## HU Extension Assignment 08 E63 Big Data Analytics

### Handed out: 03/24/2017 Due by 9:30AM EST on Saturday, 04/01/2017

You are welcome to implement TensorFlow problems in this problem set in any of supported languages.

**Problem 1.** Install newest release of TensorFlow 1.0.1 on the operating system of your choice. Use installation instructions on <https://www.tensorflow.org> site and instructions in the attached files: install-mac-docket.md, install-mac-native.md, install-ubuntu.md and install-win-native.md. Unless you know what you are doing do not install TensorFlow for GPU. Install TensorFlow for CPU. Use attach Jupyter notebook: 0\_test\_install.ipynb to demonstrate that TensorFlow is properly installed. **(10%)**

**Problem 2.** Construct a simple neural network (a network of logistic units) which will implement (X1 XOR X2) AND X3 function. Choose weights (-s) of all dendritic inputs and bias inputs. Demonstrate that your network works by presenting the truth table. Present your network by a simple graph. You can produce the graph in any way convenient including pan and paper**. (15%)**

**Problem 3.** Calculate the first 30 Fibonacci numbers using TensorFlow API and recurrence relationship:

,

with seed values: .

To help you out, we are attaching Jupyter notebook entitled: 1\_warm\_up.ipynb which contains Fibonacci calculation based on the products of 2x2 matrixes of the form. Export TensorFlow graph crated in this problem to a directory of your choice. Read and display that graph using TensorBoard tool. When starting the TensorBoard it appears that you need to specify the full directory path to the log directory, like:

C:\> tensorboard –-logdir=E:/code/output

**(25%)**

**Problem 4.** Please examine attached Jupyter notebook 2\_linear\_regression.ipynb. As you are running its cells, the notebook will complain about non-existent API calls. This notebook was written in an earlier version of TensorFlow API and some calls changed their names. Fix all code by replacing older calls with calls in TF 1.0.1. Uncomment all optional (print) lines. Provide a copy of this notebook with all intermediate results and the image of TensorFlow graph as captured by the TensorBoard.

**(20%)**

**Problem 5.** Please considered attached Excel file called Reduced\_Car\_Data.xlsx. This is the data set we used previously except that we have now removed several descriptive variables and left only: Displacement, Horsepower and Weight. Please build a regression model using TensorFlow that will predict the gasoline consumption (MPG - Miles Per Gallon) of cars based on three remaining variables. Please extract a percentage of data to serve as a training set and a percentage to serve as the test set. Please report on the accuracy of your model.

**(30%)**

Please, describe every step of your work and present all intermediate and final results in a Word document. Please, copy past text version of all essential command and snippets of results into the Word document with explanations of the purpose of those commands. We cannot retype text that is in JPG images. Please, always submit a separate copy of the original, working scripts and/or class files you used. Sometimes we need to run your code and retyping is too costly. Please include in your MS Word document only relevant portions of the console output or output files. Sometime either console output or the result file is too long and including it into the MS Word document makes that document too hard to read. PLEASE DO NOT EMBED files into your MS Word document. For issues and comments visit the class Discussion Board.