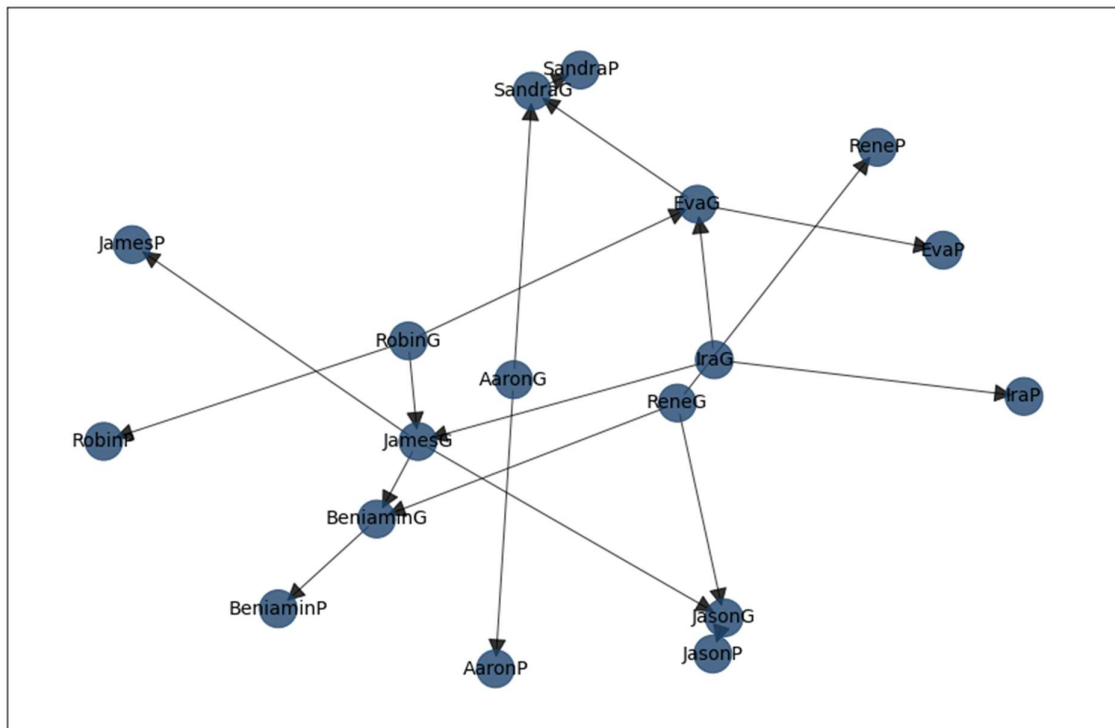Introduction to AI: Uncertainty

Report 4

Contents

Exercise:

Sandra getting sick if her aunt Rene is sick

Sandra has a 0.803 chance of getting sick if her aunt Rene is sick

```
[89] q2 = bnlearn.inference.fit(DAG, variables=['SandraP'], evidence={'ReneP':1}) #1 is sick with Phenotype

     [bnlearn] >Variable Elimination..
     [bnlearn] >Data is stored in [query.df]
     +----+-----------+-------+
     |    | SandraP   |   p   |
     +====+===========+=======+
     | 0  |         0 | 0.197 |
     +----+-----------+-------+
     | 1  |         1 | 0.803 |
     +----+-----------+-------+
```

Sandra getting sick if both her parents are sick

Sandra has a 0.853 chance of getting sick if both her parents are sick

```
q3 = bnlearn.inference.fit(DAG, variables=['SandraP'], evidence={'EvaP':1,'AaronP':1}) #both parents are sick

   [bnlearn] >Variable Elimination..
   [bnlearn] >Data is stored in [query.df]
   +----+-----------+----------+
   |    | SandraP   |        p |
   +====+===========+==========+
   | 0  |         0 | 0.146651 |
   +----+-----------+----------+
   | 1  |         1 | 0.853349 |
   +----+-----------+----------+
```

Sandra getting sick if her parents have the genotype FF and Ff

Sandra has a 0.3 chance of getting sick if her parents have FF and Ff genotype

```
[90] q4 = bnlearn.inference.fit(DAG, variables=['SandraP'], evidence={'EvaG':0,'AaronG':1})#is sick with Genotype FF and Ff

     [bnlearn] >Variable Elimination..
     [bnlearn] >Data is stored in [query.df]
     +----+-----------+-----+
     |    | SandraP   |  p  |
     +====+===========+=====+
     | 0  |         0 | 0.7 |
     +----+-----------+-----+
     | 1  |         1 | 0.3 |
     +----+-----------+-----+
```

Sandra getting sick if both her cousins Jason and Benjamin are not sick

Sandra has a 0.75 chance of getting sick if her cousins are not sick

```
q5 = bnlearn.inference.fit(DAG, variables=['SandraP'], evidence={'BeniaminP':0,'JasonP':0})

   [bnlearn] >Variable Elimination..
   [bnlearn] >Data is stored in [query.df]
   +----+-----------+----------+
   |    | SandraP   |        p |
   +====+===========+==========+
   | 0  |         0 | 0.244146 |
   +----+-----------+----------+
   | 1  |         1 | 0.755854 |
   +----+-----------+----------+
```

Ira getting sick if Sandra is sick

Ira has a 0.81 chance of getting sick if Sandra is sick.

```
[83] q6 = bnlearn.inference.fit(DAG, variables=['IraP'], evidence={'SandraP':1})

    [bnlearn] >Variable Elimination..
    [bnlearn] >Data is stored in [query.df]
    +----+--------+----------+
    |    |  IraP  |        p |
    +====+========+==========+
    | 0  |      0 | 0.184621 |
    +----+--------+----------+
    | 1  |      1 | 0.815379 |
    +----+--------+----------+
```

Collab Sources:

Original Collab:

https://colab.research.google.com/drive/1BPj72-dzz1BfT1D8Tzk7W24qtSzvcp-9?usp=sharing

Link to my own collab:
https://colab.research.google.com/drive/14n_eCzIgbXPgLxI1HXCRZUtprUj0fGt0

Feedback:

It would be really helpful to have explained what P (0,1),G (0,1,2) and the different allocations mean in a simple comment, other than that the exercise was fun!