CISC/CMPE452/COGS400
Assignment 3
PCA Network

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General Instructions for Code and Submission
(for all assignments)

- You can use any programming language (preferred C, C++, Java, or Matlab)
- For all assignments you have to submit
  - The source code with inline comments and comments in the beginning of the program saying briefly what your program does and how.
  - The executable with anything else that may be required to run your binary (libraries, input).
  - A readme.txt or word document file explaining your results.

    Your choice of initial values of variables and architecture of your network can influence your results.
  - Outputs as requested (as a text or doc file)
- Make **one zip file named as Asg#_studentID.**
- Upload your assignment to the onQ site.

Assignment 3

- This is a Cocktail Party Problem with two sound sources and two microphones. The dataset ‘sound.csv’ contains two sounds recorded by the two microphones. The goal of this assignment is to apply PCA to a network to find the approximation of the first principal component, which should provide you with a .csv file with one isolated sound source.

Assignment 3 (cont…)

- Write a program to implement the Principal Component Analysis Network with 2 inputs nodes and one output node, where the learning rate = 0.1 and the initial values of w=[1, 0];
- For simplicity, only one learning cycle will be used (iteration=1).

Data (x1, x2)

- The dataset ‘sound.csv’ contains two sounds recorded by the two microphones.
- The range of the data values is between -1 and 1.

- (Notes that the original two 'wav' files can also be downloaded. The ‘wav’ data have 8 bit value [0, 256] with single channel.
- The original sound data is downloaded from http://research.ics.aalto.fi/ica/cocktail/cocktail_en.cgi
- The explanation of the canonical wave file format: http://soundfile.sapp.org/doc/WaveFormat/)

Outputs

Submit

- The final weights of the output node in ‘readme.txt’.
- Save the final output value *y* in ‘output.csv’ file.

- If you can convert the output data into a 'wav' file, please also submit it. This can be done using python libraries numpy and scipy to write .csv data to a .wav file. Matlab also has a function for this.

Deliverables

- A zip file **Asg#_studentID containing the following.**
  - The source code with comments.
  - A readme.txt file with the final weights.
  - A output.csv file with the final output value *y*.
  - The executable with other modules if required for execution (include in the text file how to execute code if special input is required). If a data file is needed for execution, include it in the same directory as your executable in the zip file.
    - You will not get the 2 marks if we cannot execute your code.

Marks and Deadline

- Assignment should be uploaded to Moodle by **November 18, 2016.**
- Mark Distribution for a total of **5 marks**
  - Comments in program (in line and beginning of program) and explanations: 1 marks
  - Proper execution : 2 marks
  - Output : 2 marks (weights + output *y*)
- Late submission each day -1.
- (If you can convert the output data into a 'wav' file, please also submit it.)