Artificial Intelligence Methods

Assignment 5

Sindre Lian Thronæs sindrelt@stud.ntnu.no

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1 Exercise 1 - Decision Support System **1**

Department of Computer Science
Norwegian University of Science and Technology

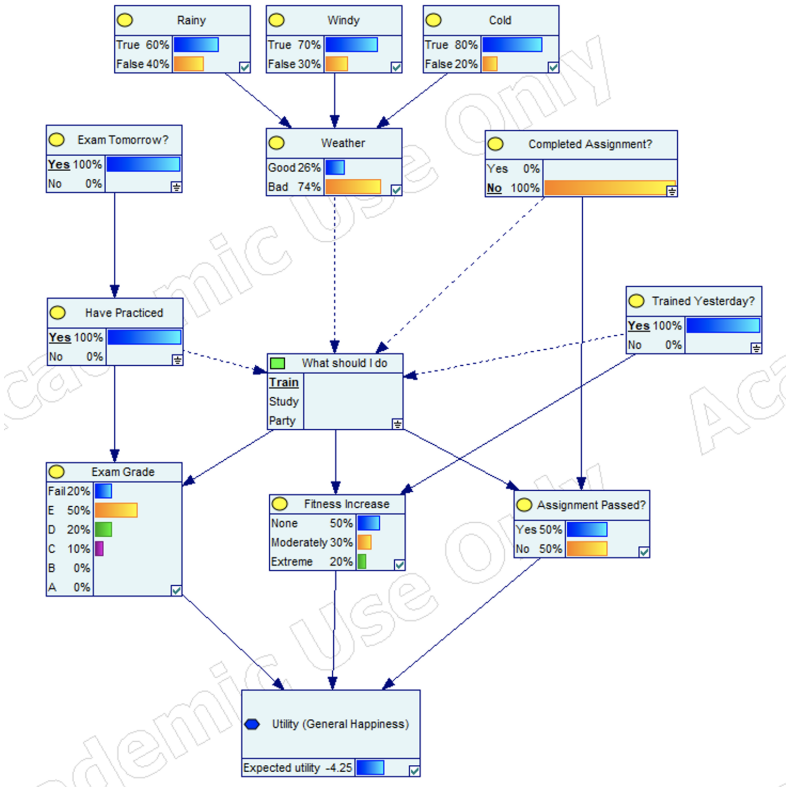
1 Exercise 1 - Decision Support System

I have chosen the domain of my Decision Support System to be an "everyday" decision related to if I should do a workout, enjoy a party or actually study for the exam that I have tomorrow. In addition to that exam, the deadline for this specific assignment approaches as well so I have to make a clever decision so that I can both complete the assignment and not fail on the exam. I also enjoy training, however I did train yesterday and I have to consider whether it is wise to do so this evening;)

My Model: Should I *workout*, *study*, or *party*? - Where the decision alternatives of course are *workout*, *study*, or *party*.

My Variables: *rainy, windy, cold, weather, examGrade, fitnessIncrease, assignmentPassed, examTomorrow, havePracticed, completedAssignment, trainedYesterday.*

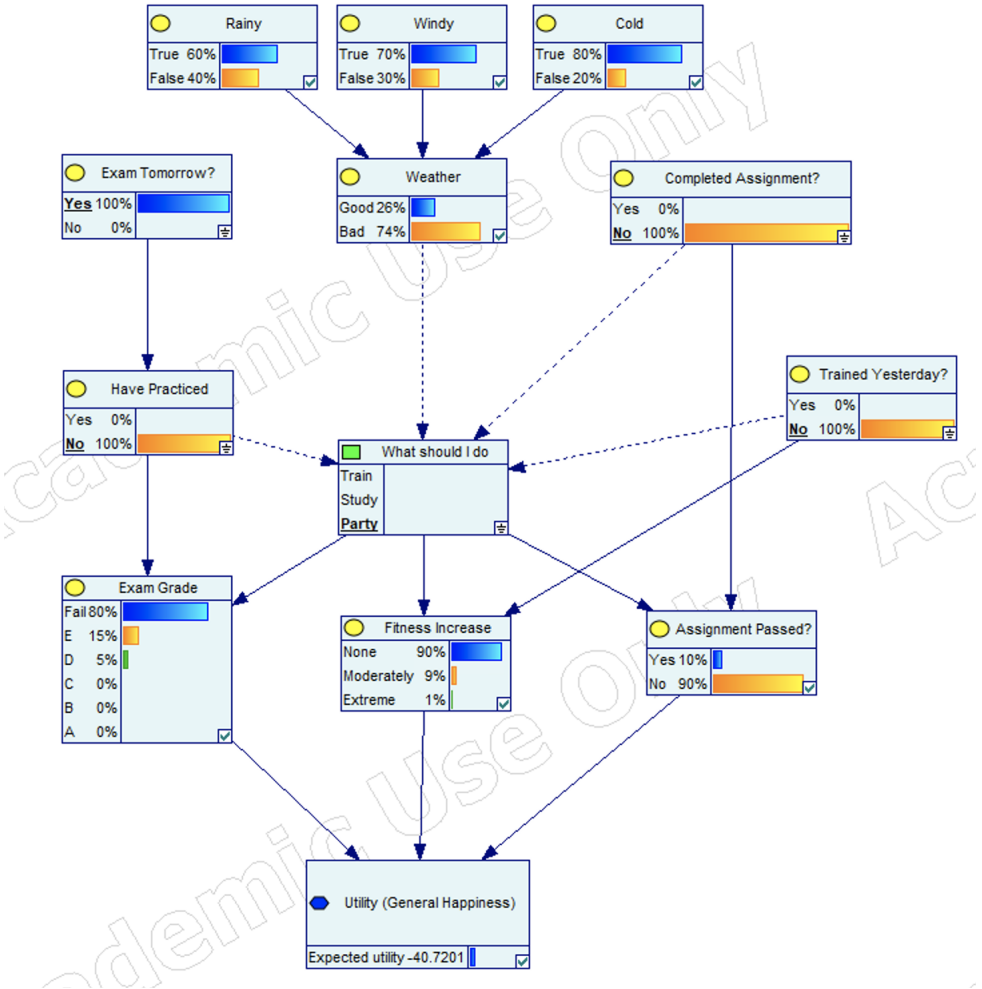
Underneath follows screenshots of the graphical structure:

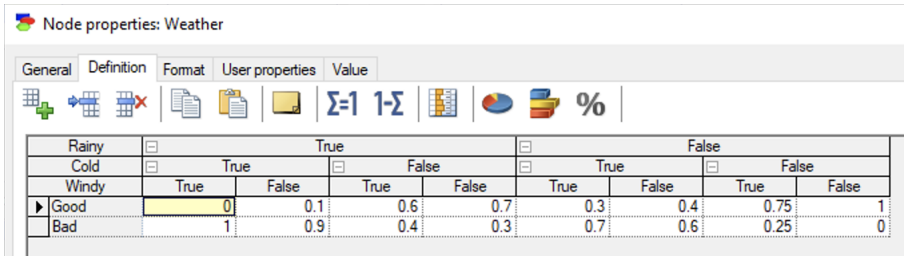


The variables that usually are observed *before* the decision is made are *examTomorrow, completedAssignment, havePracticed, trainedYesterday.* How-

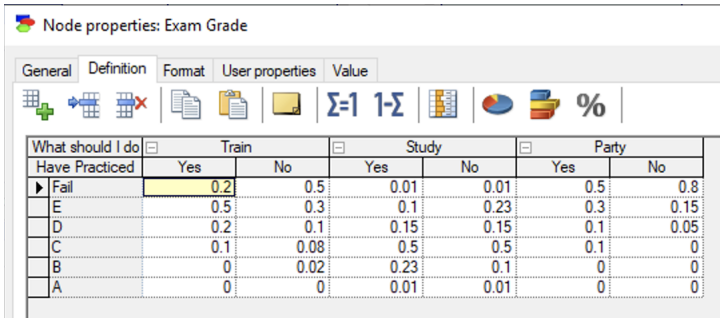
ever, some of these can also be unknown if the DSS is being used on a random day.

Regarding the parameters and the probability tables i will include them underneath along with my utility function that tells how happy I will be when taking a decision.

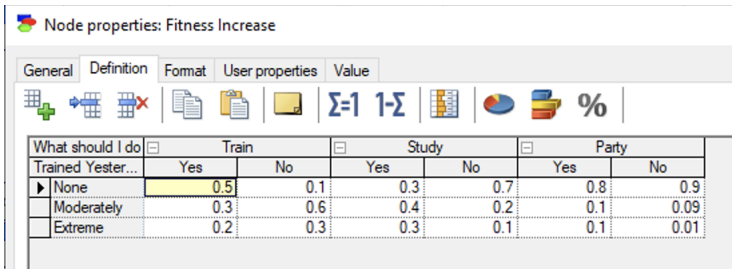




Rainy	True				False			
Cold	True		False		True		False	
Windy	True	False	True	False	True	False	True	False
Good	0	0.1	0.6	0.7	0.3	0.4	0.75	1
Bad	1	0.9	0.4	0.3	0.7	0.6	0.25	0



What should I do	Train		Study		Party	
Have Practiced	Yes	No	Yes	No	Yes	No
Fail	0.2	0.5	0.01	0.01	0.5	0.8
E	0.5	0.3	0.1	0.23	0.3	0.15
D	0.2	0.1	0.15	0.15	0.1	0.05
C	0.1	0.08	0.5	0.5	0.1	0
B	0	0.02	0.23	0.1	0	0
A	0	0	0.01	0.01	0	0



What should I do	Train		Study		Party	
Trained Yester...	Yes	No	Yes	No	Yes	No
None	0.5	0.1	0.3	0.7	0.8	0.9
Moderately	0.3	0.6	0.4	0.2	0.1	0.09
Extreme	0.2	0.3	0.3	0.1	0.1	0.01

In this model I have assumed independence between the weather at any given time and my school duties so that the training is the only variable that is affected by the weather. Above I have pasted three probability tables. For *examGrade* I have modeled it as easy to achieve a high grade on the exam if I have practiced and also choose to study before the exam, while training is a bit worse and if I choose to party then I will be almost screwed. For the utility function I have modeled it as complete failure if I fail my exam tomorrow and thus -50 no matter the other outcomes. From there I will be gradually more happy with combination of getting a better grade, passing this assignment and getting a fitness increase.

After doing a couple of tests it does actually seem like this model is "good". In hindsight I would only change the modeling by adding direct links from the weather to the other nodes, and possibly expanded the links and added more change nodes related to training as I upon delivery notice that the values for *cold, windy* and *rainy* never change no matter the choice I take. However, this does not change the validity of my model, it only seems quite irrelevant and redundant at this point actually. I will try to avoid this in future assignments!!