Adversarial network embedding using structural similarity

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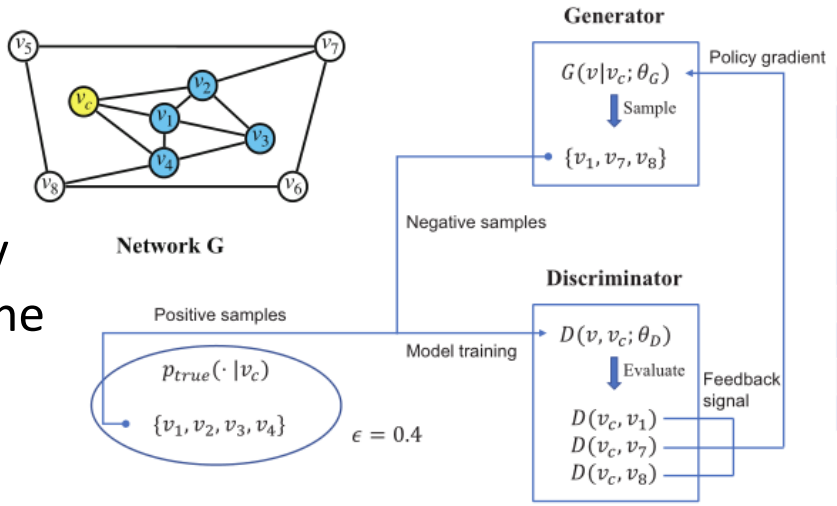
Frontiers of Computer Science, DOI: 10.1007/s11704-020-9182-1

Problems & Ideas

- Problems of network embedding
  - network embedding techniques which learn low-dimensional representations of vertexes from network topology offer an alternative to traditional manual feature engineering.

- Ideas: Learning expressive vertex embeddings by coalescing high-order proximity of the networks
  - utilize the structural similarity identity of vertexes to learn the latent representations of a network
  - adopt the robustness and effective vertex embeddings via adversarial training procedure



σ	v_c
v_c	1
v_1	0.89
v_2	0.67
v_3	0.75
v_4	0.67
v_5	0
v_6	0
v_7	0.25
v_8	0.25

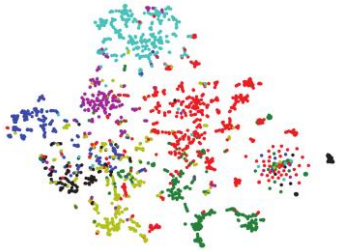
Fig. 1: Illustration of ANESS

Main Contributions

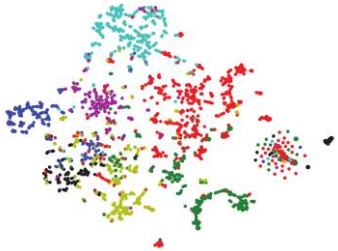
- **The proposed network embedding method ANESS performs better than state-of-the-art algorithms**

Method	5%		10%		30%		50%		70%		90%	
	Micro-F1	Macro-F1	Micro-F1	Macro-F1	Micro-F1	Macro-F1	Micro-F1	Macro-F1	Micro-F1	Macro-F1	Micro-F1	Macro-F1
DeepWalk	0.319	0.170	0.337	0.189	0.386	0.241	0.381	0.239	0.408	0.276	0.423	0.279
LINE	0.294	0.129	0.311	0.145	0.347	0.184	0.360	0.196	0.365	0.207	0.379	0.218
Node2Vec	0.318	0.167	0.336	0.190	0.383	0.248	0.394	0.264	0.407	0.272	0.421	0.289
GraphGAN	0.315	0.164	0.339	**0.197**	0.397	0.254	0.386	0.246	0.417	**0.288**	0.432	0.299
ASeedNE	-	-	-	-	-	-	0.411	0.268	0.424	0.287	0.433	0.304
ANESS	**0.328**	**0.171**	**0.341**	0.193	**0.401**	**0.266**	**0.428**	**0.284**	**0.428**	0.285	**0.445**	**0.311**

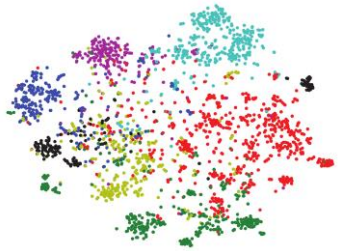
Table. 1: Comparison results on Blogcatalog benchmark network



(a) DeepWalk

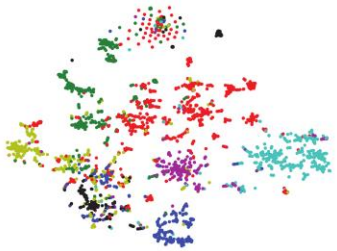


(b) Node2Vec

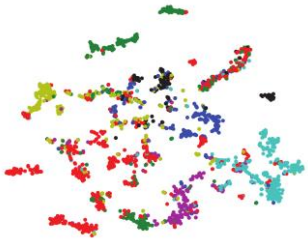


(c) TADW

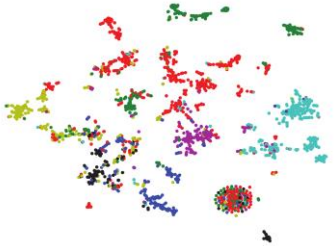
(d) GraphGAN-Dis



(e) GraphGAN-Gen



(d) ANESS-Dis



(d) ANESS-Gen

Fig. 2: Network visualization on Cora benchmark network