

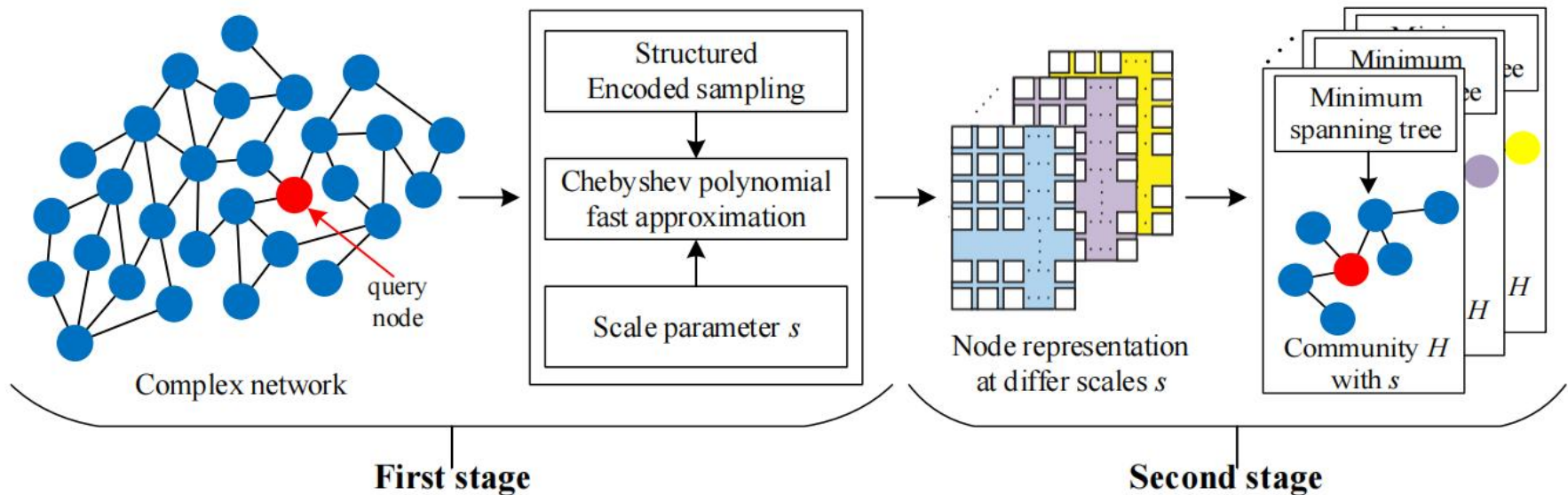
Efficient multi-scale community search method based on spectral graph wavelet

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Problems & Ideas

- Problems of Multi-scale Community Search:
 - Existing community search approaches typically returns a single target community containing query nodes by default.
 - Using spectral methods introduces a large number of matrix operations, which is not conducive to community search on large graphs.
- Ideas: A multi-scale community search model that takes both community search efficiency and personalization into account.



An illustration of MSCS. Input: a complex network and query node (marked in red). Output: the target community H at different scale s .

Main Contributions

- Contributions:
 - The MSCS model takes advantage of graph wavelets to obtain a scale-dependent analysis of communities in networks and a fine-grained representation of the nodes;
 - In order to reduce the great cost of the spectral method, the Chebyshev polynomial fast approximation is designed to obtain an approximation of the wavelet.

Table 1: Comparison of MSCS on multi-scale benchmark datasets.

Dataset		SP			SRW		
Method	Metric	1	2	3	1	2	3
SGW	<i>rec</i>	0.847	0.831	0.844	0.839	0.821	0.828
	<i>pre</i>	0.849	0.853	0.834	0.804	0.812	0.838
	F_1	0.857	0.844	0.837	0.849	0.845	0.837
LQ	<i>rec</i>	0.737	0.829	0.822	0.794	0.827	0.834
	<i>pre</i>	0.749	0.841	0.817	0.786	0.793	0.819
	F_1	0.747	0.805	0.829	0.774	0.817	0.821
MSCS	<i>rec</i>	0.851	0.847	0.853	0.848	0.853	0.849
	<i>pre</i>	0.859	0.861	0.847	0.826	0.861	0.849
	F_1	0.901	0.893	0.896	0.864	0.869	0.874

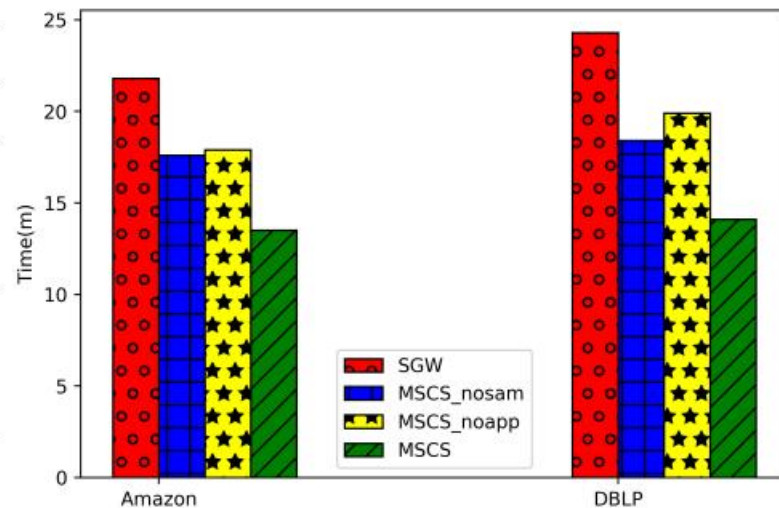


Fig.1 Efficiency evaluation of model.