EEP 596A
Computer Vision: Classical and Deep Methods
2025 Fall

Homework 2 Report

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Contents

Task 1 – Load and Analyze Image

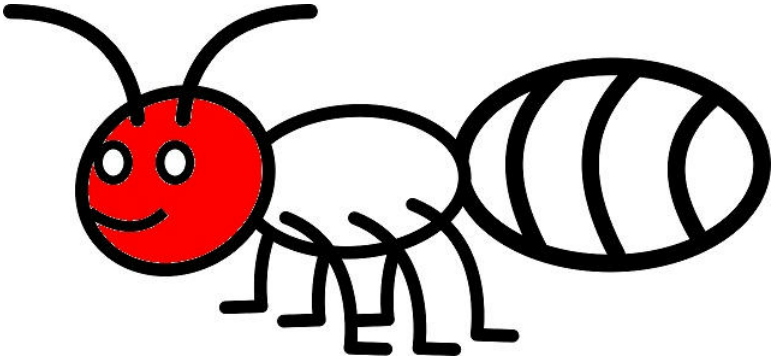

Figure 1: Floodfilled ant face (seed-based stack floodfill result)

Task 2 – Gaussian Smoothing (repeated)

Figure 2: Gaussian smoothing — level 0 (original)

Figure 3: Gaussian smoothing — level 1

Figure 4: Gaussian smoothing — level 2

Figure 5: Gaussian smoothing — level 3

Figure 6: Gaussian smoothing — level 4

Task 3 – Vertical Derivative (Gaussian × derivative)

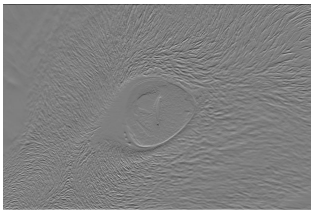

Figure 7: Vertical derivative — level 0

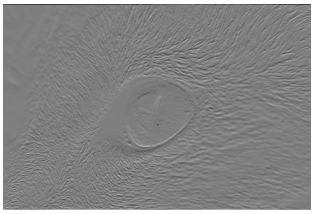

Figure 8: Vertical derivative — level 1

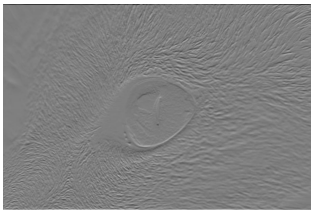

Figure 9: Vertical derivative — level 2

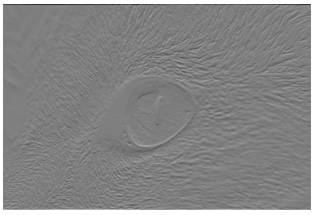

Figure 10: Vertical derivative — level 3

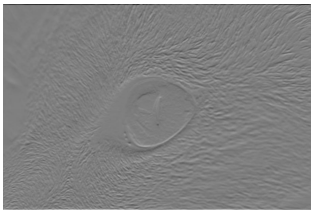

Figure 11: Vertical derivative — level 4

Task 4 – Horizontal Derivative (transpose of previous)

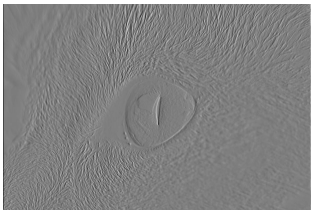

Figure 12: Horizontal derivative — level 0

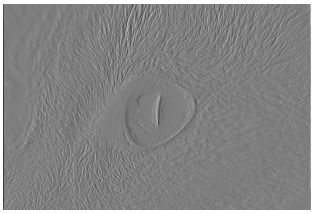

Figure 13: Horizontal derivative — level 1

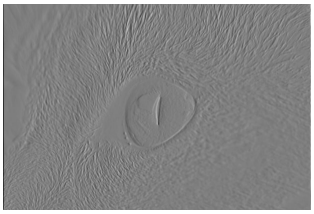

Figure 14: Horizontal derivative — level 2

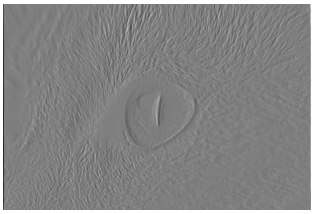

Figure 15: Horizontal derivative — level 3

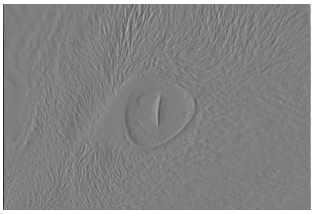

Figure 16: Horizontal derivative — level 4

Task 5 – Gradient Magnitude (Manhattan norm)

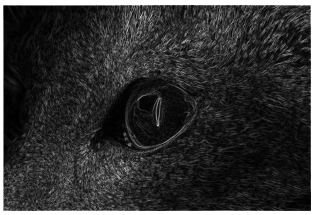

Figure 17: Gradient magnitude — level 0

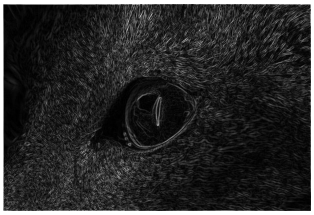

Figure 18: Gradient magnitude — level 1

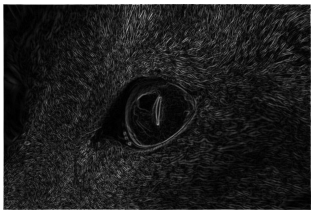

Figure 19: Gradient magnitude — level 2

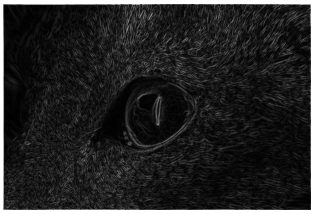

Figure 20: Gradient magnitude — level 3

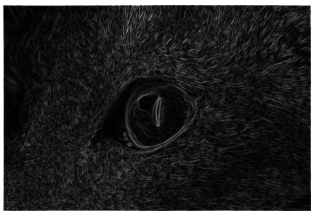

Figure 21: Gradient magnitude — level 4

Task 6 – Gaussian Derivative (scipy.signal.convolve2d)

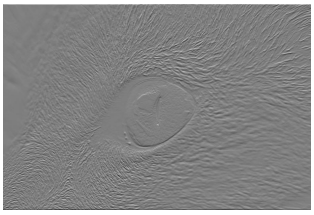

Figure 22: SciPy vertical derivative — level 0

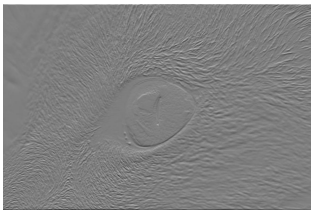

Figure 23: SciPy vertical derivative — level 1

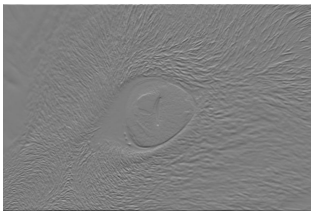

Figure 24: SciPy vertical derivative — level 2

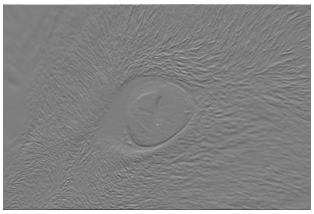

Figure 25: SciPy vertical derivative — level 3

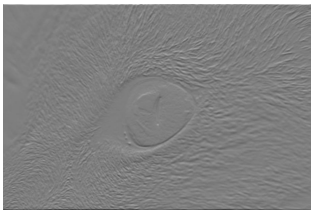

Figure 26: SciPy vertical derivative — level 4

Task 7 – Repeated Box Filtering (approximate Gaussian)

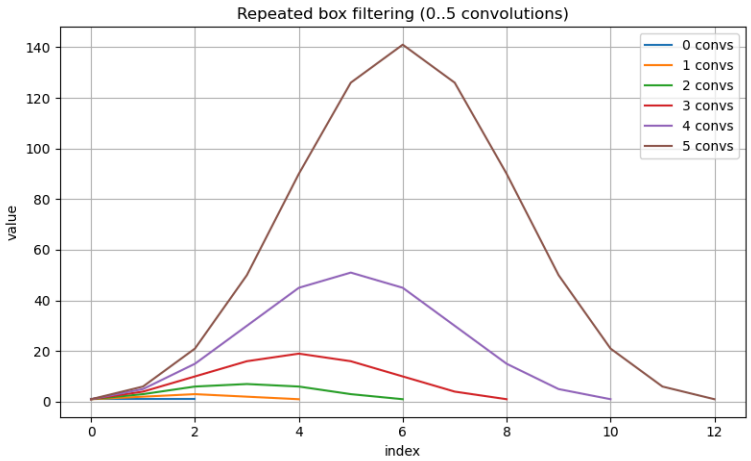

Figure 27: Repeated box filter convolutions (power of box filter) illustrating approach to Gaussian