



**INSTITUTO TECNOLÓGICO Y DE ESTUDIOS SUPERIORES DE
MONTERREY**

Artificial Intelligence

Report Lab Bayes Networks

Equipo:

Melannie Isabel Torres Soto	A01361808
Shara Teresa González Mena	A01205254

Due Date:

October 16, 2018

Comparison between our program and Hugin Lite

Hugin is a decision making software that uses Bayesian Networks to calculate probabilities. Hugin allows you to create your own bayes network and make your probability calculus in a graphical way and through an easy user interface. Due to its interface, it's relatively simple to use, you can find quick tutorials in youtube, but you'll take a while to create your network and give it all the inputs it requires to be complete. After you've created your network you can do your queries with different fixed values and see how the probability distribution changes all over the network when a value is modified. The result given in Hugin is a percentage.

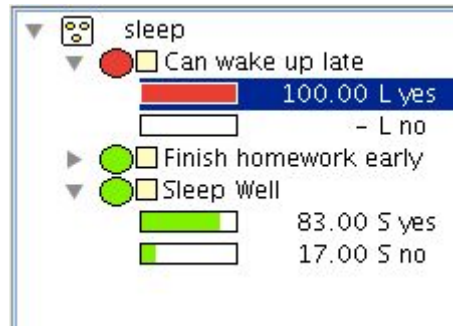


Figure 1. Example of fixing a variable, output Hugin

Our implementation of bayes networks lacks of a graphical interface, you can run the program in the command line and the input can be given in the same command line or in an external .txt file with a very specific syntax (provided in the instructions of alpha grader). After entering the input, the program itself computes the missing probabilities in order to complete the CPT. The results of the queries given will be printed in the in the order you wrote them. Our program can be more difficult to use than Hugin because it's less user-friendly and represents the network with data structures, not with drawings as Hugin. Despite that, it's faster to create the bayesian network and to see the results of all the queries. Same as Hugin, our program uses bayesian calculus.

Figure 2. Output of our program

Hugin	Our program
Slower to create the network	Faster to create the network
User-friendly	Not user-friendly
GUI	CLI
Output in percentage format	Output in decimal format
Can save your work	Doesn't save information about previous work
Lets the user to imagine the network in a graphical way	Does not provide a representation of the framework in a graphical way

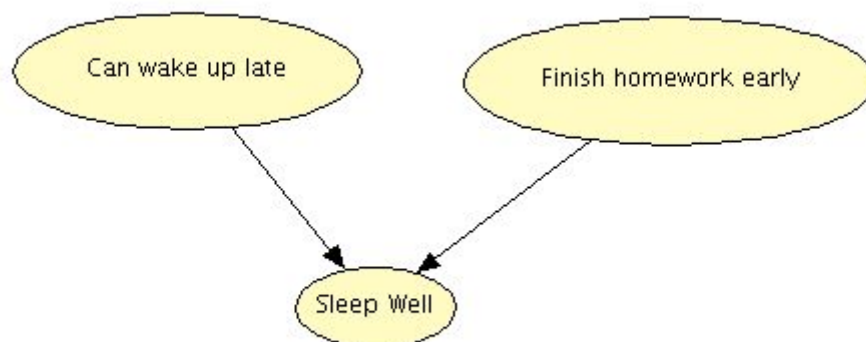
The decision of using one or another can be based in the needs of each people and the preferences:

- Our program is faster when computing probabilities and we already know how it works and how to represent, with data structures, the network. For exercises as the ones in the lab we might prefer to use our program because we are familiarized with it.
- In the other hand Hugin is not a software with which we are familiarized but the difference is that, due to its graphical interface, you can infer or figure out how to use it and how to represent different bayesian networks. Maybe if we needed to solve a more complex program that makes us need a graphical representation to understand it, we might use Hugin.

To conclude Hugin is an excellent tool, specially when you require a Graphical Interface, it is used to make business decisions since you can store your company's data in a Bayesian Networks, do calculations with it and use it later. Meanwhile our program doesn't fit a business purpose, it can be faster, but it's more difficult to use and is limited to educational purposes.

Additionally, our program can be useful for people in the need of understanding the way of programming or the way of reasoning when working with bayesian networks because of its educational scope. For people in the need of taking more important decisions without caring in how bayesian networks work or how the total probability theory applies to them, Hugin is the perfect tool.

Diagram:



Input for Hugin:

Late

L yes	0.4
L no	0.6

Finish

F yes	0.3
F no	0.7

Sleep Well

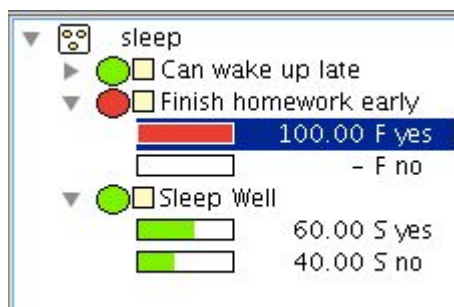
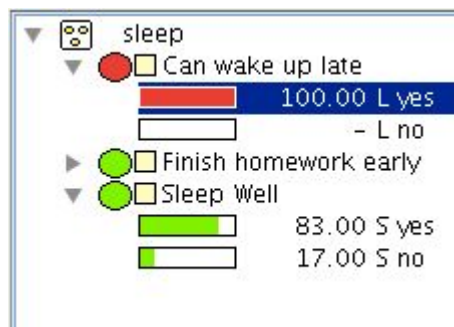
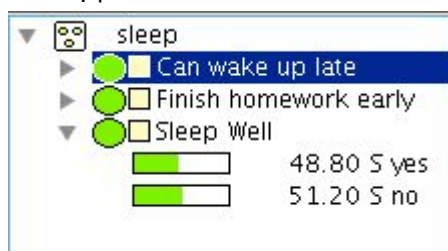
Finish ho...		F yes			F no		
Can wake...		L yes	L no		L yes	L no	
S yes	0.9	0.4	0.8		0.2		
S no	0.1	0.6	0.2		0.8		

Results Queries Hugin:

+Sleep = 48.8%

+Sleep|+Late = 83.00%

+Sleep|+Finish = 60%



Input for our program:

Late,Finish,Sleep

6

+Late=0.4

+Finish=0.3

+Sleep|+Late,+Finish=0.9

+Sleep|+Late,-Finish=0.8

+Sleep|-Late,+Finish=0.4

+Sleep|-Late,-Finish=0.2

3

+Sleep

+Sleep|+Late

+Sleep|+Finish

Results Queries:

+Sleep

+Sleep|+Late

+Sleep|+Finish

0.488

0.83

0.6

References:

Hugin. (2018). TECHNOLOGY. Retrieved October 16, 2018, from <https://www.hugin.com/index.php/technology/>