

Assignment9

To get the probabilities of having a pit in the three selected cells we can build the network shown in Figure 1 using the Netica software, where each node represents one position in the grid. There are two nodes representing breeze in (1,2) and (2,1) and three nodes representing the probability of having a pit in (1,3), (2,2) and (3,1). A further network recap is shown in Figure 2.

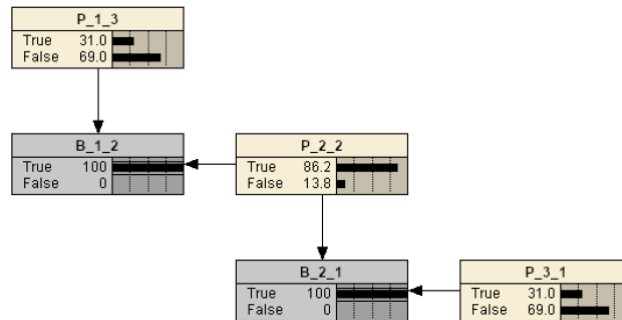


Figure 1

Netica Messages	
assignment9	
5	Nodes (not including constants)
0	Decision nodes
0	Utility nodes
0	Constant nodes
0	Title or text notation entries
4	Links (not disconnected)
0	Disconnected links
0	Time delay links
0	Directed cycles (without delays)
0	Loops (disregarding link directions)
1	Separate networks (ignoring constants)
22	Conditional probabilities total
0	Decision conditions
2	Findings nodes (not including constants)
0	Negative or likelihood findings nodes

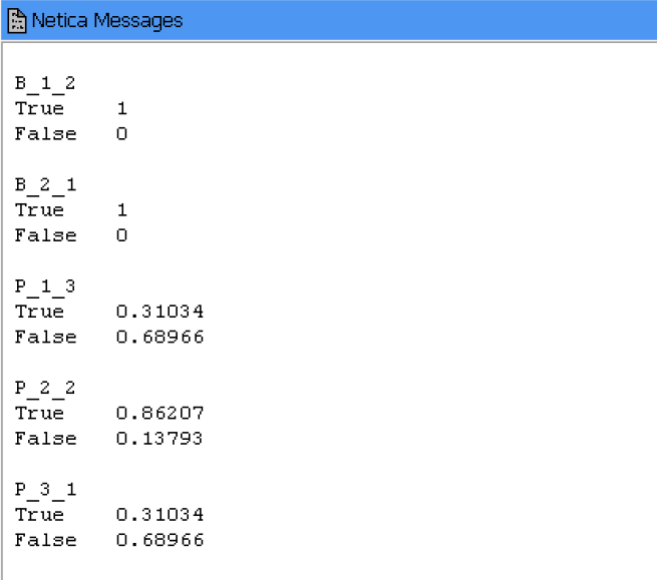
Figure 2

The CPT (Conditional Probability Table) shown in Figure 3 contains the conditional probabilities. For all the cells we have that the prior probability of having a pit is 20%, while we know that we can have a breeze only when we're close to a pit.

Netica Messages	
P_1_3:	
True	False
0.2	0.8
P_2_2:	
True	False
0.2	0.8
B_1_2:	
	P_1_3 P_2_2
True	True True
True	True False
True	False True
False	False False
B_2_1:	
	P_2_1 P_3_1
True	True True
True	True False
True	False True
False	False False
P_3_1:	
True	False
0.2	0.8

Figure 3

Given that breeze was observed both in (2,1) and in (1,2), we get the final values shown in Figure 4, where we have that the probability of having a pit in (1,3) and (3,1) is 69% (not having it is 31%), while the probability of having a pit in (2,2) is 86.2% (not having it is 13.8%).



The image shows a screenshot of a 'Netica Messages' window. It contains text output from a belief network inference process. The output is organized into five sections, each corresponding to a node in the network. Each section lists the node name, followed by the probability for the 'True' state and the 'False' state. The probabilities are given as decimal values.

B_1_2		
True	1	
False	0	
B_2_1		
True	1	
False	0	
P_1_3		
True	0.31034	
False	0.68966	
P_2_2		
True	0.86207	
False	0.13793	
P_3_1		
True	0.31034	
False	0.68966	

Figure 4