



JNIESTRT'S
SMT. INDIRA GANDHI COLLEGE OF ENGINEERING
GHANSOLI, NAVI MUMBAI – 400701
(Approved by AICTE New Delhi & Govt. of Maharashtra, Affiliated to University of Mumbai)
COMPUTER ENGINEERING DEPARTMENT

ACADEMIC YEAR :- 2021-22(EVEN SEM)

Deepak

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ROLL NO - 77
YEAR - TE SEM - VI
BRANCH - COMPUTER

EXPERIMENT NO : 08

TITLE:- IMPLEMENTING BAYESIAN BELIEF NETWORK : BURGLARY ALARM PROBLEM.

Date of Performance	Date of Evaluation	Marks (10)					Sign / Remark
		A	B	C	D	E	
		2	3	2	2	1	
22/03/22	29/03/22						
		Total Marks					



Date: _____

Date	Experiment	Sign:
22-03-2022	Exp-8: Implementing Bayesian Belief Network: Burglary Alarm Problem	Grade:

Aim: Implement Burglary Alarm Problem, in Bayesian Belief Network.

Theory: A belief network is a graph with the following:

1. Nodes: Set of random variables

2. Directed links: The intuitive meaning of a link from node X to node Y is that X has a direct influence on Y .

3. Each node has a conditional probability table that quantifies the effect that the parent have on the node.

4. The graph has no directed cycles (DAG).

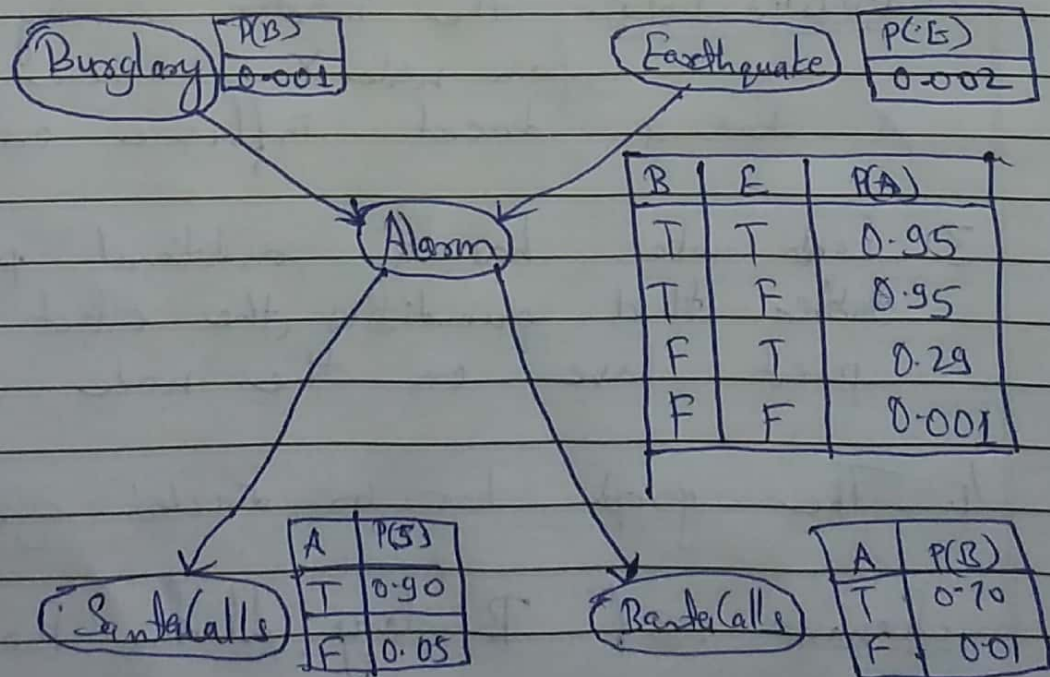
Scenario of Burglary Alarm Problem:

i. You have a new burglar alarm installed at home.



Date: _____

- ii. It is fairly reliable at detecting burglary, but also sometimes responds to minor earth quakes.
- iii. You have two neighbors, Santa and Banta, who promised to call you at work when they hear the alarm.
- iv. Santa always call when he hears the alarm, but sometimes confuses telephone ringing with the alarm and call too.
- v. Banta likes loud music and sometimes missed the alarm.
- vi. Given the evidence of who has or has not called, we would like to estimate the probability of a burglary.



Bayesian Network



Date: _____

The joint probability distribution:

A generic entry in the joint probability distribution $P(x_1, x_2, \dots, x_n)$ is given by:

$$P(x_1, \dots, x_n) = \prod_{i=1}^n P(x_i | \text{Parents}(x_i))$$

The Probability event of the event that alarm has sounded but neither a burglary nor an earthquake has occurred, and both Santa and Banta call:

$$P(S \wedge B \wedge A \wedge \neg B \wedge \neg E)$$

$$= P(S|A) P(B|A) P(A|\neg B \wedge \neg E) P(\neg B) P(\neg E)$$

$$= 0.9 \times 0.7 \times 0.001 \times 0.999 \times 0.998$$

$$= \underline{0.00062 \dots}$$