

Models of Consensus Formation based on Quantum Walk

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Our works were inspired by the famous Japanese drama "Legal High". When a person is making a decision, he/she must consider his/her personal favorites (and benefits) and the mainstream opinion of the community he/she is in. The competition between personal individuality and bandwagon effect cause the complicated phenomenon in "Consensus Formation".

In the literature, this problem in interpersonal networks is often likened to the diffusion in physical systems. We extend this analogy, and try to do some studies both on computer simulations and field experiments.

Firstly, we adopt the basic idea of quantum walk model to build a simple model to simulate the competition of different opinions. In this model, the opinions which stored in each person's mind are written in a multi-state wave function. When someone tries to make a decision, the wave function will collapse into a choice (a measurement). The process of spreading is written to a coin and a shift operator. By using these operators, the opinions can be modified and propagated. In addition, two competitive elements, namely personal individuality and bandwagon effect, are considered by using a ratio control parameter in this model.

For comparing our results with real world, we design different types of experiments on our campus. In each experiment, several conditions have been considered such as group size, opinion delivery network, information visibility, peer pressure, etc.

In this oral report, we will give a brief introduction of our works. The details of simulations and experiments will be shown in another two reports at poster presentation.

References

- [1] C.-I. Chou, C.-L. Ho, "A model of interacting multiple choices of continuous opinions", arXiv:1601.00570 (2016).