

Data Mining, CSCI 347, Fall 2019
Homework 2, Trees and evaluation, due Sept. 30

1. Calculate the bits of information for the following.

Given 5 instances with two class values.

$\text{Info}([5,0])$

$\text{Info}([4,1])$

$\text{Info}([3,2])$

$\text{Info}([2,3])$

$\text{Info}([1,4])$

$\text{Info}([0,5])$

2. Calculate the bits of information for the following.

Given 4 instances with two class values.

$\text{Info}([4,0])$

$\text{Info}([3,1])$

$\text{Info}([2,2])$

$\text{Info}([1,3])$

$\text{Info}([0,4])$

3. Calculate the bits of information for the following splits with 3 class values.

Info([5,5,5])

Info([6,6,6])

4. Calculate the bits of information for the following splits with 4 class values.

Info([5,5,5,5])

5. Calculate the bits of information for the following splits with 8 class values.

Info([5,5,5,5,5,5,5,5])

6. Look over your answers to questions 1-5. State patterns that you notice.

7. Use the measure of gain ratio to determine the best attribute to use as the root of a tree to predict the class value in the following dataset.

This is the contact-lenses dataset with the tear_prod-rate attribute removed. Note that the first column (the numbers) is there for your convenience. It is not part of the data.

Show all work.

Relation: contact-lenses-weka.filters.unsupervised.attribute.Remove-R4				
No.	1: age Nominal	2: spectacle-prescrip Nominal	3: astigmatism Nominal	4: contact-lenses Nominal
1	young	myope	no	none
2	young	myope	no	soft
3	young	myope	yes	none
4	young	myope	yes	hard
5	young	hypermetrope	no	none
6	young	hypermetrope	no	soft
7	young	hypermetrope	yes	none
8	young	hypermetrope	yes	hard
9	pre-presbyopic	myope	no	none
10	pre-presbyopic	myope	no	soft
11	pre-presbyopic	myope	yes	none
12	pre-presbyopic	myope	yes	hard
13	pre-presbyopic	hypermetrope	no	none
14	pre-presbyopic	hypermetrope	no	soft
15	pre-presbyopic	hypermetrope	yes	none
16	pre-presbyopic	hypermetrope	yes	none
17	presbyopic	myope	no	none
18	presbyopic	myope	no	none
19	presbyopic	myope	yes	none
20	presbyopic	myope	yes	hard
21	presbyopic	hypermetrope	no	none
22	presbyopic	hypermetrope	no	soft
23	presbyopic	hypermetrope	yes	none
24	presbyopic	hypermetrope	yes	none