# Exercise 3

Introduction

This exercise is intended for creating and documenting a simplified decision support system for everyday problems. By looking at inference between variables and a given decision we can calculate utility values.

My problem is which role in the game Overwatch should I play. It is a game I enjoy a lot that I use to relax weekly, thus being a quite regular problem. The problem includes states of mind such as mood, states for physical feeling, a set of choices for roles, states for consequences, as well as a utility function on how good a pick is. The focus will be on the modeling of the decision support system.

As my text will be based on the model I created, I choose to put the model here in the start, the information about the model will be explained further beneath.
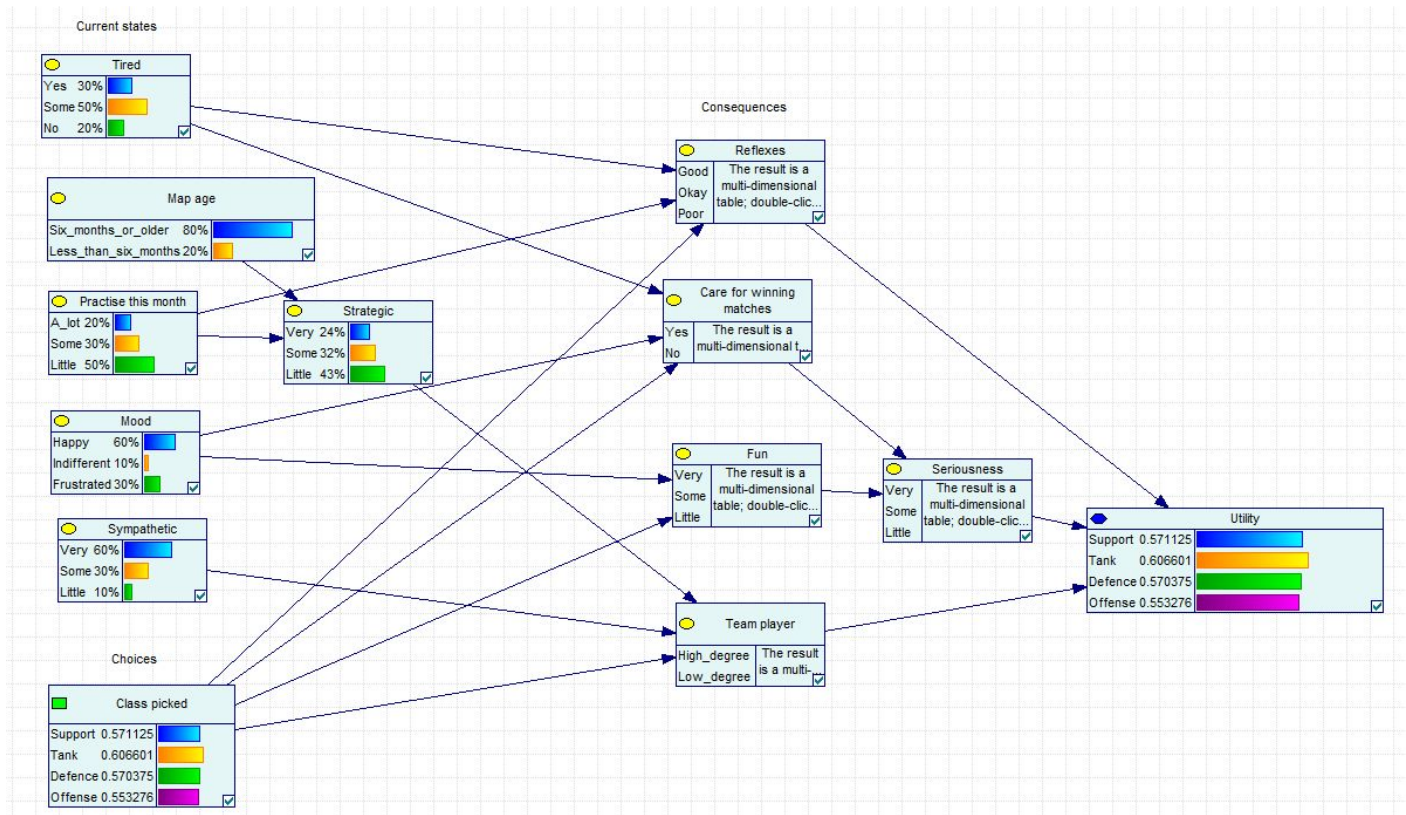
Creating the support system

Problem:

As stated in the introduction I have chosen the problem 'Which role should I pick in the game Overwatch'. This is for the situation of starting a match where the map is randomly selected. Overwatch is a first-person-shooter where each team has six heros that goes within four roles. The different roles each have different sub-objectives in a match, for example the role support focus is on healing their team, while the role offense focus on eliminating enemy players. As I was unable to find consistent data that I could use for the utility values, I landed on picking values according to my own habits in the game. This means this system is likely not a good representation for someone else with a different personality, preferences and/or physique.

Naturally my actions are about picking between the four roles in the game, which are:
- Support
  - Generally supporters of their teammates, healers, providers of body shields, etc.
- Tank
  - High health and the moving force of the team, also very team dependant.
- Defence
  - Tactical and advanced heros having abilities such as building turrets, etc.
- Offense
  - High damage, fast pace, low health, also quite tactical heros.

Decision parameters:

Now that we have the problem and actions defined, we need current states that affect the decision.
I chose the following attributes that I have become aware of affecting my choices:
- Tired
  - State of my body. This will clearly affect abilities such as reaction which is more important for certain roles than others.
- Map age
  - In Overwatch maps are randomly selected. How old the map is tells me how well I know it. As the game depend on tactical usage of the map, this becomes an important attribute in my opinion. This variable is distributed on maps either being 6 months or older, or younger than 6 months. This I can base off of official data. According to patch notes released by Blizzard

(https://playoverwatch.com/en-us/game/patch-notes/pc/); of a total of 15 maps there has been released 3 new maps the past 6 months.

- Practise this month
    - I made it to 'this month' for simplicity sake. In reality this is about how much I have played the game recently as that affects motoric skills and how well I remember maps and tactics.
- Mood
    - My mood can affect my rationality in a game. In the community we use the world tilting. That is when you start getting increasingly frustrated thus playing poorly, making you even more frustrated, this continues in a downward spiral. A good mood may entail better focus, which certain roles require more of.
- Sympathetic
    - To be clear, this is not in the general term of me as a person. This is rather about how much I want to focus my teammates and making sure they do well. For instance, a player that is not very sympathetic may play more offense that primarily focus on the opponent.

As you see in the GeNIe model, most of these variables are quantified into 2 to 3 levels. This is because feelings and state of mind is not a simple thing to quantify. Going with too many probabilities is likely to be less accurate as I can't really put levels of how I feel in a very detailed and systematic manner. Also in order to find fitting probabilities and make the process of adjustment feasible the number of probabilities must be kept relatively small.

Compiling variables into a system

Now we have a set of variables and choices representing the world of picking a character. As we have to do a trade between accuracy and simplicity, naturally many other aspects of the real world may affect which character I pick. For example, if I play with friends, how my friends play etc. However this brings in a huge amount of complexity as variables may vary on how many friends I play with, who they are etc. Besides I still feel the variables provided a more prominent. Regardless of who I play with, I would still pick a role that I feel fit at the time, though it is hard to know how friends may affect my choices subconsciously.

The variables I have come up with are all quite independent of each other with the exception of 'Strategic' that depend on 'Practise this month' and 'Map age'. One could argue that there are connections been mood, tired and sympathetic. However, after reviewing my habits I have come to realize I have instances of almost all combinations. I found no place where I for instance was mostly frustrated while tired. I suspect this to be the case because the game is used as a way to relax. This means most of my variables (which is set up as a Bayesian network) have conditional independence.

Consequences

As a result of the variables and choices we have a set of consequences that directly affect the utility value. I found the following consequences to be the most relevant:

- Reflexes
  - A consequence of how much I have practised this month, how tired I am and which character I pick. Heros have different mobility thus affecting my reaction to the environment in the game.
- Care for winning
  - Surprisingly, how much one cares to win a in a game may affect which role being the most ideal. I might pick a role that I am less comfortable with if I am less worried of losing. How much I care for winning is also affected by my mood and how tired I am. For example being tired makes it less likely I will care to win.
- Fun
  - One can honestly have fun in a lot of situations, even if you lose a lot. In my experience it really comes down to mood and the hero I choose. Therefore these come naturally as the only cases for this consequence.
- Team player
  - How much of a team player I am will depends on which role I pick (as noted before with my support example), how sympathetic I am and how strategic I play. It is natural that most strategy involves teamwork in Overwatch.

In order to make the utility easier to adjust, I combined fun and care for winning into 'Seriousness'. How serious I am when playing will naturally depend on how much I care about winning and whether I am having fun. Reviewing my habits I see that I am the most serious when I care about winning as well as having a lot of fun. When I don't care for winning and I am bored, I might play in a rather silly manner in hope of enjoying myself more. Here is for instance the table for seriousness:

Care for winnin... ⊟		Yes		⊟		No	
Fun	Very	Some	Little	Very	Some	Little
▶ Very	0.9	0.7	0.5	0	0.1	0
Some	0.1	0.2	0.2	0.05	0.1	0
Little	0	0.1	0.3	0.95	0.8	1

Most of my tables are rather large and I would rather recommend to review in the genie file.

These consequences I feel are a good indication for how good a pick is. Once again, there are probably more consequences that I have not thought of, however as we will see when evaluating the utility, the consequences picked seem to be enough for a viable assesment.

Utility

I chose to evaluate the convenience of a pick by a utility function. The utility values are between 0 and 1, where 1 is the most convenient. Once again, I had to weight these values according to my own assessment, setting myself as the "expert" evaluating the system.

In my opinion the utility function came out surprisingly well. One aspect of Overwatch that I have not pointed out is how most players need to play most roles to some extent. Flexibility is very important, because of this one should expect the utility values to always be somewhat close, but some reaching higher than others based on the probability of certain variables.

When inputting my habits as probabilities in the variables I ended up with Tank and support reaching the highest (as seen in the genie model). This is consistent with my game statistics, here with heros sorted by playtime:

Roles of each hero:
Tanks: Winston, Roadhog, Reinheardt, D.VA
Support: Ana, Symmetra, Lucio
Defense: Junkrat, Torbjorn
Offense: Soldier: 76
The list is quite long as there are 24 heros, I chose to only include the first 10, more offense heros comes right after Lucio.

One can see the nuances by for example setting Sympathetic to little. Then we see the role offense having the highest utility. High on strategic puts tank as highest utility. Support has highest utility if I am very sympathetic, but also not tired, as reflexes are more important for supports than tanks. For instance not being tired and 'some' sympathetic puts defense in a very small lead. This is because defense is the only role that one can argue is not essential in a team composition, thus may be played when you don't really take the game as seriously and don't mind what your teammates are doing as much.

Just as many of my other tables, my utility table is quite large and I would recommend to rather look at it in the GeNIe programme.