

## Assignment 5

CIS 471/571 Introduction to Artificial Intelligence, Fall 2018

**due 11:59 pm, Wednesday, November 21th**

1. Design and train a neural network with one hidden layer based on the data in Figure 18.3 but excluding the “Hungry” information/attribute. The number of input nodes are fixed as 9 because there are 9 attributes. One design is to use one node to represent the output (Target) and 3 nodes in the hidden layer. Report the final results (i.e., label weights in your network) when the weights converge and the error less than  $10^{-5}$ . You need to write a program to train the neural network. (Hint, you may need to change the values of Attributes and Target (Wait) to numerical values by yourself: e.g., F to 0.1 and T to 0.9 etc. So you need to report your converted input data as well.)

2. Understanding the mechanism of neural network: forward propagation, backpropagation, and gradient updating. Download the jupyter notebook from the following URL: <https://classes.cs.uoregon.edu/18F/cis471/assignments/deeplearning.ipynb> and finish the tasks in it. For this problem, you may run the jupyter notebook on your machine or upload it to Google drive, then run it by Colaboratory. (**Note:** In this Friday’s class(11/16), Eric will give a tutorial of TensorFlow and numpy. To submit your answer for problem 2, you may use a .ipynb file or a link to your Colaboratory notebook.)

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**To turn in by Canvas/emails:** If you are in **CIS 471**, submit your answers on **Canvas**. If you are in **CIS 571**, email to **dou@cs.uoregon.edu**. We prefer that you send in a pdf file. If you are using Word, you should be able to convert your word file to a pdf file.