EE641-Digital Image Processing II
Research Project - Final Exam
Spring 1998

Each student will be required to research project on a topic of her or his choice. The project may be either the implementation of an existing method, or the investigation of a newly proposed method.

Each project will be composed of two parts.

1. Due April 10 - Proposal including:

   - Title

   - 200 word abstract

   - Timeline for project completion

2. Due May 1 - Written Report

   - Four pages including figures and references; may be double column.

   - Should include:
     - 200 word abstract
     - Introduction including references.
     - Body - Derivation of theory and motivation. This may be broken down into smaller sections.
     - Experimental results with explaination and discussion.
     - Bibliography

Your report will be graded based on:
Your performance will be graded based on the following criteria:

1. Clearity of discussion and quality of report.

2. Validity of approach

3. Throughness of investigation.

4. Accuracy of results.

The topic of your project may be related to your current research, but should **not be the same as your current research or any other course projects.** For example, if you are currently doing research in segmentation, you might consider doing a project on multiscale segmentation algorithms which extends your current work. Alternatively, you might want to pick a topic which is very different from your current research. In either case, your proposal and report should explain which components of your project are new, and which components are from existing research.

Possible topics for the projects are:

1. Motion estimation

   (a) Bayesian estimation of motion.

   (b) Fast motion estimation algorithms.

2. Image segmentation

   (a) Unsupervised segmentation of images/video.

   (b) Texture segmentation using Bayesian models.

   (c) Segmentation using edge and region information.

3. Image reconstruction and inverse problems

   (a) Bayesian recontruction from acoustic, radar and optical measurements.

   (b) Fast algorithms.

   (c) Alternative image models (e.g. PDE's)

4. Image analysis

   (a) Adaptive edge following using EM algorithm.

   (b) Depth from stereo using MRF.

   (c) Automatic detection of image features - (e.g. cars in arial photos).

   (d) Stochastic template matching.

5. Image coding

   (a) Lossless image coding using stochastic image models.

   (b) Heterogeneous image coding based on segmentation.

6. Image database

   (a) Similarity models for images based on segmentation.

   (b) Image retrieval based on color space clustering.

7. Your own idea.

Useful information

A video sequence known as the "salesman" sequence is available at
/home/yake/bouman/images/pix/Movie/salesman.

   You can play the sequence using the command:
/usr/local/bin/magick/animate sales*.tiff

   You can also find a wider variety of images at
/home/yake/bouman/images/pix/corel