# HW02

## The face becomes recognizable when sigma < 5.0

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| Figure : image when Gaussian smoothing with sigma = 20 | A person wearing a suit and tie  Description automatically generated  Figure : image when Gaussian smoothing with sigma = 10 | A person in a suit and tie  Description automatically generated with medium confidence  Figure : image when Gaussian smoothing with sigma = 5 |
| A person in a suit and tie  Description automatically generated with medium confidence  Figure : image when Gaussian smoothing with sigma = 2 | A person in a suit and tie  Description automatically generated with medium confidence  Figure : image when Gaussian smoothing with sigma = 1 | A person in a suit and tie  Description automatically generated with medium confidence  Figure : image when Gaussian smoothing with sigma = 0.5 |

1. Gaussian derivative masks. Sigma = 5

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| A picture containing diagram  Description automatically generated  Figure : contour of Gaussian derivative mask Gx | Diagram  Description automatically generated with low confidence  Figure : contour of Gaussian derivative mask Gy |

1. Magnitude of edges.

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| A close up of a dog  Description automatically generated with low confidence  Figure : image filtered by a gaussian derivative Gx | A picture containing stone  Description automatically generated  Figure : image filtered by a gaussian derivative Gy | Figure : image filtered by gaussian derivatives |

1. Testing different T values.

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| A picture containing text, silhouette  Description automatically generated  Figure : edges shown with a threshold T = 0.27 | A picture containing text  Description automatically generated  Figure : edges shown with a threshold T = 0.13 | A picture containing text  Description automatically generated  Figure : edges shown with a threshold T = 0.06 |

1. Sobel filter shows much sharper edges with more details than a Gaussian based filter overall.

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| A picture containing text  Description automatically generated  Figure : edges shown with a threshold T = 0.13 | A black and white photo of a person's face  Description automatically generated with low confidence  Figure : edges shown with Sobel filter |

1. Canny detector captures the most apparent edges and sharper than both Gaussian and Sobel.

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| A picture containing text  Description automatically generated  Figure 17: edges shown with a threshold T = 0.13 | A black and white photo of a person's face  Description automatically generated with low confidence  Figure 18: edges shown with Sobel filter | A picture containing text  Description automatically generated  Figure : edges shown with a canny edge detector with sigma = 5 |