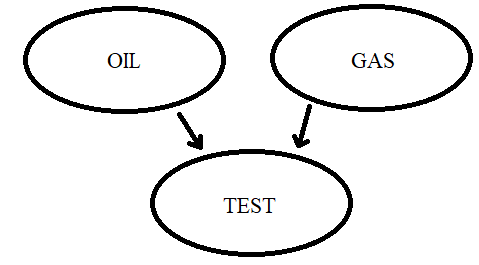
Naim Ayat

CS 161: Fundamentals of Artificial Intelligence

Assignment 6 – March 22, 2018

1a.



|  |  |
| --- | --- |
| Oil | P(Oil) |
| T | 0.5 |
| F | 0.5 |

|  |  |
| --- | --- |
| Gas | P(Gas) |
| T | 0.2 |
| F | 0.8 |

|  |  |  |  |
| --- | --- | --- | --- |
| Test | Oil | Gas | P(Test | Oil, Gas) |
| T | F | F | 0.1 |
| T | F | T | 0.3 |
| T | T | F | 0.9 |
| T | T | T | 0 |

1b. where .

Hence,

This yields

2a.

2b.

2c.

2d. By definition of independence,

Because node is independent of node due to parent :

Now, note that node is dependent on its parent . By Law of Total Probabilities,

partitioning on , we have: .

By conditioning,

2e. Markovian assumptions:

2f. Markov blanket for :

2g.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |
| F | F | F | .5 | F | F | .1 | F | F | F | F | .05 |
| F | F | T | .5 | F | T | .9 | F | F | F | T | .45 |
| F | T | F | .6 | T | F | .9 | F | F | T | F | .05 |
| F | T | T | .4 | T | T | .1 | F | F | T | T | .45 |
| T | F | F | .1 |  |  |  | F | T | F | F | .54 |
| T | F | T | .9 |  |  |  | F | T | F | T | .06 |
| T | T | F | .8 |  |  |  | F | T | T | F | .36 |
| T | T | T | .2 |  |  |  | F | T | T | T | .04 |
|  |  |  |  |  |  |  | T | F | F | F | .01 |
|  |  |  |  |  |  |  | T | F | F | T | .09 |
|  |  |  |  |  |  |  | T | F | T | F | .09 |
|  |  |  |  |  |  |  | T | F | T | T | .81 |
|  |  |  |  |  |  |  | T | T | F | F | .72 |
|  |  |  |  |  |  |  | T | T | F | T | .08 |
|  |  |  |  |  |  |  | T | T | T | F | .18 |
|  |  |  |  |  |  |  | T | T | T | T | .02 |

2h. Assign

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| T | T | T | .1 |
| T | T | F | .9 |
| T | F | T | .9 |
| T | F | F | .1 |
| F | T | T | .1 |
| F | T | F | .9 |
| F | F | T | .9 |
| F | F | F | .1 |