

exp6.py

```

1  '''exp-6:Write a program to construct a Bayesian network considering medical data. Use this
  model to
2  demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can
  use
3  Java/Python ML library classes/API.'''
4  import numpy as np
5  import pandas as pd
6  import csv
7  from pgmpy.estimators import MaximumLikelihoodEstimator
8  from pgmpy.models import BayesianModel
9  from pgmpy.inference import VariableElimination
10
11 heartDisease = pd.read_csv('heart.csv')
12 heartDisease = heartDisease.replace('?',np.nan)
13
14 print('Sample instances from the dataset are given below')
15 print(heartDisease.head())
16
17 print('\n Attributes and datatypes')
18 print(heartDisease.dtypes)
19
20 model= BayesianModel([('age','heartdisease'),('gender','heartdisease'),
  ('exang','heartdisease'),('cp','heartdisease'),('heartdisease','restecg'),
  ('heartdisease','chol')])
21 print('\nLearning CPD using Maximum likelihood estimators')
22 model.fit(heartDisease,estimator=MaximumLikelihoodEstimator)
23
24 print('\n Inferencing with Bayesian Network:')
25 HeartDiseasetest_infer = VariableElimination(model)
26
27 print('\n 1. Probability of HeartDisease given evidence= restecg')
28 q1=HeartDiseasetest_infer.query(variables=['heartdisease'],evidence={'restecg':1})
29 print(q1)
30
31 print('\n 2. Probability of HeartDisease given evidence= cp ')
32 q2=HeartDiseasetest_infer.query(variables=['heartdisease'],evidence={'cp':2})
33 print(q2)
34 '''OUTPUT
35 Sample instances from the dataset are given below
36   age  gender  cp  trestbps  chol  fbs  restecg  thalach  exang  oldpeak  slope  ca  thal
  heartdisease
37  0    63      1   1      145   233    1         2    150     0      2.3     3   0     6
    0
38  1    67      1   4      160   286    0         2    108     1      1.5     2   3     3
    2
39  2    67      1   4      120   229    0         2    129     1      2.6     2   2     7
    1
40  3    37      1   3      130   250    0         0    187     0      3.5     3   0     3
    0
41  4    41      0   2      130   204    0         2    172     0      1.4     1   0     3
    0
42  '''

```