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論文要旨

THESIS SUMMARY

専攻 :	Computer Sciences	専攻
Department of		
学生氏名 :	Sorn Jarukasemratana	
Student's Name		

申請学位 (専攻分野) :	博士	(Engineering)
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指導教員 (主) :	Tsuyoshi Murata	
Academic Advisor(main)		
指導教員 (副) :		
Academic Advisor(sub)		

要旨 (英文 300 語程度)
Thesis Summary (approx.300 English Words)

This thesis is consisted of 5 chapters.

The first chapter is the introduction. This chapter introduced key concepts such as scale-free networks and community detection algorithms which are important for the latter chapters.

The second chapter introduced the first contribution of this thesis, node centrality and edge distance approach. In this approach, a power law degree distribution property of scale-free networks is used as the main idea for designing this algorithm. Centrality values of each node and distances between nodes are calculated, and then both values are used for determining the communities. This approach is tested on both synthetic and real-world datasets and the results showed that it can achieve better accuracy on scale-free networks than other traditional methods such as Louvain algorithm, Girvan-Newman, or Top Leader.

The third chapter introduced the second contribution of this thesis, edge weight approach. In this approach, we focused on a subtype of scale-free networks called "mixed scale-free network". In this type of network, some communities have node degree follows a power law which is normal for scale-free networks, but some communities have node degree follows normal distribution which is not scale-free. In this mixed networks, methods that are aimed for scale-free can have reduced accuracy because some communities do not have scale-free properties. At the same time, methods that are aimed for normal degree distribution networks also received a reduced accuracy because some communities have scale-free properties. Our method is a combination of both scale-free and non scale-free methods which can extract the communities of both types in the same network correctly. Our method received better accuracy than other based line methods on mixed scale-free networks and received about the same accuracy on normal scale-free networks and network with normal degree distribution.

The fourth chapter is discussion. Many aspects of both approaches are discussed such as computational times and the relation between parameters of both algorithms and parameters of scale-free networks. The fifth chapter is the conclusion of this thesis and future works.