

VIVEKANAND EDUCATION SOCIETY'S INSTITUTE OF TECHNOLOGY

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Department of Artificial Intelligence and Data Science

Subject: AAI lab

Class: D16AD

Semester: 8

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Exp. No.: <u>2</u>	Title: <u>To design and implement a bayesian network</u>		
DOP:		DOS:	
GRADE <u>A</u>	SIGNATURE: <u>AP 22/3</u>		

AAI - Experiment 2

► Aims: To design and implement a bayesian network for outcome prediction

► Theory: • Bayesian Belief: It is a key computer technology for dealing with probabilistic event to solve a problem which has uncertainty.

A bayesian network is a probabilistic graphical model which represents a set of variables and their conditional dependencies using a directed acyclic graph.

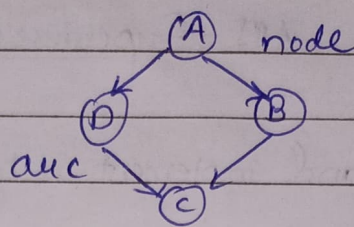
It is also called a Bayes network, belief network, decision network or Bayesian model.

Bayesian networks are probabilistic because these networks are built from probability distribution and also use probability theory for prediction and anomaly detection.

Real world applications are probabilistic in nature and to represent the relationship b/w multiple events, we need a Bayesian networks. It can also be used in various tasks including prediction, anomaly detection, diagnostic, automated insight, reasoning, time saves prediction and decision making under uncertainty.

Bayesian n/w can be used for building models from data and expert opinions. It consist of 2 parts:

• Directed acyclic graph:



a) node represents random variable which can be either continuous or discrete

b) auc or directed arrow represent causal relationship or conditional probabilities.

• Joint Probability Distribution:

If we have variables $x_1, x_2, x_3, \dots, x_n$ then the probabilities of a different combination of $x_1, x_2, x_3, \dots, x_n$ are known as joint probability distribution.

$$\begin{aligned}
 &P[x_1, x_2, x_3, \dots, x_n] \\
 &= P[x_1 | x_2, x_3, \dots, x_n] \cdot P[x_2, x_3, \dots, x_n] \\
 &= P[x_1 | x_2, x_3, \dots, x_n] \cdot P[x_2 | x_3, \dots, x_n] \cdot P[x_3, \dots, x_n]
 \end{aligned}$$

* Conclusion: We have studied Bayesian belief network and implemented the same.