ARTIFICIAL INTELLIGENCE - CSL7540

ASSIGNMENT-2

Bayesian Networks

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Step1: Take Input

Step2: Assign Weights

-Provide the weights to samples if there is missing value then [0,1] is provided. 0 for True and 1 for False and if there is no missing value then [1,1] is used which depicts that the weight is 1 for that sample.

Step3: Find missing indices from the given samples and store them into 'missing_column_index' and 'missing_row_index', these two lists have values 1 or -1 where -1 indicates the indices of missing value.

Algorithm:

For i in range(Total_no_of_samples):

For j in range(length_of_sample):

If(sample_value == '?'):

Add '-1' into missing_row_index

Else:

Add '1' into missing_row_index

For i in range(Total_no_of_Nodes):

For j in range(Total_no_of_samples):

If(sample_value == '?'):

Add '-1' into missing_column_index

Else:

Add '1' into missing_column_index

Step4: Create network and store parent information of nodes.

Step5: Calculate conditional probability of each node with respect to the number of parents they have.

CDT Algorithm:

-Takes three argument-column number, samples, parents

-For the variable having missing value:

-Find number of parents:

-Now Depending on the number of parents and weights, find probabilities and update the conditional probability table.

Step6: Get probability using conditional table

Algorithm:

-Call CDT (col_index, samples, parents) and get table

-Depending on the length of parent[col_index] and table return the probability.

Step7: Call EM function which take samples, parents, missing_idx_list as argument

EM algorithm:

-Get missing indices and initialize empty conditional probability table (cpt).

-For each Column in samples Call CDT (col_index ,samples, parents) and append the cpt by adding the resulting table.

-Iterate a loop up to the algorithm converge

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Initialize cd=[ ]
For each column:
        cd.append(CDT(i,o,parents))
initialize nw with weights to store new weights
for j=0 to length_of_missing_indicies:
        p = call get_probablity fxn
        if p >1-p:
                update weights
```

-Returns the result table (the final conditional probability table)

Step8: Get the final conditional table with updated parameters and print them.