FACULTY OF **SCIENCE**

香港浸會大學
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DISTRIBUTED COMPUTATIONAL MECHANISM DESIGN AND PROBABILISTIC MODELING FOR SEARCH AND DECISION SUPPORT IN COMPLEX NETWORKS

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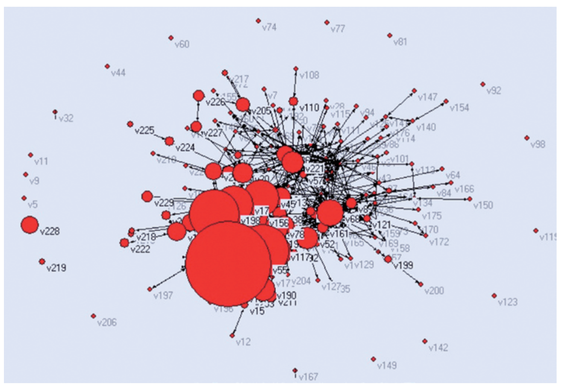
OBJECTIVES

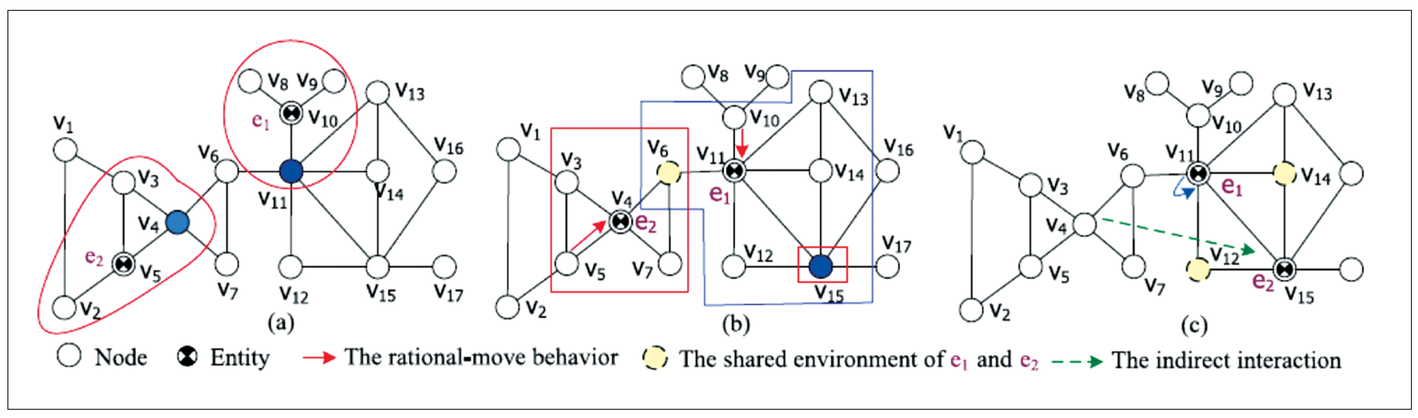
1. To design distributed computational mechanisms for distributed search and sharing data-mining results among competing/self-interest agents in complex networks (GRF HKBU 210508)
2. To adopt probabilistic approach and agent-based simulation for modeling and analysing complex networks with applications to healthcare process improvement (GRF HKBU 210410)

HIGHLIGHTS

DECENTRALIZED AND SCALABLE STRATEGY FOR SELF-INTEREST AGENTS IN COMPLEX NETWORKS

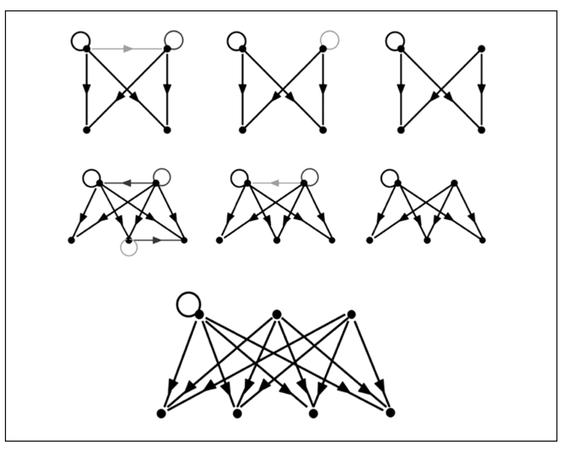
- ✦ Follow a self-organized computing approach
- ✦ Collectively search for nodes with high degrees of conductivities for network immunization [1]
- ✦ Search for trusted partners in a dynamic complex network [2] which may also be applied to community mining [3]

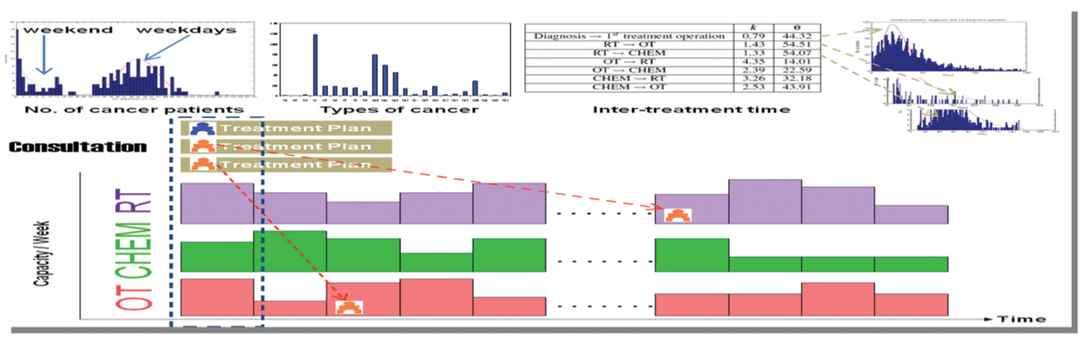


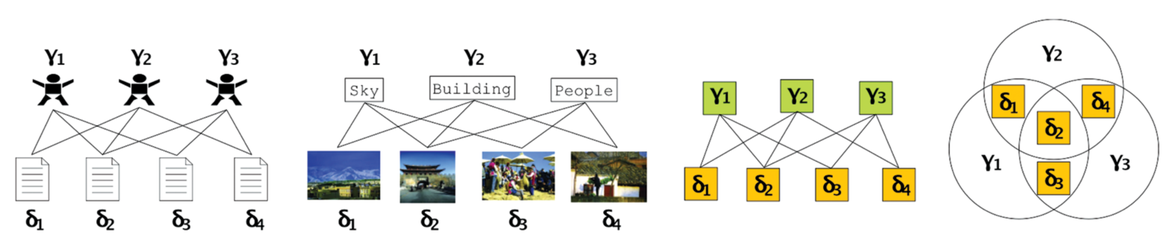


BAYESIAN MODELING FOR COMPLEX NETWORK ANALYSIS COMBINED WITH AGENT-BASED SIMULATION FOR HEALTH PROCESS IMPROVEMENT

- ✦ Probabilistic modeling for complex networks, e.g., linked documents [4, 5], interpersonal communication networks
- ✦ Agent-based mechanism design and simulation for patient scheduling and resource allocation for patient journey optimization [6]







SELECTED PUBLICATIONS

1. C. Gao, J. Liu and N. Zhong, “Network immunization with distributed autonomy-oriented entities,” in IEEE Transactions on Parallel and Distributed Systems, November, 2010.
2. J. Liu, H. Qiu, N. Zhong and C. Gao, “A dynamic trust network for autonomy-oriented partner finding,” in Journal of Intelligent Information Systems, Springer, 2011 (to appear).
3. B. Yang, J. Liu and J. Feng, “On the spectral characterization and scalable mining of network communities,” in IEEE Transactions on Knowledge and Data Engineering, November, 2010.
4. J. Zeng, W.K. Cheung, C.H. Li and J. Liu, “Multirelational Topic Models”. In Proceedings of 2009 IEEE International Conference on Data Mining, Miami, Florida, USA, 1070-1075.
5. J. Zeng, W. Feng, W.K. Cheung and C.H. Li, “Higher-order Markov tag-topic models for tag-doc network data,” submitted to Computational Intelligence: An International Journal.
6. C. Choi, W.K. Cheung, I.T. Cheung, J. Liu. “A multi-agent framework for cancer patient journey improvement,” in Proceedings of the Third International Conference on Health Informatics, 2010.