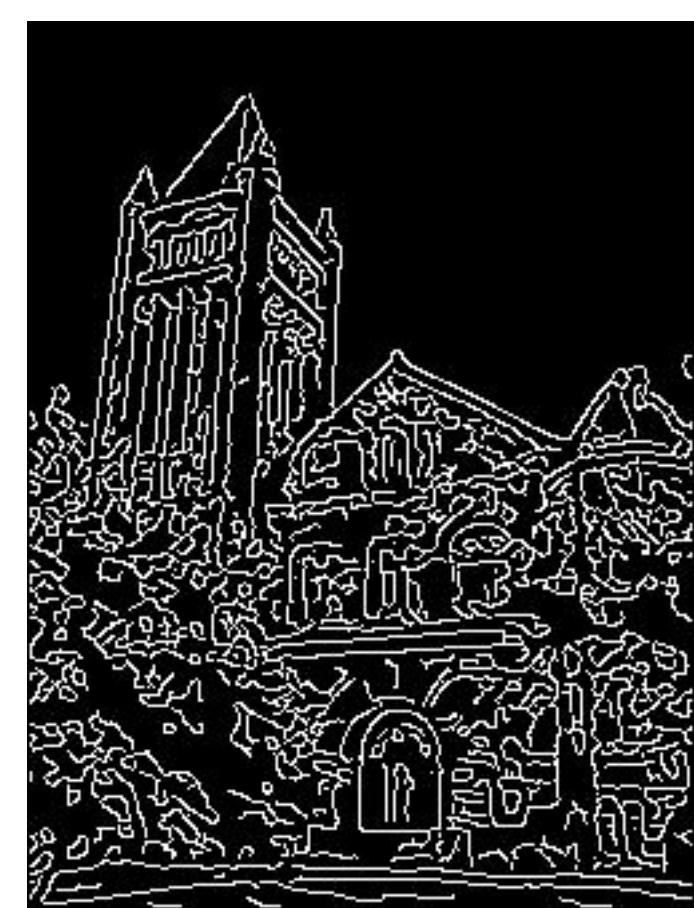
The Generated Image

## Random Generation

Use antialiased lines to simulate brush strokes. Generate strokes with color at its center pixel at the original image. The length and the width of strokes are preset values. Use gradient normals to decide the orientation of strokes. Add random perturbation to their parameters(width, length, color and orientation) and generate them in random order to create a hand-touched look.

## Edge Clipping

To preserve edges, clip strokes when they reach edges



Canny Edge Detector  
on Low-Pass Image



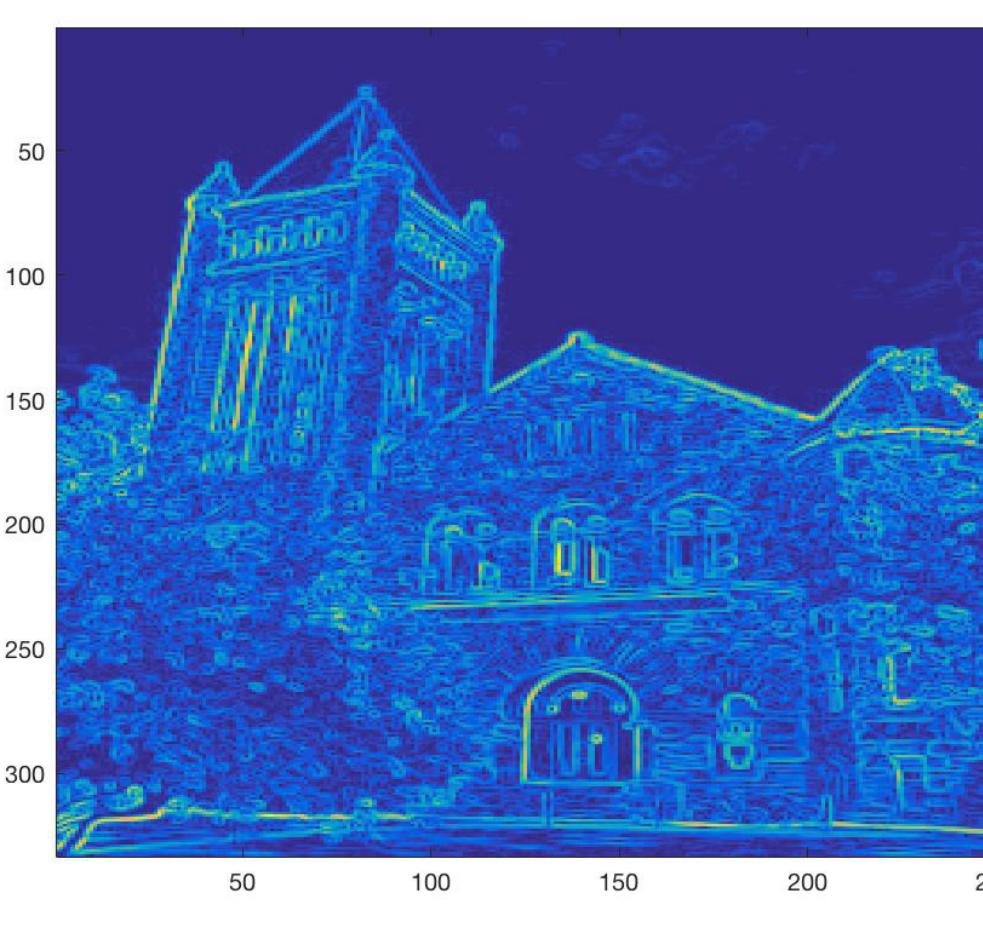
Without Edge Clipping



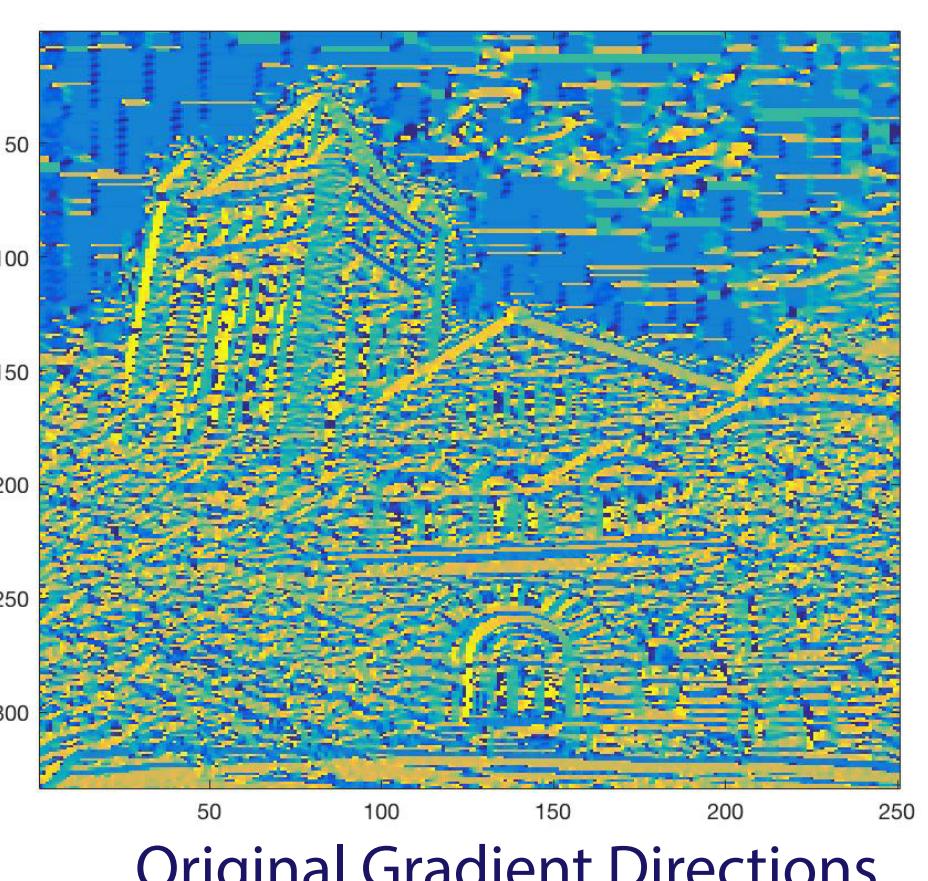
With Edge Clipping

## Improved Gradient-Based Strokes

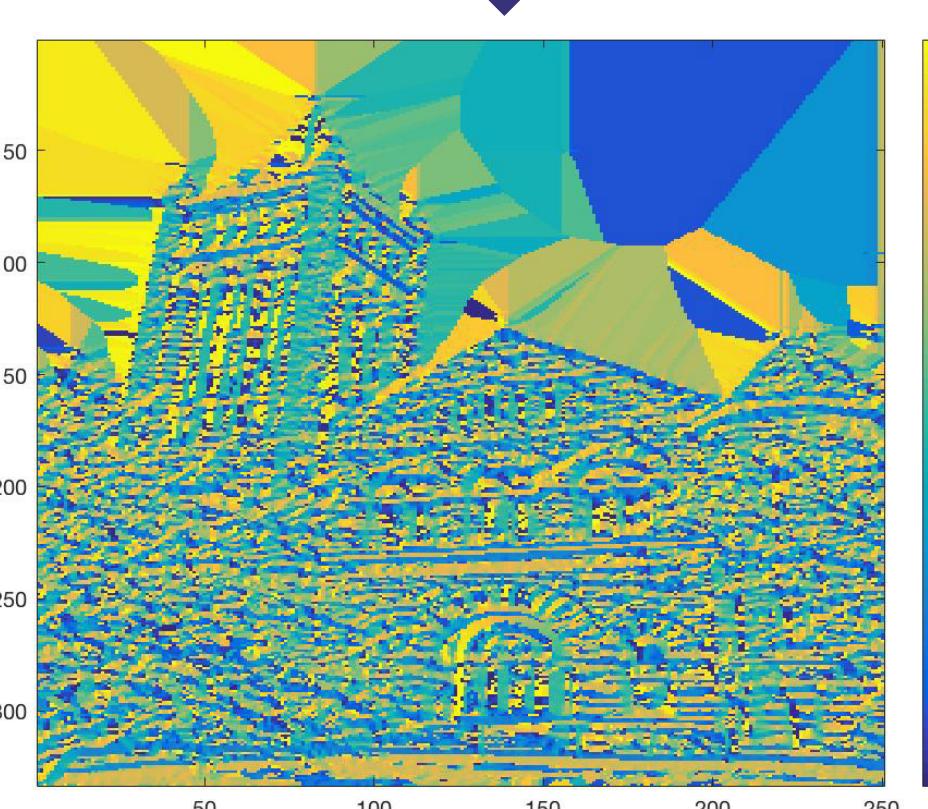
For pixels with zero or near zero gradient magnitude, replace it with the nearest valid gradient.



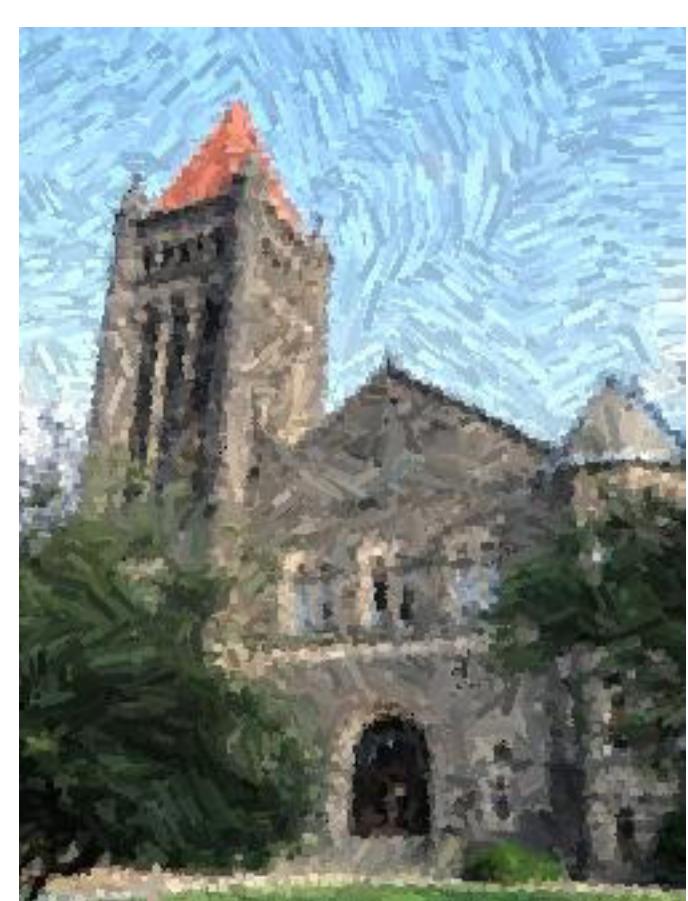
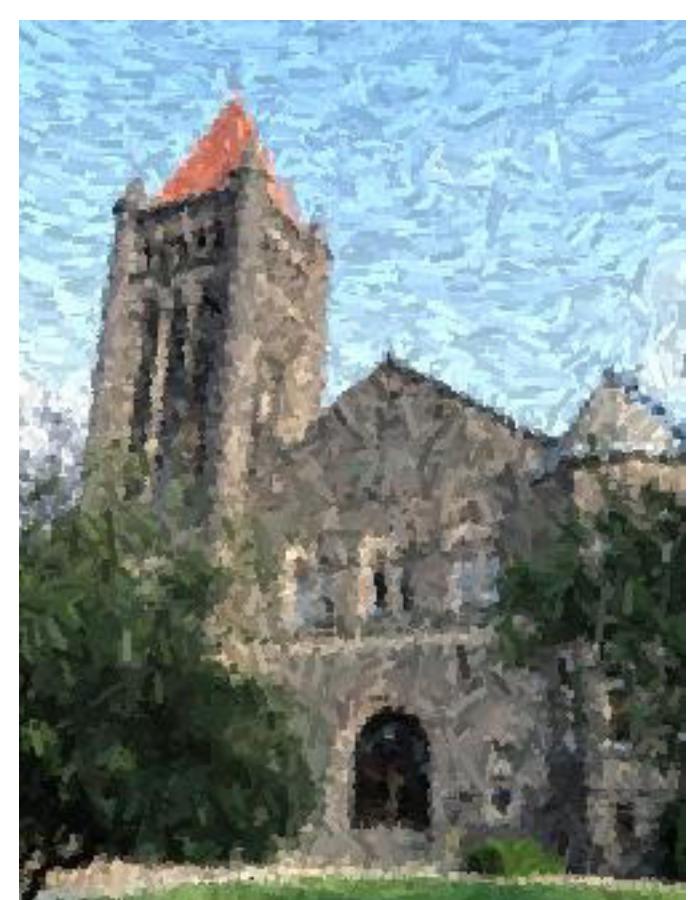
Gradient Magnitude



Original Gradient Directions



Improved Gradient Directions



## Result



A Photo of the Palace of Westminster



The Generated Image



Starry Night Over the Rhône by Vincent van Gogh