CSE 473/573
Computer Vision and Image Processing (CVIP)

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Lecture 35 – Review for midterm
Schedule

• Last class
  – Overview of convolution neural networks

• Today
  – Midterm review

• Readings for today:
  – None

11/17/2014
Midterm logistics

• In class; 45 minutes for 20-25 questions
• Similar in difficulty level to the quizzes
• Will cover topics we did in class; programming assignments are also fair game
• Close book exam
• 1-sided “cheat sheet” notes allowed on a standard “8.5x11” paper
Linear algebra foundations

• Review quiz 0 to get a sense of the LA questions
• Basic linear algebra definitions
• Vector and matrix operations
• Principal component analysis (PCA), eigenvalues and eigenvectors
• RANSAC
Photometry and color

• Reflection at surfaces
• Lambertian + specular model
• Shape from shading
• Color representation (linear and nonlinear color spaces)
  – No questions on
    • Human color perception
    • Physics of color
Linear filters

- Fundamentals of filtering
- Convolution and correlation
- Gradients
- Edge detectors
- Pyramids
Image features and textures

• Harris corner detector
• Blob detector
• Descriptors
  – Histogram of gradients
  – SIFT
• Texture extraction
Stereopsis

- Correspondence problem (disparity)
- Epipolar geometry
- Image rectification
- Depth estimation
- Homography
- Fundamental and essential matrices
  - Know when to use which
Motion estimation

• Estimating optical flow
• Lucas-Kanade flow equations
• Motion-based feature tracking
Clustering and Segmentation

• K-means clustering
• Mean-shift algorithm
• Features for segmentation
Object detection and recognition

- Detection via classification
- Person detection
- Bag-of-words representation
- Object detection evaluation
Probability concepts and classifiers

• Basic definitions
• Bayes rule
• Linear versus nonlinear classifiers
Deep architectures

• Artificial Neural networks
  – Perceptron
  – Multi-layer networks and backpropagation

• Motivation for deep architectures

• Uses of CNN
Questions