

Rensselaer Polytechnic Institute

ECSE 35-6640 Digital Picture Processing - Spring 2005

Monday-Thursday 12:30 – 13:50 DCC 239

First meeting on January 24

- Instructor: Professor George Nagy (nagy@ecse.rpi.edu)
- Office hours: Tuesday and Wednesday 10:00-1:00, or by appointment, JEC 6020, 276-6078
- Prerequisites: programming skills; linear systems and data structures desirable
- Grading:
- | | |
|-------------------------------|-----|
| 5 programming assignments | 50% |
| 5 non-programming assignments | 20% |
| Term paper | 10% |
| Software trial by fire | 20% |
- Text: O’Gorman, Practical Image Processing Algorithms??
- Topics:
- Image acquisition and display
 - Spatial sampling and quantization: scanner test charts and calibration
 - Common image formats, representation, and compression methods
 - Image and text compression methods and software
 - Elementary picture-processing operations; morphology
 - Geometric and intensity quantization and normalization
 - Picture segmentation and connected component labeling (CC)
 - Image registration (2-D and 3-D)
 - Vectorization and tracing as an alternative to thinning and skeletonization
 - Color models, formats, and transformations
 - Digital watermarking and steganography
 - Image databases and digital libraries
 - Selected applications: documents, biomedical, biometric, remote sensing

Programming assignments:

- P1. Binarization methods
- P2. Connected components
- P3. Morphological and convolution operators
- P4. Object location and segmentation
- P5. Vectorization

Non-programming Assignments:

- NP1 Analysis of a scanned test chart.
- NP2 Compression
- NP3 X-Y trees
- Term paper
- NP4 Transformations in color space
- NP5 Image warping

Course objective:

All of the programming assignments will be based on a file of optically scanned documents, which we will use to demonstrate various picture processing algorithms. On completion of the course, students should be sufficiently familiar with the (meager) theoretical foundation, notation and vocabulary of digital picture processing to pursue matters of interest in the current technical literature. They will understand some of the engineering aspects of a prototypical application of digital picture processing