cse352 AI

Homework 3   10pts

There are 4 problems. Solve all problems.

SUBMITT TWO PROBLEMS of your choice

PROBLEM 1
Use Lecture Notes to WRITE short, 1-2 paragraphs long ANSWERS to the following questions.

1. **Describe what is CLASSIFICATION; type of data, goals and types of applications**
2. **Describe all stages of the classification process**
3. **Describe and discuss basic classification Models and their differences**
4. **Discuss the Decision Tree Induction and its strengths and weaknesses**
5. **Discuss the Neural Network Model and its strengths and weaknesses**
6. **Describe a process of building a CLASSIFIER**
7. **Define a CLASSIFIER**

PROBLEM 2: BUILDING A CLASSIFIER

For the data set given below build a classifier following all steps needed in the constructions:
preprocessing, training and testing
Describe and motivate your choice of algorithms and methods used at each step.

CLASSIFICATION DATA:

Age	Income	Student	Credit Rating	Buys Computer
21	60,000	yes	3	No
30	70,000	No	5	No
38		No	2	Yes
45	45,000	yes	3	Yes
46	25,000	no	2	Yes
47	30,000	Yes	6	No
39	28,000	Yes	5	No
29	48,000	Yes	3	No
50	75,000	Yes	2	No
48		Yes	3	No
30		Yes	6	Yes
51	46,000	No	4	Yes
32	80,000	Yes	2	No
45	50,000	No	4	No

1. Preprocessing

Attributes: Age, Income, Credit Rating

1. **Fill the missing Values**
2. **Use Binning Method to discretize values of attributes**
   Age, Income, Credit_Rating
   The number of bins is up to you

Preprocessing Calculations

1. Mising Values: **explain the method you used**

2. Binninig: **AGE**

3. Binning: **INCOME**

4. Binning : **CREDIT RATING**
2. YOUR Data after Preprocessing:

Age	Income	Student	Credit Rating	Buys Computer
		yes		No
		No		No
		No		Yes
		yes		Yes
		no		Yes
		Yes		No
		Yes		No
		Yes		No
		Yes		No
		Yes		No
		Yes		Yes
		No		Yes
		Yes		No
		No		No

3. Training and Testing
Specify and write down in full   Decision Tree Algorithm you use for training.

USE Three-Fold Cross Validation for Testing

Remember: must perform training and testing 3 times and
predictive accuracy is averaged;
We adopt the union of rules as the
FINAL set of rules

 YOU do not need to show me your TREES (this was hmk2)
WRITE here ONLY your sets of rules describing how you
obtained them at each stage of **training** and **testing.**
Calculate your rules ACCURACY at each stage.

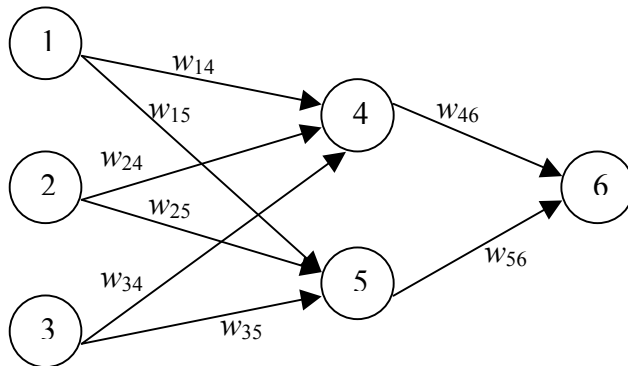**MY CLASSIFIER IS: (explain why you accept your classifier)**

PROBLEM 3: Learning Neural Networks

Given two records (Training Sample)

a_1	a_2	a_3	Class
0.5	0	0.2	1
0	0.3	0	1

Use the Network below to evaluate a passage of 2 EPOCHS

Learning Rate: L= 0.7

REMEMBER: YOU HAVE TO SET YOUR INITIAL WEIGHTS AND BIASES
                 RANDOMLY; DON'T USE THE SET-UP FROM THE EXAMPLE.

EXTRA CREDIT(5pts) write your program to calculate your answer

PROBLEM 4: Classification by Association

Given a classification TRAINING data

Income	Student	Rating
high	No	Fair
low	No	Excellent
high	yes	Fair
medium	No	Fair

low	Yes	Fair
medium	no	Excellent

and classification TEST data

Income	Student	Rating
low	Yes	Excellent
medium	No	Fair
low	no	Fair
medium	Yes	Fair

Build a CLASSIFIER using Classification by Association Method