CS161: FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

Fall 2014
Assignment 9 - Due 11:55pm Monday, December 15

Please submit your solutions on CCLE. The submitted file should be plain text or a formatted PDF file (no scans or pictures).

1. Consider the table below which represents a dataset by listing each unique example with the number of times it appears in the dataset. Construct the decision tree learned from this data by finding the most discriminating attribute at each step. Show precisely how you decided on the most discriminating attribute at each step by computing the expected entropies of the remaining attributes.

Example	Input Attributes			Class	#
	A	B	C	D	
$\mathbf{x}_1$	T	T	T	Yes	1
$\mathbf{x}_2$	T	T	F	Yes	6
$\mathbf{x}_3$	T	F	T	No	3
$\mathbf{x}_4$	T	F	F	No	1
$\mathbf{x}_5$	F	T	T	Yes	1
$\mathbf{x}_6$	F	T	F	No	6
$\mathbf{x}_7$	F	F	T	Yes	2
$\mathbf{x}_8$	F	F	F	No	2

2. Create a two layer neural network that uses the step function to implement $(A \vee \neg B) \oplus (\neg C \vee D)$, where $\oplus$ is the XOR function. You can either use the network structure provided below or another structure you construct. After drawing your network, clearly show the weights and activation function for each node. Assume inputs of $\{0, 1\}$ for each input variable. Note that solutions with more than two layers will still receive partial credit.