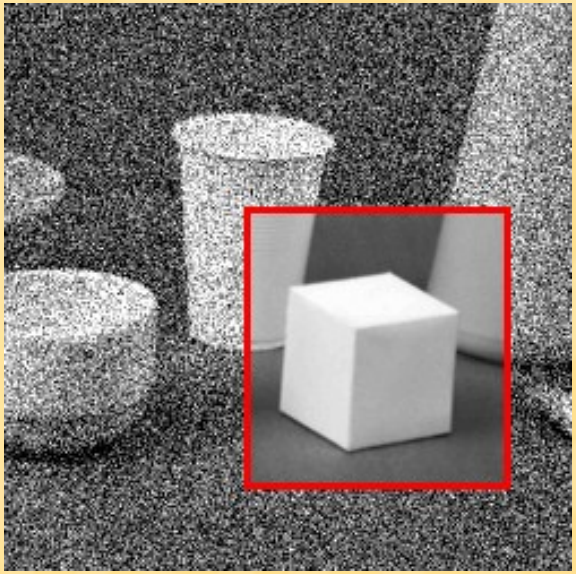

Pre-processing/Filtering for Computer Vision

Alexander Wong

Department of Systems Design Engineering

University of Waterloo

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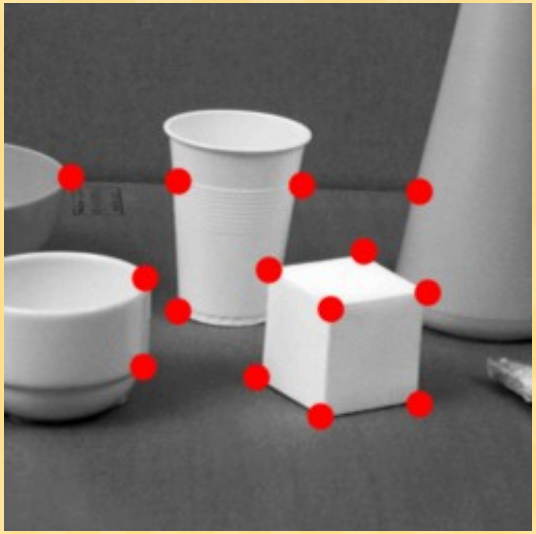
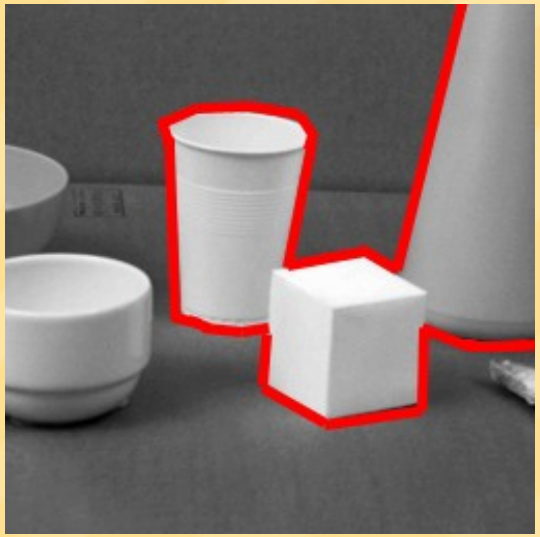
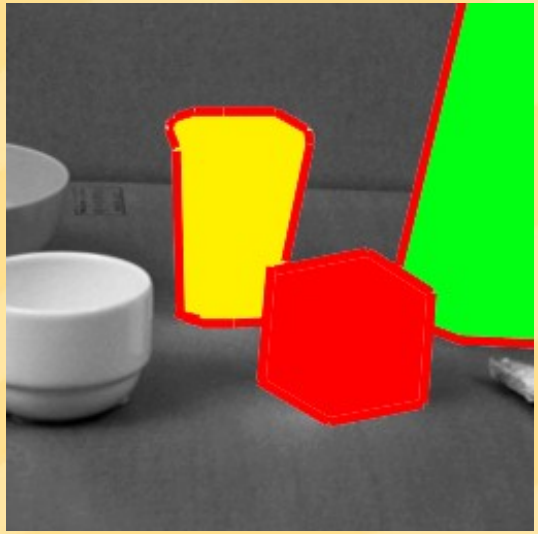
Motivation



Feature extraction



Segmentation



Classification

So where does filtering come in?

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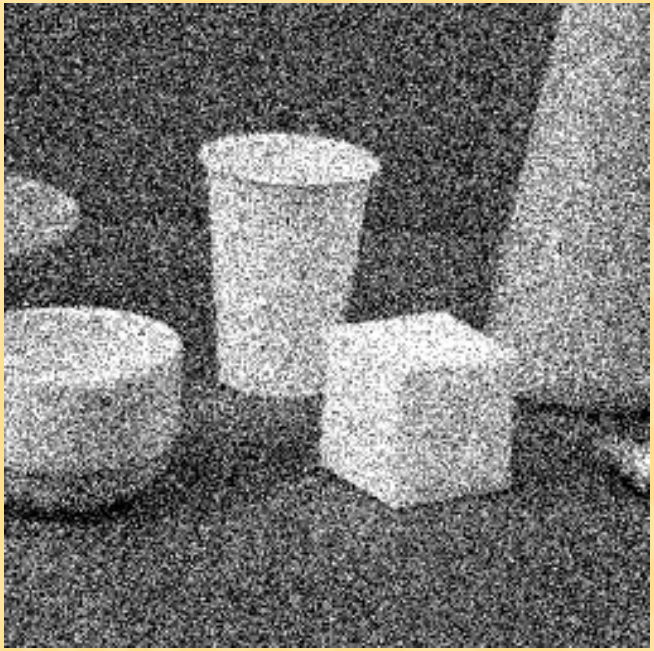
Where does filtering come into play for computer vision?



Noise

Clutter

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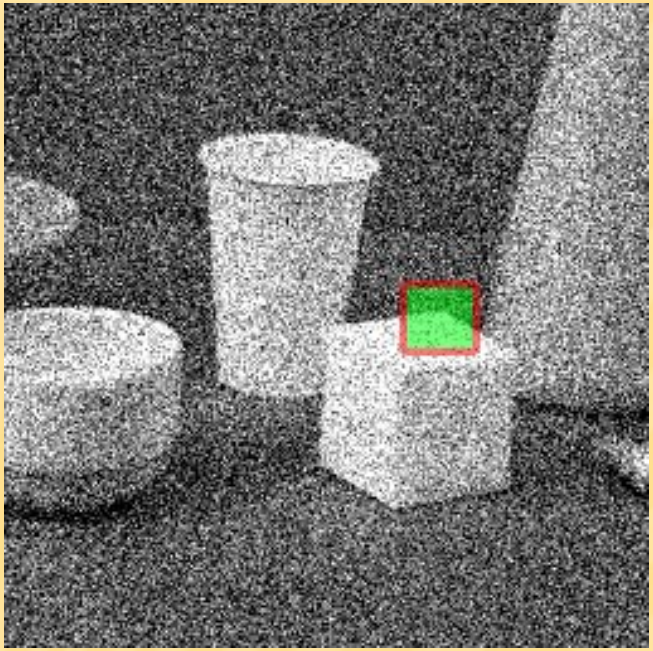
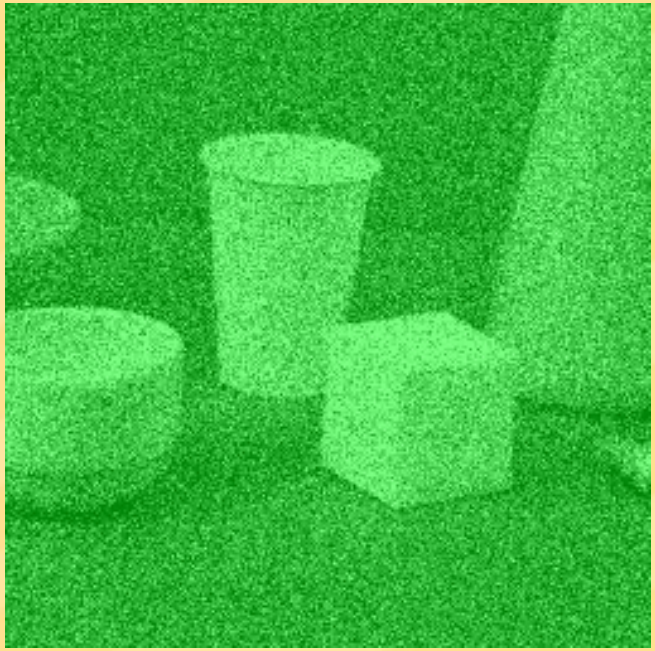
Types of Filtering for Computer Vision



Local



Global

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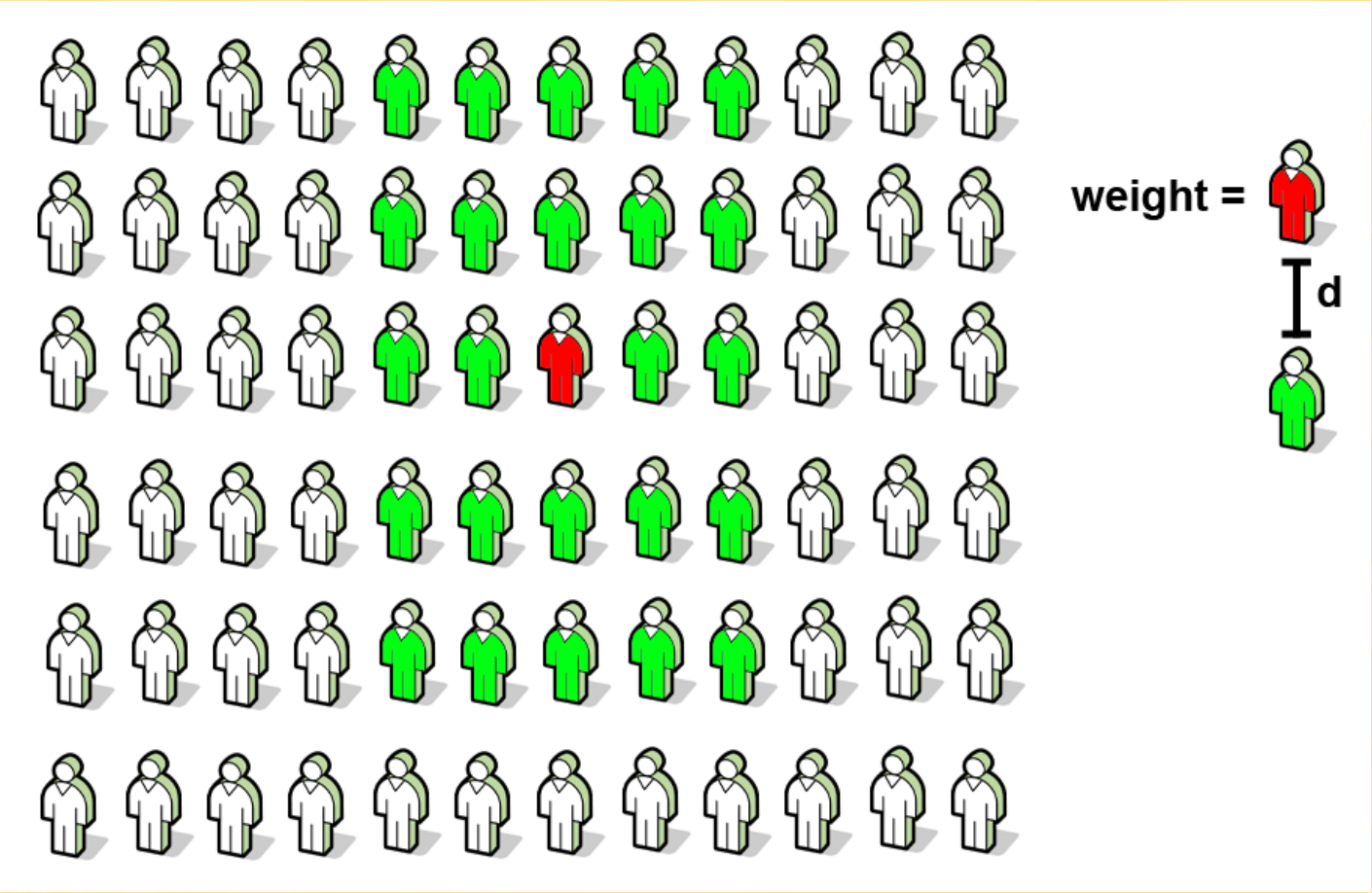
Classical Local Filtering



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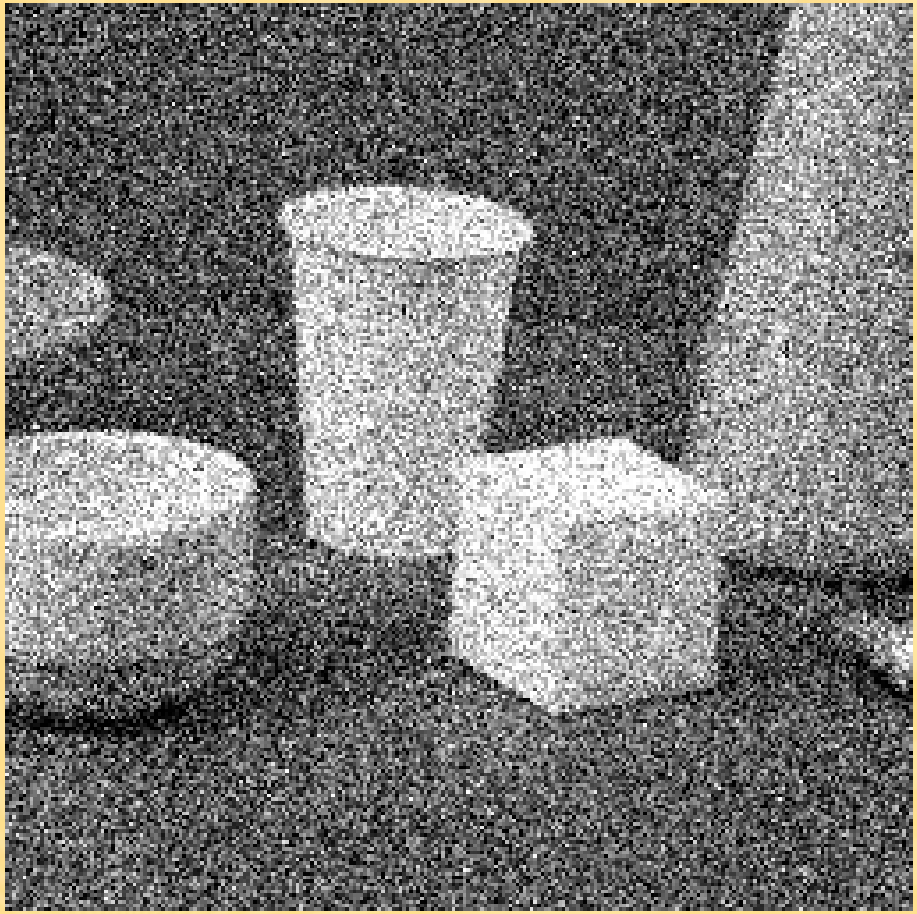
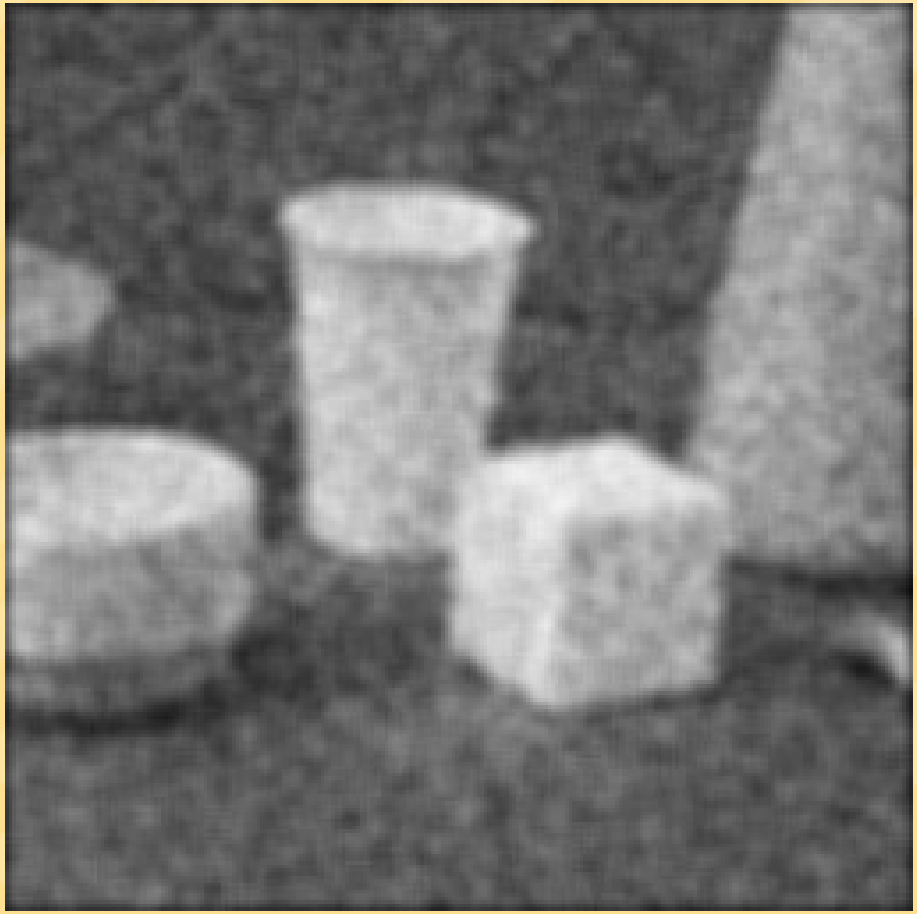
Classical Local Filtering





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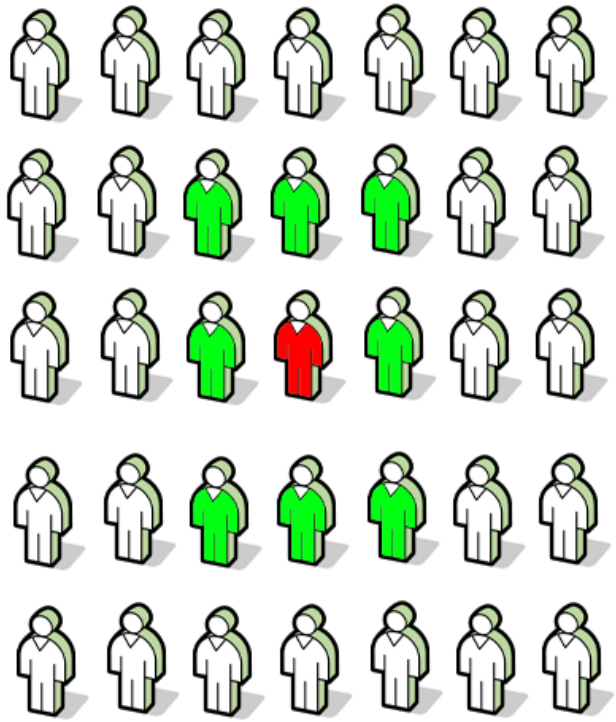
Classical Adaptive Local Filtering

$$\frac{\sigma_f^2 - \sigma_n^2}{\sigma_f^2} + \left(1 - \frac{\sigma_f^2 - \sigma_n^2}{\sigma_f^2}\right)$$



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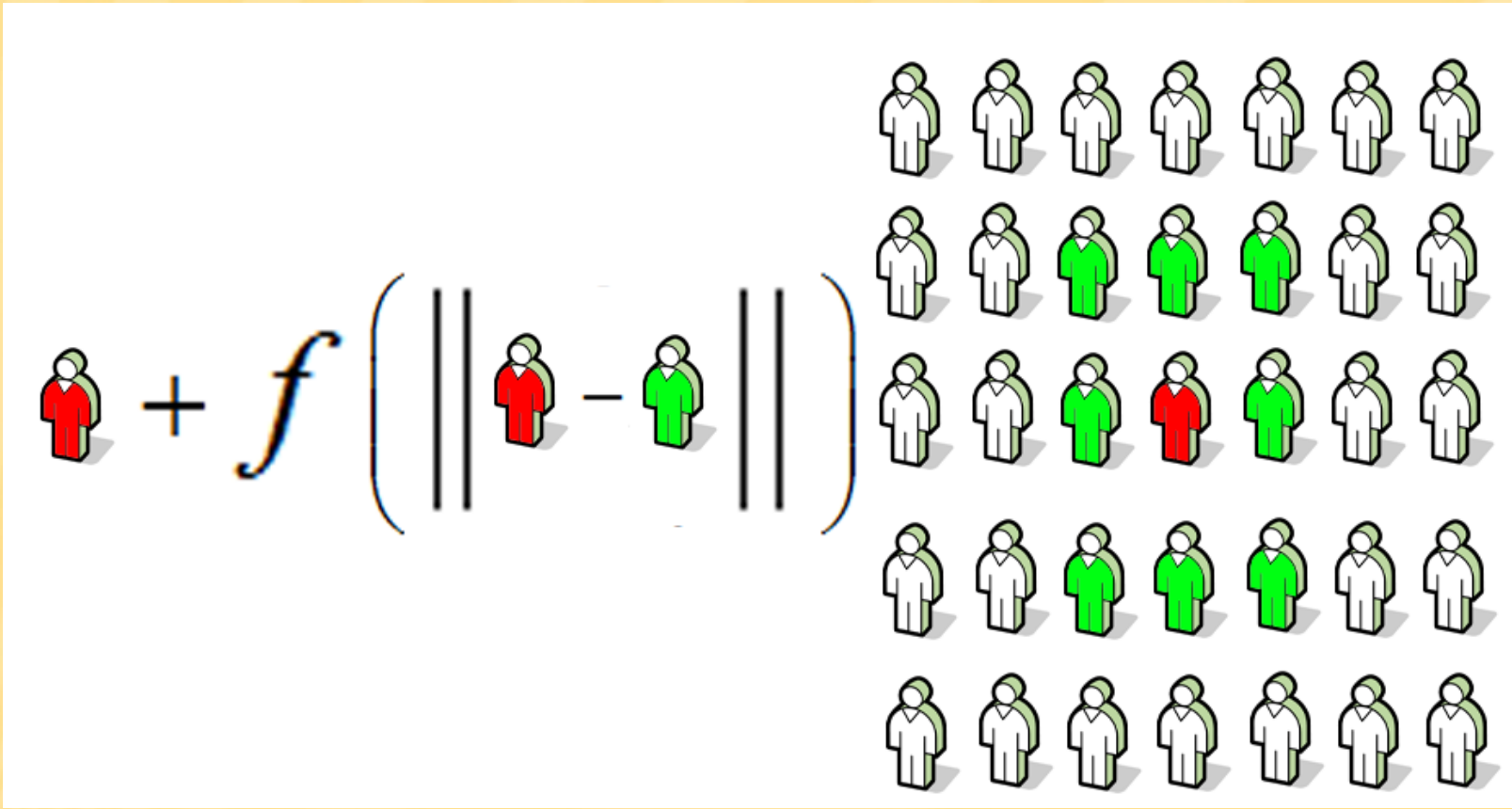
Anisotropic Filtering (Perona and Malik, 1990)



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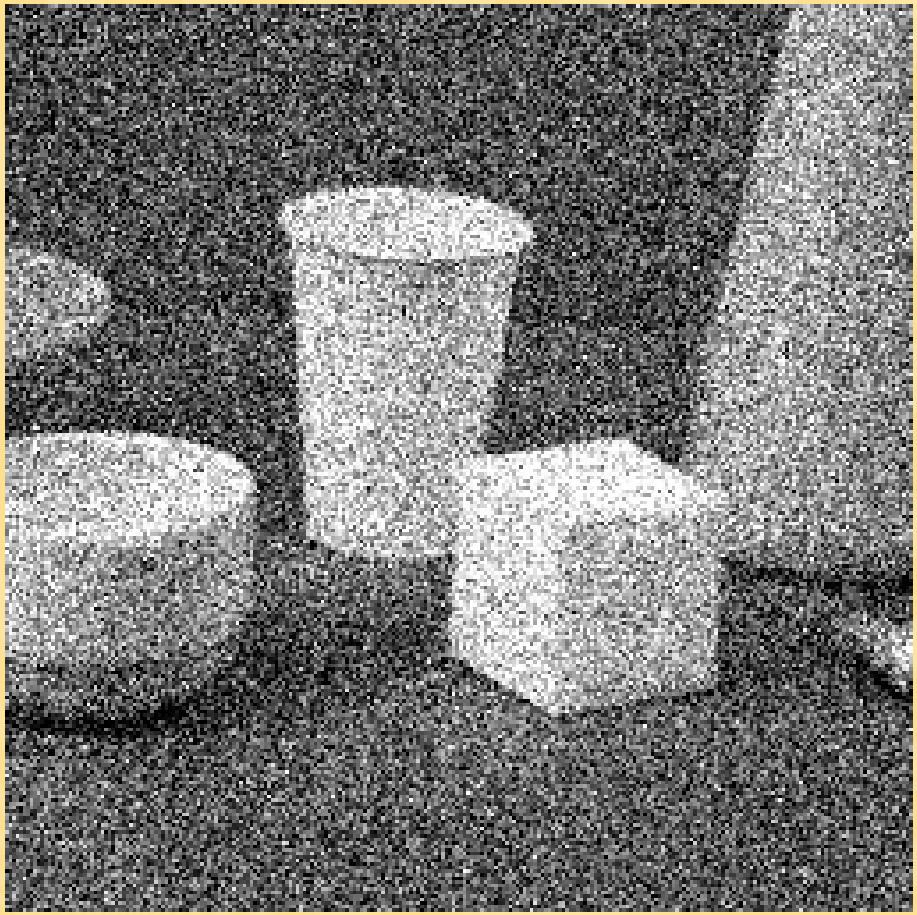
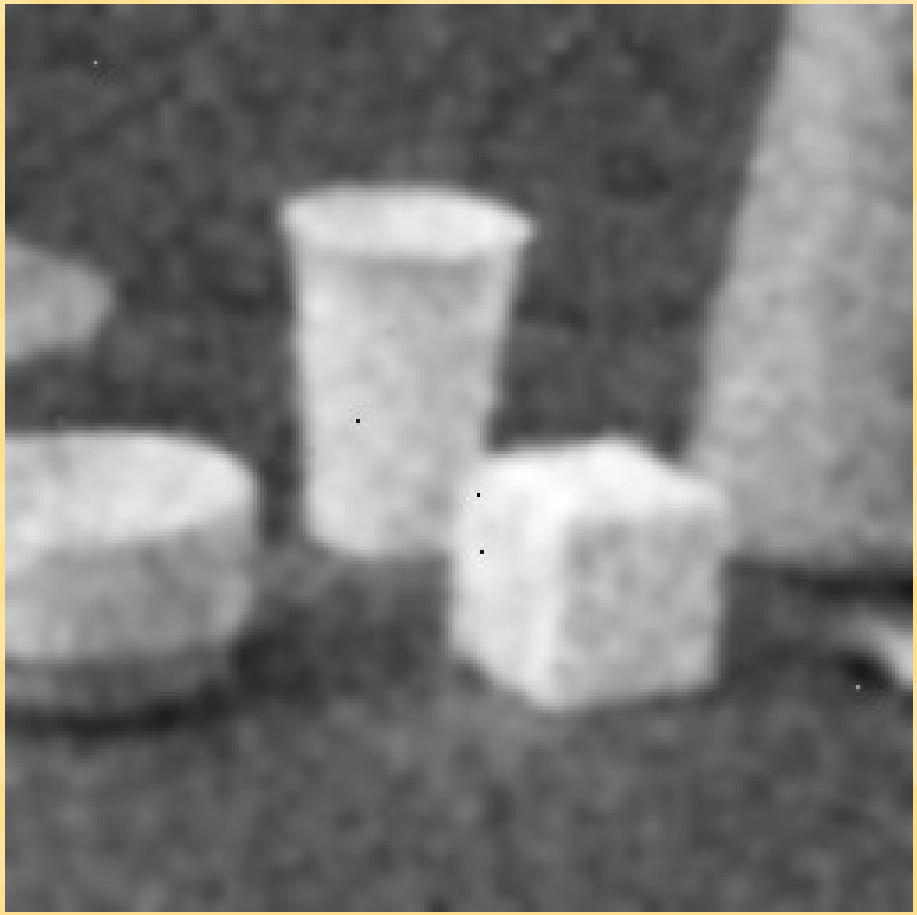
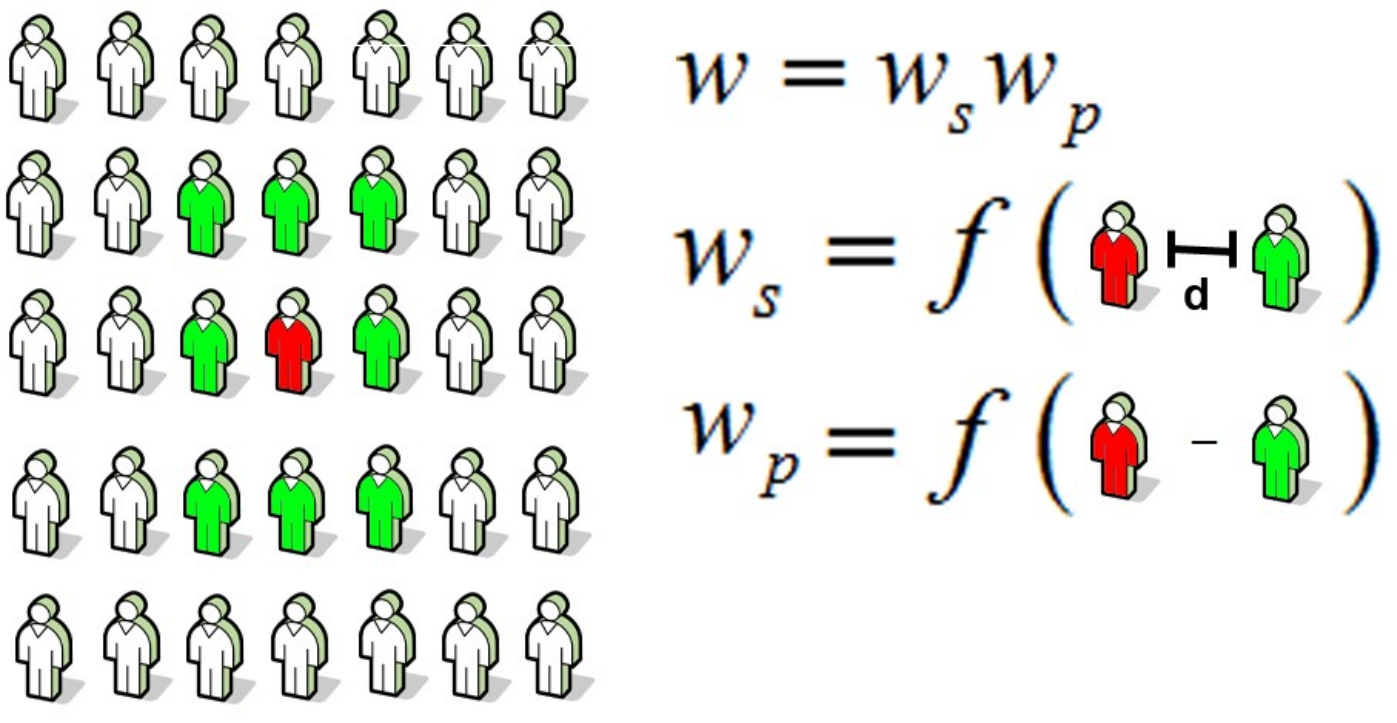
Anisotropic Filtering (Perona and Malik, 1990)





Bilateral Filtering (Tomasi and Manduchi, 1998)



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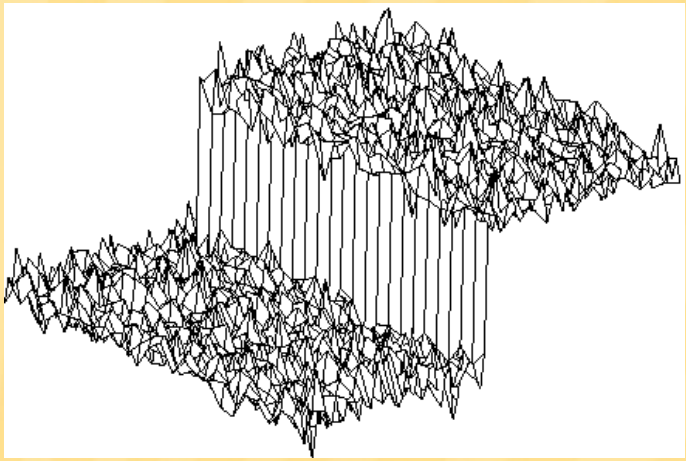
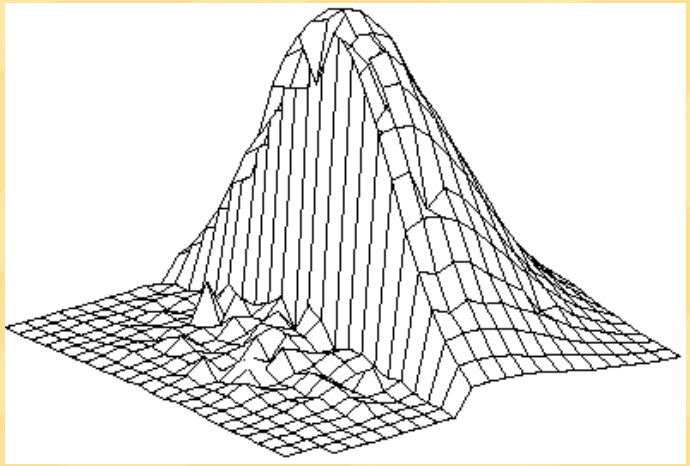
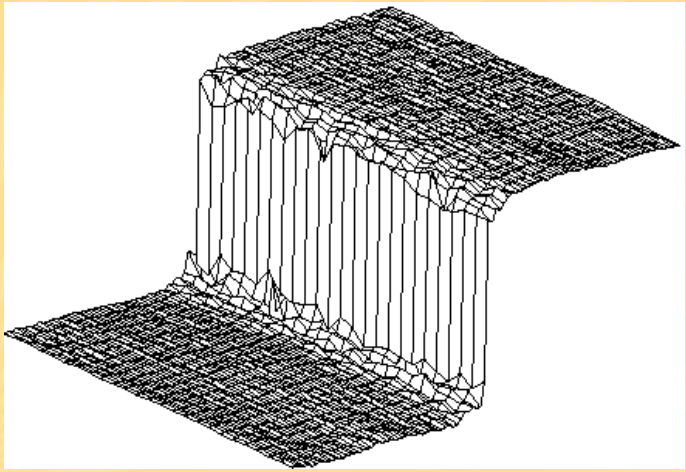
Bilateral Filtering (Tomasi and Manduchi, 1998)







[Tomasi and Manduchi, 1998]

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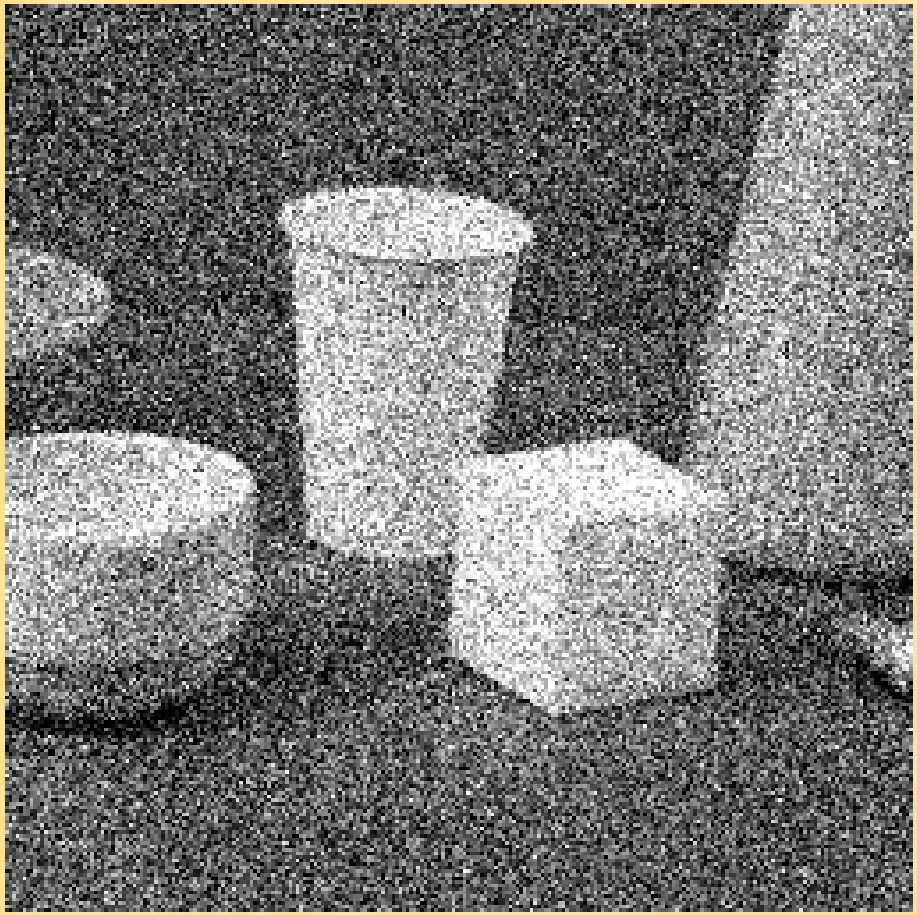
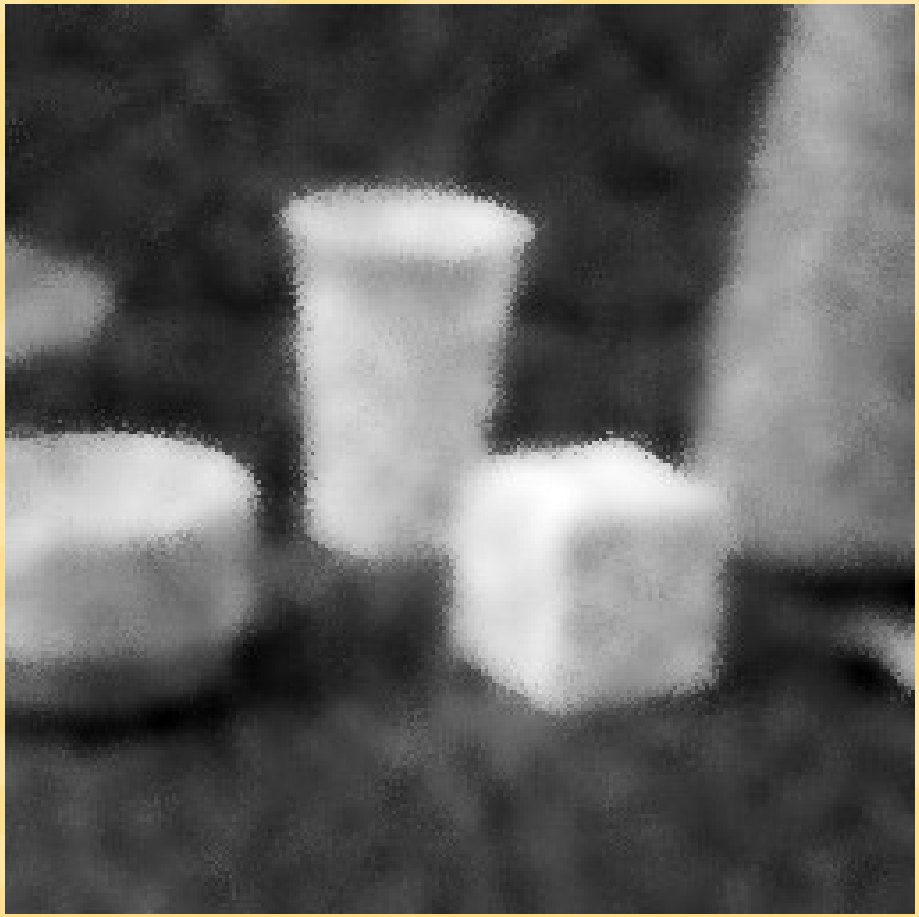
Bilateral Filtering (Tomasi and Manduchi, 1998)





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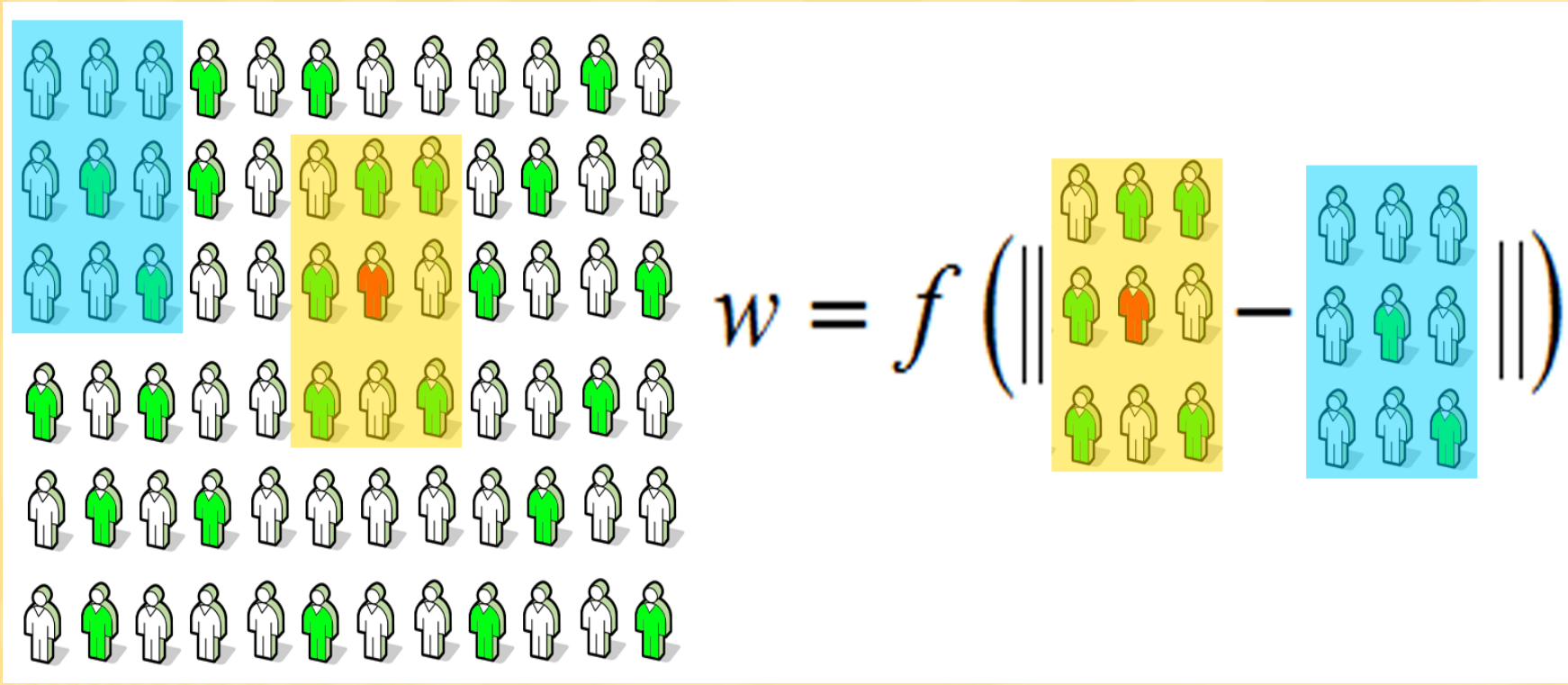
Probabilistic Global Filtering (Wong et al., 2008)



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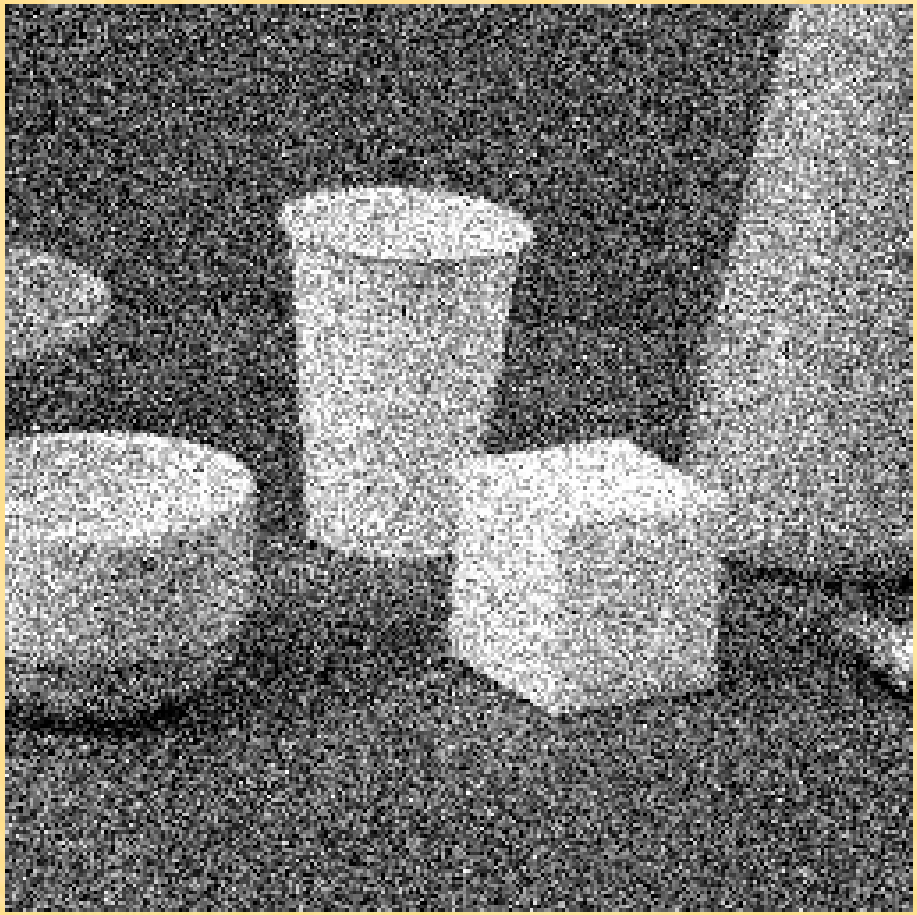
Probabilistic Global Filtering (Wong et al., 2008)



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Thank you!

- Any questions?