Application of Quantum-Like Bayesian Networks in Social Sciences

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Since the 70's, researchers noticed that people do not follow the rules of probability theory while making decisions under risk.

Just like quantum physics was created in order to accommodate paradoxical findings from classical physics, quantum cognition arose as a disciple with the promise of creating models that would accommodate and explain the violations found in human decision-making.

In this work, we explore an alternative quantum structure to perform quantum probabilistic inferences. We propose a Quantum Probabilistic Graphical Model in order to predict human decisions under situations with high levels of uncertainty.

Under the proposed network, if a node (event) is unobserved, then a particle can enter in a superposition state and produce interference effects. These effects provide some explanation in terms of cognition, since they can be seen as the feeling of confusion or ambiguity.

This work also discusses the problem of creating a generalized quantum probabilistic model: the number of quantum parameters grows exponentially. We will see that for a given event, several outcomes are possible through quantum probability. A final question is posed and discussed: is it possible to find a method to assign quantum parameters in order to provide accurate predictions?