ECES-690-503: Genomic Signal Processing
Week 1 in-class assignment 1

Due: April 7th, 2009

Database Comparison Exercise:

1) Find the record for the human gene APOE. Provide the gene name and description.

2) What area of research apparently led to the discovery of this gene?

3) What chromosome contains this gene?

4) How many nucleotides down the chromosome is the next closest protein coding gene, in each direction?

5) Do either of these adjacent genes have a related function? (Alternately, have these genes been connected in a research article?)

6) How many sequence tagged sites are identified for this gene?

7) How many nucleotides long is the genomic region for this gene?

8) How many nucleotides long is the transcript for this gene, and how does this compare with the genomic region length?

9) How many amino-acids long is the protein peptide encoded by this gene, and how does it compare with the transcript length?

10) What mutations are associated with this gene in the OMIM database? Which mutations correspond with disease?

11) Determine the number of SNPs associated with this gene in the dbSNP database, including exonic, interonic, and upstream regions.

How does the number of SNPs compare with the number of entries in the OMIM database?

12) Perform a Conserved Domain search. Does this protein contain a domain in common with another protein? If so, what is the function of the other protein, and based on the similarity of these proteins, what is the function of this domain?

13) Create a hypothesis for the origin and evolution of this gene. Your answer may be somewhat vague and creative.

Matlab Exercise:

1) Go to the following URL and complete the exercise:

http://www.computational-genomics.net/case_studies/humans_demo.html