**[HW7](https://ualearn.blackboard.com/webapps/assignment/uploadAssignment?content_id=_4713865_1&course_id=_164945_1&group_id=&mode=view)**

Attached Files:

* + [[File](https://ualearn.blackboard.com/bbcswebdav/pid-4713865-dt-content-rid-45072029_1/xid-45072029_1) hmm.mat](https://ualearn.blackboard.com/bbcswebdav/pid-4713865-dt-content-rid-45072029_1/xid-45072029_1) (2.887 KB)
  + [[File](https://ualearn.blackboard.com/bbcswebdav/pid-4713865-dt-content-rid-45562089_1/xid-45562089_1) FullBNT-1.0.7.zip](https://ualearn.blackboard.com/bbcswebdav/pid-4713865-dt-content-rid-45562089_1/xid-45562089_1) (11.706 MB)

**Assignment:**  
Classification of discrete sequences using HMM  
 **What to submit:**  
A report on the assignment as specified in the syllabus and MATLAB code submitted through the Blackboard.  
 **Grading criteria:**1. Correctness of the models and your explanations - 90 pts equally split between subproblems in the assignment  
2. Clarity  of the report - 10 pts  
3. Bonus - 5 pts

**Start here:**1. Download and install [HMM Toolbox for MATLAB](http://www.cs.ubc.ca/~murphyk/Software/HMM/hmm_download.html)  
  
2. Carefully read the tutorial on using [HMM Toolbox](http://www.cs.ubc.ca/~murphyk/Software/HMM/hmm_usage.html).  
  
3. Download the data file (attached) . This file contains 7 matrices.

* + The first two matrices (data1 and data2) represent output of two Markov processes (lets call them Process 1 and Process 2) with 3 discrete outputs and unknown number of hidden states. Each matrix represents 20 samples of 200 consequtive observations. These data are to be used for learning Hidden Markov Models.
  + Matrices X1-X6 contain observations either from Process 1 or from Process 2. Your goal is to classify X1-X6 and tell which Process was used to generate those sequences.
  + Estimate what was the likely number of states for Process 1 and Process 2.

Hints:

* + information in the [HMM Tutorial](http://www.cs.ubc.ca/~murphyk/Software/HMM/hmm_usage.html) is sufficient to complete this assignment
  + you may want to search for the parameters of the best HMM model for each Process

Bonus problem:

- Demonstrate an HMM classifier for physical activity using this [tutorial](http://www.media.mit.edu/wearables/mithril/BNT/mixtureBNT.txt). For the bonus problem to count toward your grade, you need to replicate the results and create a script that will train the classifier and recognize the data provided in the tutorial. The submission must include the script, the data and clearly visualized results of the classification. The report must include a discussion of the results.