ELEN E6820:

Speech and Audio Processing and Recognition

Columbia University Dept. of Electrical Engineering
Spring 2003

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Web site:
http://www.ee.columbia.edu/~dpwe/e6820/
General information

- **Goals:**
  - survey topics in sound analysis & processing
  - develop an intuition for sound signals
  - learn some specific technologies (esp. ASR)

- **Course structure:**
  - weekly assignments (25%)
  - midterm exam (25%)
  - final project (50%)

- **Text:**
  
  *Speech and Audio Signal Processing*
Web-based

- **Course website:**
  
  http://www.ee.columbia.edu/~dpwe/e6820/

  for lecture notes, problem sets, examples, ...

  + student web pages for homework etc.
Course outline

**Fundamentals**

- L1: DSP
- L2: Acoustics
- L3: Pattern recognition
- L4: Auditory perception

**Audio processing**

- L5: Signal models
- L6: Music analysis/synthesis
- L7: Audio compression
- L8: Spatial sound & rendering

**Speech recognition**

- L9: Speech features
- L10: Sequence recognition
- L11: Recognizer training
- L12: Systems & applications
Weekly Assignments

• **Research papers**
  - journal & conference publications
  - summarize & discuss in class
  - written summaries on web page

• **Practical experiments**
  - MATLAB-based (+ Signal Processing Toolbox)
  - direct experience of sound processing
  - skills for project

• **Book sections**
  + questions from book
Final Project

- Most significant part of course (50% of grade)

- Oral proposals mid-semester; Presentations in final class + website

- Scope
  - practical (Matlab recommended)
  - identify a problem; try some solutions
  - evaluation

- Topic
  - few restrictions within world of audio
  - investigate other resources
  - develop in discussion with me
Examples of past projects