

Roll No.: _____
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B.Tech Second Assessment Examinations – January 2018
Sixth Semester
Computer Science Engineering
15CSE361Pattern Recognition

Time: Two hours

maximum: 50 Marks

Answer all questions

Part A

(5*2=10)

1. List some factors affecting the performance of KNN?
2. The temperature values observed in a particular data set are:

45,69,92,53,39,92,38,31,34,56,78,49.

Estimate the density using histogram for the above samples.

3. For estimating the density using histogram, How to fix optimal bin size for better approximation of density?
4. What are the different metrics used in KNN for measuring the dissimilarities between features?
5. What is the use of confusion matrix? Give an example?

Part B

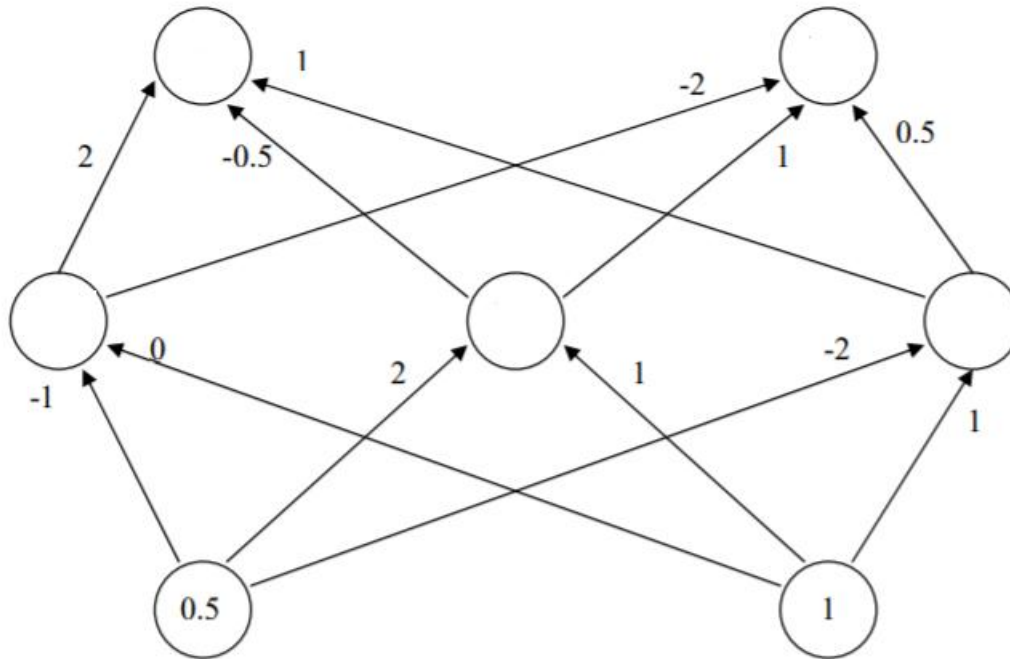
(4*5=20)

6. We have the following training data for student height/weight vs gender:

Student	1	2	3	4	5	6
Height	70	65	66	60	58	62
weight	175	170	168	150	155	160
Gender	0	0	0	1	1	1

Gender=0 is male and Gender =1 is female.Now we have a test case(height=64,weight=161).Use the KNN classifier with the following properties:k=3,distance=Manhattan,weight=uniform to classify the given test case.

7. The following is a network of linear neurons, that is, neurons whose output is identical to their net input, $o_i = \text{net}_i$. The numbers in the circles indicate the output of a neuron, and the numbers at connections indicate the value of the corresponding weight.



a) Compute the output of the hidden-layer and the output-layer neurons for the given input (0.5, 1) and enter those values into the corresponding circles.

b) What is the output of the network for the input (1, 2), i.e. the left input neuron having the value 1 and the right one having the value 2? Do you have to do all the network computations once again in order to answer this question? Explain why you do or do not have to do this.

8. Use a symmetric triangular kernel with base of 4 to estimate the density at $x=2$, given samples at 0,1,1,2,3,5,8, and 9. Sketch the estimated density function for the given values.

9. At some point in training a set of adaptive discriminant functions, the equations were

$$Dc1=3+4x+5y+6z$$

$$Dc2=7+2x-3y+4z$$

$$Dc3=-2-4x+6y+8z$$

$$Dc4=5+6x-7y+8z$$

The next sample had the feature value $x=1$, $y=2$, $z=3$, and was a member of class 3.

What would be new set of discriminate functions after adapting them for this sample if $c=1$ and $k=3$.

Part C

(2*10=20 marks)

9. Derive the decision boundaries for the following set of labeled samples and show the results up to 10 iterations if it is not converged.

X1	X2	D
0	0	1
2	1	1
1	2	-1
2	3	-1

With $k=c=1$.

10. Apply Back propagation algorithm for XOR with learning rate $=0.3$. find the weights of the connections after learning.

