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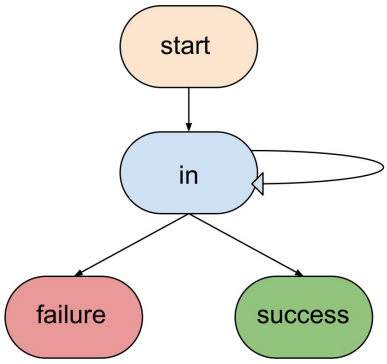
Buchak's main argument considers the humane nature of human beings. Most individuals do not compute Bayesian probabilities to model or reinforce their beliefs. Neither do they make decisions after a grueling statistical evaluation. Experience and world knowledge play a big role here. Also, the idea of using one's heart rather than one's mind is seen in effect and we'll come to this later.

To elaborate on the example of the risky long term project, one might have much better odds at preventing losses avoiding the project altogether, or dropping out of the scene once the chances of success appear too bleak. In this position, the concept of utility maximization comes into the picture. A formal theory in the form of a markovian process can be provided here where we regard the agent as the person, and the different states as: within the project phase, project success, & project failure. Success and failure would be the terminal stages here.



Now, a normal probabilistic decision will simply take the odds of success and failure into account and this is not a perfect modeling of reality, even in the epistemic sense. Therefore, we consider positive and negative reinforcements. That is to say if we reach success, there is a positive reward and if we reach failure, there is a negative reward and we get to decide their magnitudes. We can also factor in large hindrances and stagnancies by assigning a negative reward to every time unit spent in the 'in' phase. Thus, we have arrived at the notion of utility which factors in probabilities of taking an arrow plus the reward weights of spending unit time in a state. For the project in question, the reward for success might be very high (say a research paper publication at a top conference or the birth of a new startup) and this offsets the very small likelihood of success. The practical and real-world components such as say; one's desire to see things through, trying to give one's best, the idea of ego in some sense, and many more such titbits also contribute to one's final decision. At this stage, I come to the notion of faith which can be thought of as a belief that X is true, which remains unaltered even after being given a large amount of evidence Y against X. But why does faith play a positive role here?

The answer can be found by looking at the two ways of making decisions we saw above: using purely probabilistic tools or using the notion of utilities. One can think of it as follows: faith is what pushes you to move past the basic likelihoods of success and consider the potential reward, and have a belief that even though the probability of taking the arrow leading to success might be tiny, I can still take that path. In simple terms, it is a notion of self-belief and trusting one's own abilities.

Now we come to Buchak's example. Before we start, one should note that the numbers here are fundamentally different from the rewards and likelihoods of project completion. The potential negative reward if the 'faith' is broken is of a really large magnitude. It's not simply about being married to a murderer, but about being married to a person whom you actually do not understand. He might be a psychopath for all you know. Now, the negative cost in case of your belief being incorrect may be fatal. Add your own children to the mix and the negative cost is scaled up further. You're looking at physical and/or mental harm of your children which can even lead up to their collective demise.

Sorry for framing it in a frightening manner. The point I'm trying to make is that we're trying to compare apples and oranges here. The best way to see that is through final state rewards. To keep things simple, let us keep it binary and focus on the terminal belief states being true or false.

1. Project Example | Belief being True: Project is successful (Very High Positive Reward), Belief being False: Project fails (Smaller negative reward accrued while staying in the 'in' phase)
2. Anna and Bates story | Belief being True: Bates is innocent (High Positive Reward for choosing someone nice), Belief being False: Bates is a murderer and you don't really know the person you're married to (Extremely high negative Reward)

I would put a negative utility appraisal for Anna in the Anna and Bates case based on this. However, there is a catch to it. Let's say that Anna has clear and convincing evidence that Bates is actually not the murderer or she knows something to be evidently true about Bates which clears him of all charges. In a nutshell, if the probability of Bates being the murderer tends to zero, then the utility would go up to a positive value and then it would be rational for Anna to marry Bates.

Lastly, I would fall back to the idea of practical rationality of taking everything into account, even emotions. And if a decision seems rational to Anna, questioning it as a third person or passing judgments on her without knowing her complete circumstances and her side of the story would be in poor taste as well. The innocent until proven guilty principle dictates that we do not put Bates into a position that is particularly uncalled for.

Overall, it is not wise to say with absolute certainty whether Anna's choice is rational or not due to the reasons mentioned above. But given the information available to us, it would be wise to hold off the marriage until Bates is cleared or until evidence indicates that the probability of Bates being the murderer has reached below some threshold value.