

Exercises

A resource for MCQs on KNN

<https://www.analyticsvidhya.com/blog/2017/09/30-questions-test-k-nearest-neighbors-algorithm/>

Q1. KNN

What is K-nn?

Explain the majority vote and weighted vote method with an example.

Consider the one-dimensional dataset given below:

x	0.5	3.0	4.5	4.6	4.9	5.2	5.3	5.5	7.0	9.5
y	-	-	+	+	+	-	-	+	-	-

- (a) Classify the data point $x = 5.0$ according to its 1-, 3-, 5- and 9- nearest neighbors (using majority vote)
- (b) Repeat the previous analysis using the distance-weighted voting approach

Q2. Decision Trees

Given the following data, create a decision tree using Entropy

Day	Outlook	Temperature	Humidity	Wind	Play Cricket
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes

Also describe what would have you done if 'Temperature' would have been a continuous attribute.

Q3. Suppose we are dealing with a word sense disambiguation problem (same word having multiple meanings in different contexts, like run can mean

run1: move swiftly (I ran to the store)

run2: operate (I run a store)

run3: flow (water runs from the spring)

run4: length of torn stitches (Her stockings had a run)

Possible features include:

near(w): is the given word near an occurrence of word w?

pos: the word's part of speech

left(w): is the word immediately preceded by the word w?

Construct a binary tree using info gain as a split measure which will classify the meaning of the word 'run'

Features				Word Sense
pos	near(race)	near(river)	near(stockings)	
Noun	No	No	No	Run4
Verb	No	No	No	Run1
Verb	No	Yes	No	Run3
Noun	Yes	Yes	Yes	Run4
Verb	No	No	Yes	Run1
Verb	Yes	Yes	No	Run2
Verb	No	Yes	Yes	Run3

Q4. Consider the following training dataset and construct the decision tree using entropy as an impurity measure

	Categorical	Categorical	Continuous	Class
ID	Home Owner	Marital Status	Annual Income	Defaulted Borrower
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes