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## Information diffusion analysis in online social networks based on deep representation learning

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## Propositions

pertaining to the thesis

Information Diffusion Analysis in Online Social Networks  
based on Deep Representation Learning

by Xueqin Chen

1. Understanding how information spreads through online social networks, as well as what elements drive the success of information diffusion, has significant implications for a wide range of real-world applications [This thesis, Chapter 1].
2. Both structural and temporal features are indispensable for the prediction of information diffusion using deep learning methods [This thesis, Chapter 4 & 5].
3. To improve both accuracy and efficiency in predicting how information spreads in social networks we need different types of data and an effective sampling method of past information diffusion [This thesis, Chapter 5].
4. Detecting a rumor by considering only its content is not enough, because rumors are intended to mimic real news. Instead, it is possible to detect a rumor by looking only at its diffusion pattern [This thesis, Chapter 6].
5. Users are the main contributors to rumors spreading on online social networks. Therefore, it is effective to have fine-grained user information to better detect rumors [This thesis, Chapter 7].
6. In a wide range of scientific domains, graph neural networks are effective tools for handling data with more complicated structures, such as graph and manifold structures.
7. The performance of a deep learning-based model is highly dependent on the quality and quantity of the available data. It is important to develop more sophisticated learning models that can handle incomplete and sparse data.
8. Most of the current deep learning-based models are designed to solve one specific task, but there is an increasing need to develop a unified learning framework for solving different tasks.
9. The success of deep learning models in the future will be determined by how interpretable they are.
10. The way to a PhD is full of trials and hardships. When in doubt, remember the ancient poem of Lu You (1125–1209): "After endless mountains and rivers that leave doubt whether there is a path out, suddenly one encounters the shade of a willow, bright flowers and a lovely village."