Adversarial Learning on Heterogeneous Information Networks

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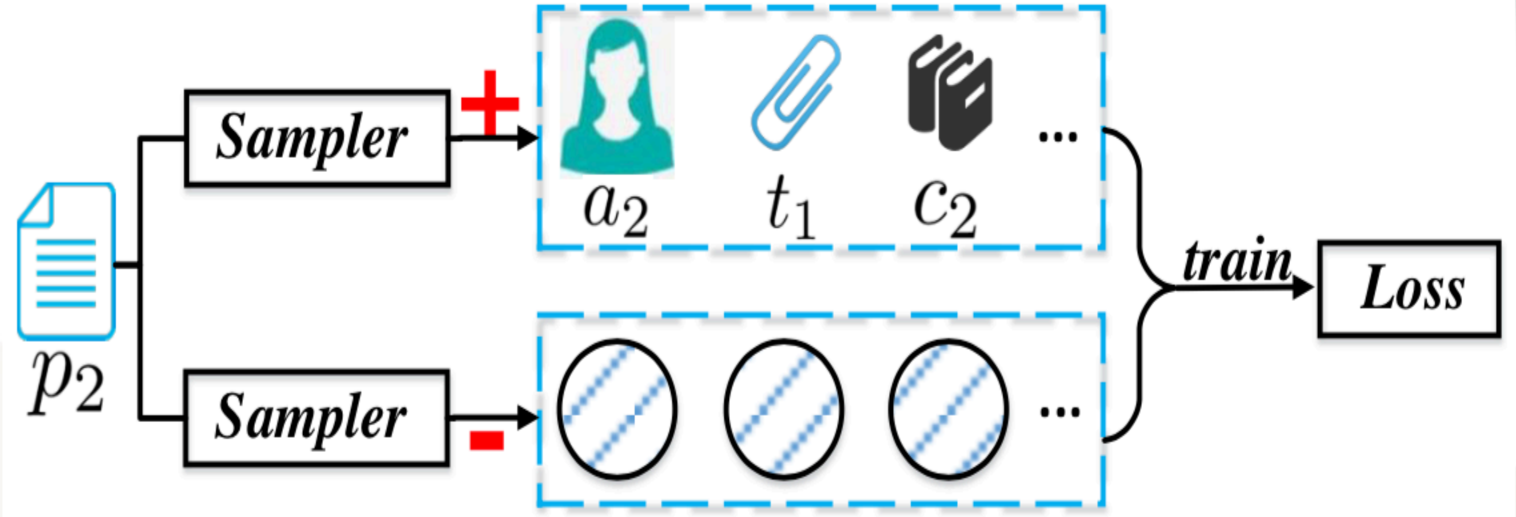
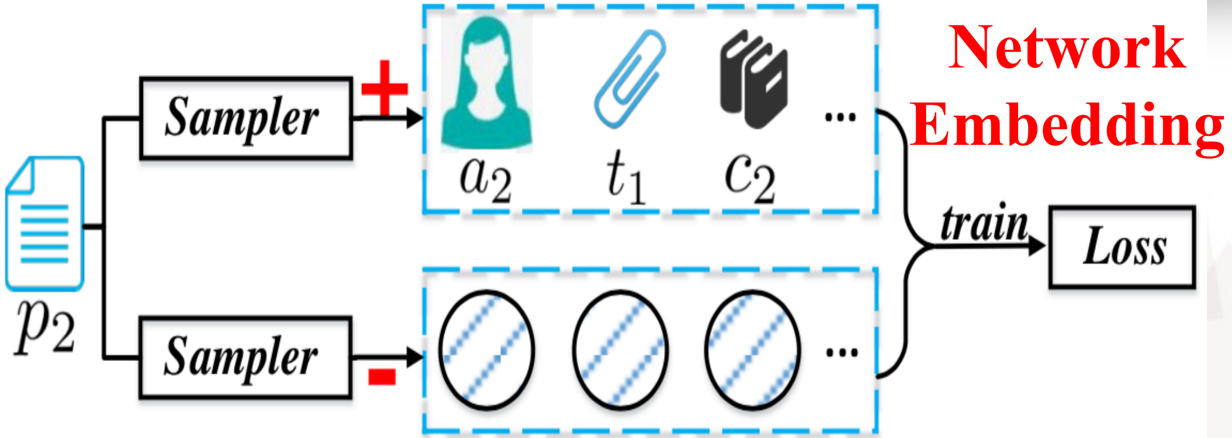
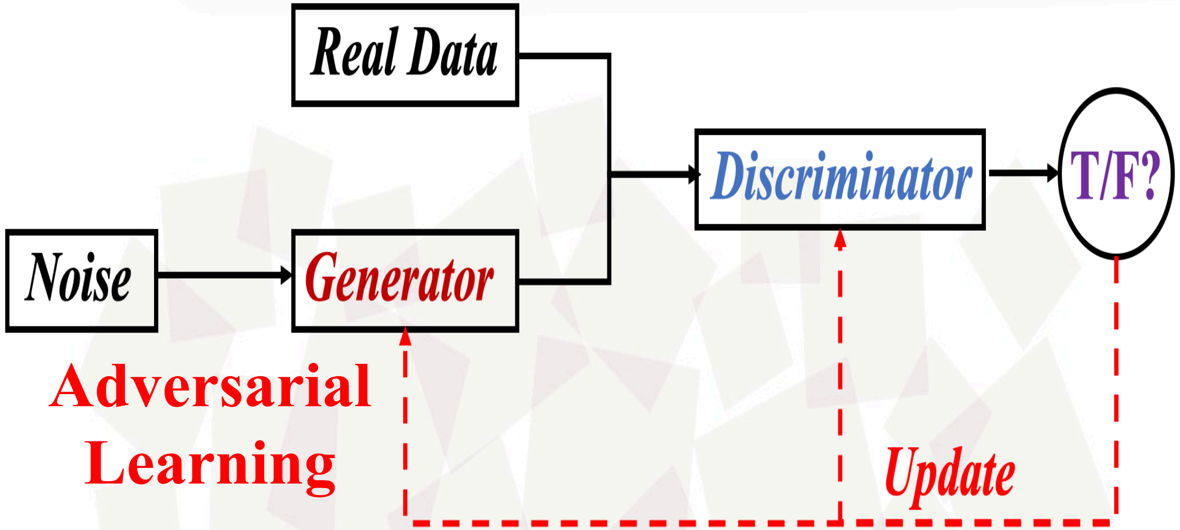


Limitations

Randomly select existing nodes in the network as negative samples	⇒	Arbitrary and confined to the universe of the original network
Focus on capturing the rich semantics on HINs	⇒	Heed to the latent distribution of the nodes so that lack robustness
Rely on appropriate meta-paths to match the desired semantics	⇒	Require domain knowledge that is often expensive to obtain



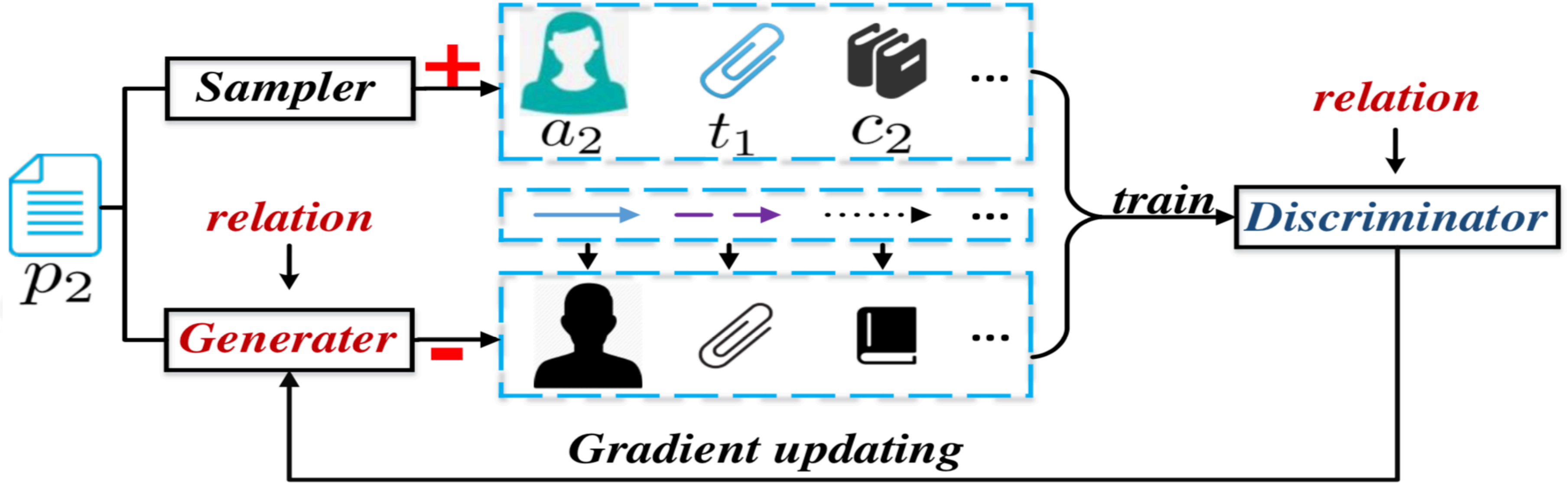


Challenges

How to capture the semantics of multiple types of nodes and relations?

How to generate fake samples efficiently and effectively?

HIN Embedding with GAN based Adversarial Learning(HeGAN)



Relation-aware Generator and Discriminator → Challenge 1

(i) Discriminator can tell whether a node pair is real or fake w.r.t relation

(ii) Generator can produce fake node pairs that mimic real pairs w.r.t relation

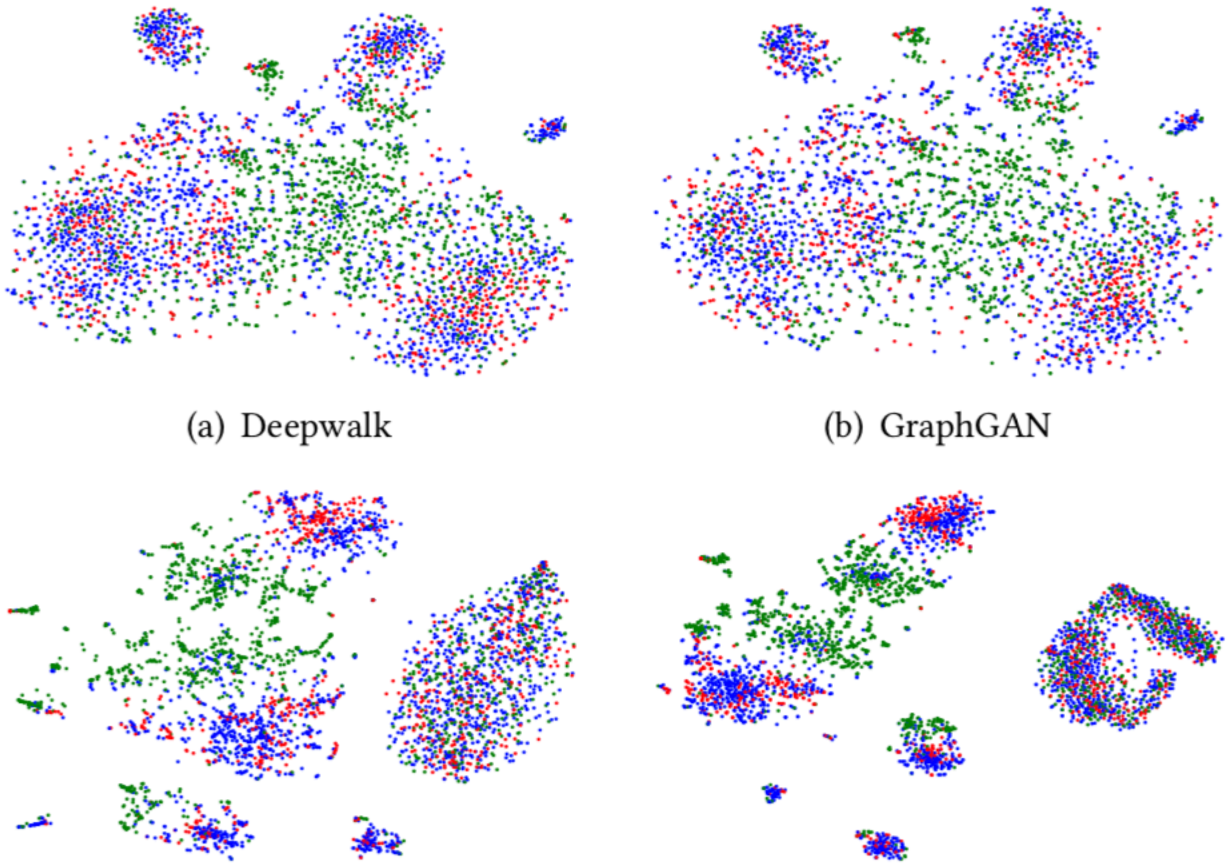
Generalized Generator → Challenge 2

(i) Sample latent nodes from a continuous distribution

(ii) no softmax computation and fake samples are not restricted to the existing nodes

Node clustering

Methods	DBLP	Yelp	AMiner
Deepwalk	0.7398	0.3306	0.4773
LINE-1st	0.7412	0.3556	0.3518
LINE-2nd	0.7336	0.3560	0.2144
GraphGAN	0.7409	0.3413	-
ANE	0.7138	0.3145	0.4483
HERec-HNE	0.7274	0.3476	0.4635
HIN2vec	0.7204	0.3185	0.2812
Metapath2vec	0.7675	0.3672	0.4726
HeGAN	**0.7920****	**0.4037****	**0.5052****


(a) Deepwalk (b) GraphGAN (c) Metapath2vec (d) HeGAN

HeGAN learn semantic-preserving representations in a robust manner through the adversarial principle

HeGAN has a more crisp boundary and denser clusters

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More details will be published in our poster

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