NTNU
Kunnskap for en bedre verden

TDT4171 - Artificial Intelligence Methods

Assignment 2

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1 Using GeNIe

I started by adding three chance nodes, and labeled each node as

- MyDoor, state for which door the player choose

- ContainsPrize, state for which door, the prize was behind

- OpenedDoor, state for which door the offical opened

As the player has an equal chance to pick each door, I put each option as 1/3.

And also because the prize has en equal chance to be behind each door, I put each option as 1/3.

Then I connected the nodes into a V-structure, where the opened door was the child of the other two. This was because the offical had to choose a door based on both the player door, and the door with the car behind. Also the player door, and the prize door are independant, which meant that they are not connected.

This resulted in this structure.

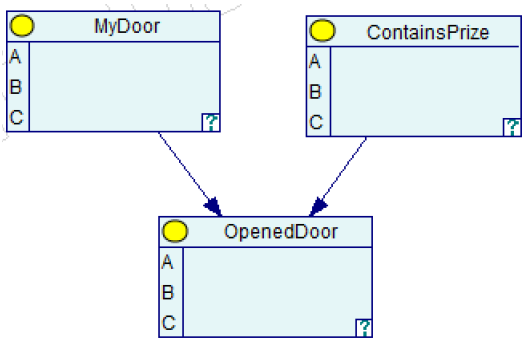

Figure 1: Structure of network

Last I defined the door opened by the offical according to the table below.

MyDoor	A			B			C		
ContainsPrize	A	B	C	A	B	C	A	B	C
A	0	0	0	0	0.5	1	0	1	0.5
B	0.5	0	1	0	0	0	1	0	0.5
C	0.5	1	0	1	0.5	0	0	0	0

Figure 2: Defintion of OpenedDoor

To calculate the values we can look at the example where the player chooses door **A**. This means that the official has to open either door **B** or **C**. If the prize is behind door **A**, the offical has an equal chance to pick either door **B** or **C**. Which can be seen in the leftmost column. Next if the prize is behind door **B**, the official has to pick door **C**. Which is the next column. The same condition applies if the prize is behind door **C**. To find the other values, we just have use the same logic for the other doors.

Below are examples of the player choosing each door.

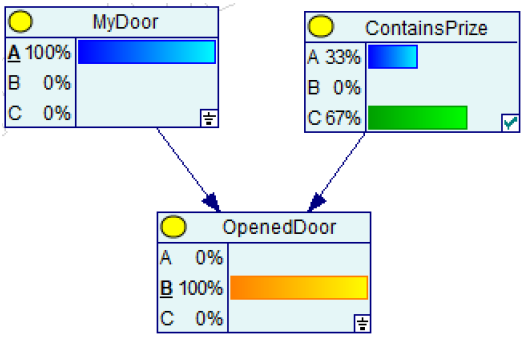

Figure 3: Example 1: Player choosing door A

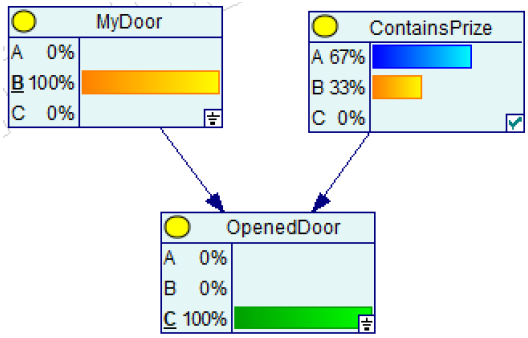

Figure 4: Example 2: Player choosing door B

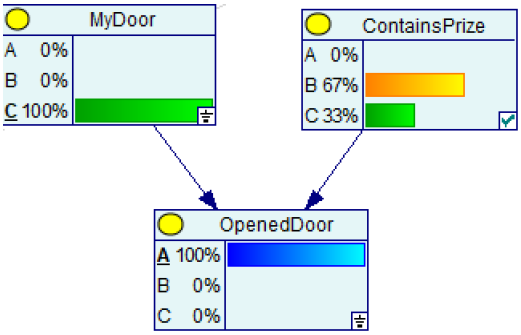

Figure 5: Example 3: Player choosing door C

In conclusion we can see that for every case you should alter your choice, as there is a 2/3 chance for the priz being behind the other door, while there is a 1/3 chance for the prize being behind the originally picked door.