

Expected student activities in ECE8873- Spring/2004

1. Presentation of coding and compression standards:

- LPC10/FS-1015 – low bit-rate (2.4 kbps) federal standard in voice coding
- MELP – new low bit-rate federal standard in voice coding
- CELP/FS-1016 – 4.8kbps federal standard in voice coding
- G.729 – ITU standard
- G.722/AMR-WB – wideband speech coding standard
- PAC/AAC – audio coding standard
- JPEG/JPEG2000 – still image coding standard
- H.120/H.261 – early video coding standard
- MPEG-1 – early video coding standard
- H.262/MPEG-2/HDTV – digital video standards
- H.263-4 – new video coding standard
- MPEG-4 – multimedia standards
- MPEG-7 – multimedia standards
- Current signal compression activities in packet networks.

Every student will be assigned a presentation topic at the beginning (3rd week) of the semester and is expected to collect materials for his/her presentation which will last 30 minutes. The sequence of presentation is listed in the course schedule. Each presentation is going to be judged not only by the extent of the collected material, but more importantly, how the presenter demonstrates his/her understanding of the algorithms used in the standards according the theoretical framework discussed throughout the class lectures. This demonstration of understanding is best reflected in form of contrast or comparison to other algorithmic choices that either were earlier generation of techniques or had not been chosen during the standards competition.

2. Contribution to the pool of compression software tools

Every student needs to elect a subject in data compression and develop software/code that demonstrates the detailed idea of the subject. Data compression is not useful unless it is implemented. These code modules need not be as sophisticated as the entire system of a coding standard but each of them should be sufficient to encapsulate a key idea in the class. For example, a code that implements the Lloyd algorithm with the possibility of variable input dimensions (i.e., it works for both scalar and vector inputs). Another example may be a Huffman encoder/decoder module that takes in specification of the probability distribution of source symbols and produces the compression code. Feel free to seek open source codes as a starting point but be aware that they ALL need adaptation to suit the purpose. Towards the end of the semester, an oral report and demonstration of the software capability are going to be made to the class by each contributor. Each software module is also going to be shared among (made available to) all the students in class. The schedule for this contribution assignment is as follows:

February 10	Submission of definition of functionality of the intended contribution for approval
March 10	Interim progress report (1-page) and possible revision of the original plan
April 12-21	Final report and demonstration to the class

3. Grading schedule:

- Standards presentation 30%
- Software tool contribution 40%
- Final exam 30%

Presentation Assignments:

- LPC10/FS-1015 – Soo Hyun Bae
- MELP – Phil Whitehead
- CELP/FS-1016 – Mehmet Demircin
- G.729 – ITU standard – Rungsun Munkong
- G.722/AMR-WB – Dwi Mansjur
- PAC/AAC – Antonio Moreno
- JPEG/JPEG2000 – Isabelle Marque
- H.120/H.261 – Qaiser-Ahmed Patel
- MPEG-1 – Richard Tarbell
- H.262/MPEG-2/HDTV – Dihong Tian
- H.263-4 – Ted Wada
- MPEG-4 – Olivier Dechazal
- MPEG-7 – Deryck Yeung
- Current signal compression activities in packet networks