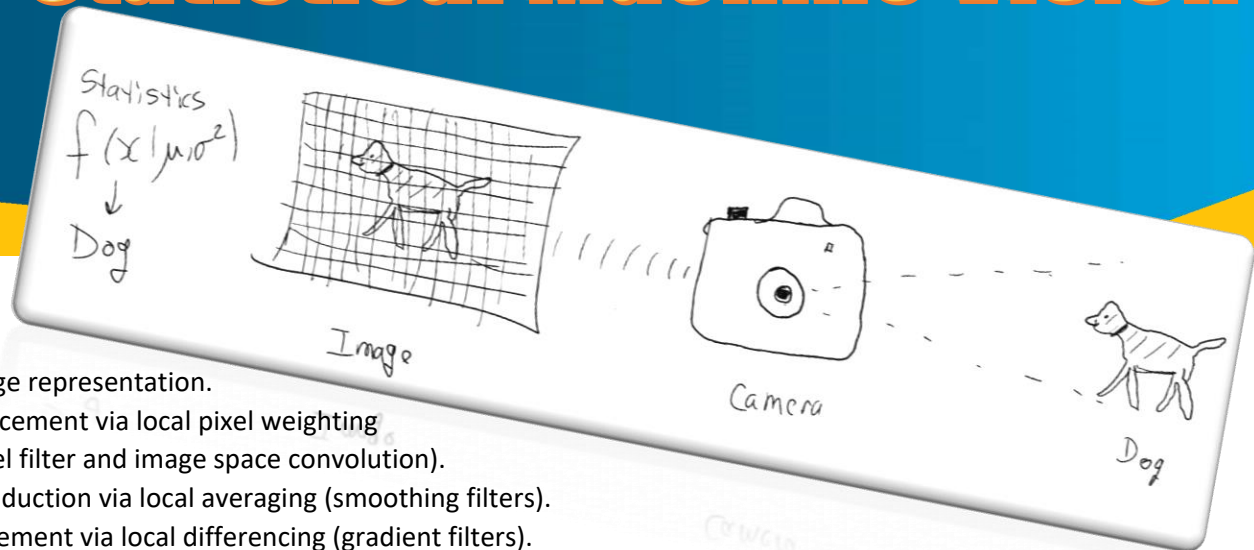
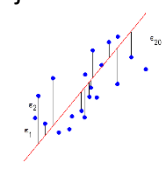
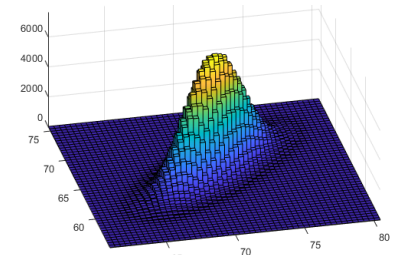


TOPICS IN MATHEMATICS OR STATISTICS: Statistical Machine Vision



Topics:

- Discrete image representation.
- Image enhancement via local pixel weighting (spatial kernel filter and image space convolution).
- Pixel noise reduction via local averaging (smoothing filters).
- Edge enhancement via local differencing (gradient filters).
- Statistical properties of local averaging or differencing (change in pixel mean, variance, and correlation).
- Image text recognition, letter or word identification (letter A, word MATH) or image object detection (car, face) via statistical correlation (template matching).
- Line tracing (road lane lines) within an image via discrete derivatives, gradients, and Hessians.
- Weighted time averaging (temporal recursive filters) for pixel noise reduction in image sequences.
- Identifying and tracking of objects including orientation through a sequence of images (car moving across a scene in a sequence of images).
- Image object segmentation (outlining image objects of interest).
- Connected component analysis object identification (determining the pixels that make up objects within an image).
- Image object representations (perimeter, area, elongation, etc.), feature extraction.
- Statistical classification of image objects using features (square, circle, and rectangle).
- Throughout computational implementation and examples will be given with Matlab.
- Additional topics if time permitting may include the DFT to perform convolutions faster in frequency space.



Prerequisites/Notes:

- COSC 1010, MATH 1451, and MATH 4720 or the equivalents
- Students enrolled in MSSC 5931 will have additional assignments

For more information, email the instructor:

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