Heterogeneous Graph Neural Network

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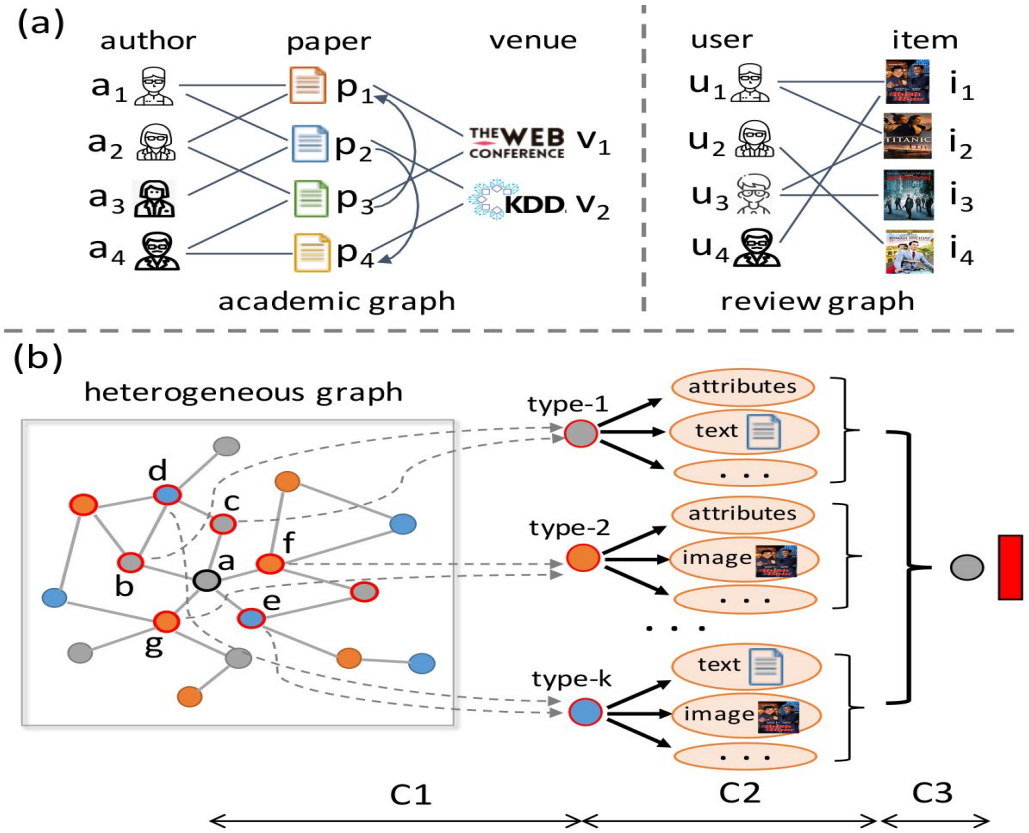
Heterogeneous graphs aims

- Purse meaningful vector representation for each **node** so as to facilitate downstream applications such as link prediction, personalized recommendation, node classification

Graph neural networks

The key idea behind GNNs is to aggregate feature information from node’s local neighbors via neural networks

Challenges of graph neural network for HetG



Challenges

C1 - Sampling heterogeneous neighbors: Many nodes in HetG may not connect to all types of neighbours.

C2 - Encoding heterogeneous contents: A node in HetG can carry unstructured heterogeneous contents.

C3 - Aggregating heterogeneous neighbors: Different types of neighbors contribute differently to the node embeddings in HetG.

Solve these challenges

- HetGNN

HetGNN

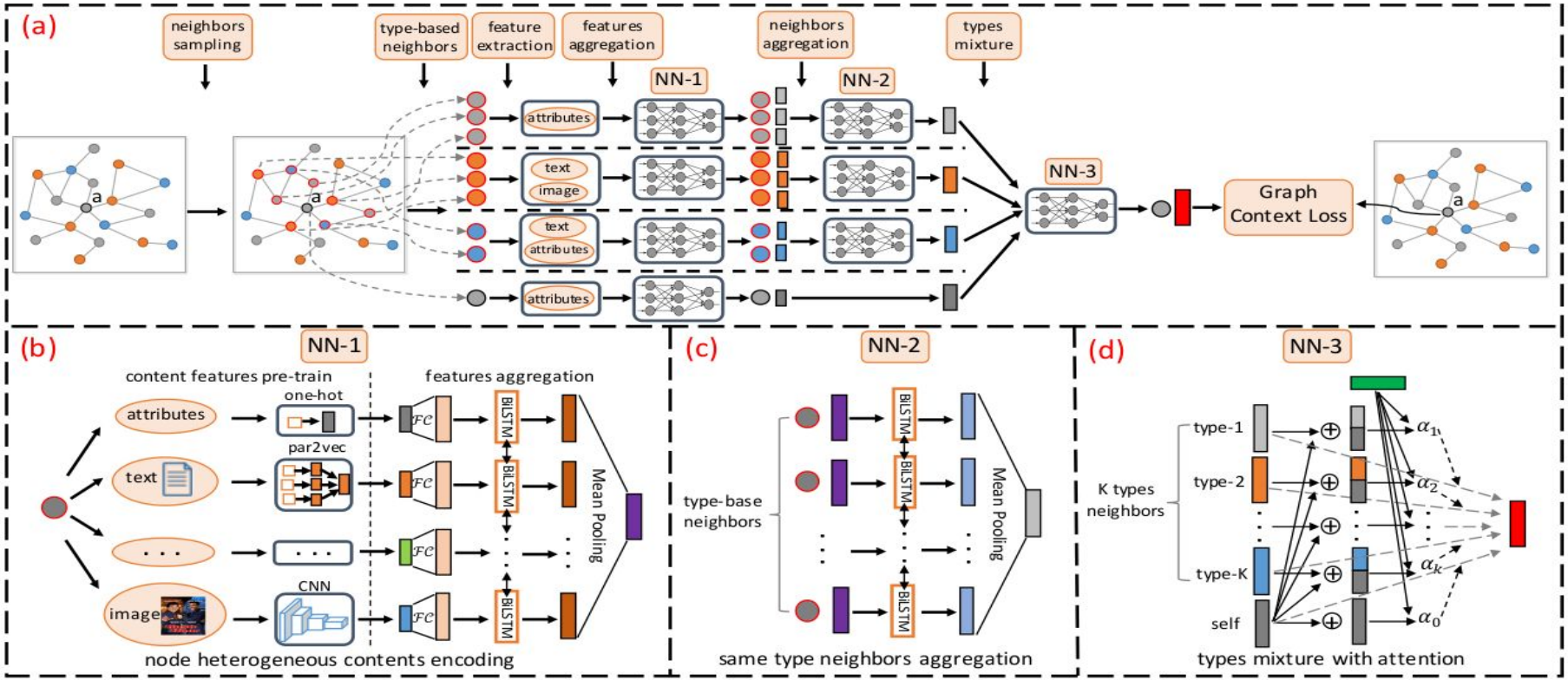
(1) Sampling heterogeneous neighbors;

(2) Encoding node heterogeneous contents;

(3) Aggregating heterogeneous neighbors;

(4) Formulating the objective and designing model training procedure.

HetGNN


(a)
neighbors sampling
type-based neighbors
feature extraction
features aggregation
neighbors aggregation
types mixture
NN-1
NN-2
NN-3
attributes
text
image
text
attributes
attributes
Graph Context Loss
a
(b)
NN-1
content features pre-train
features aggregation
attributes
one-hot
text
par2vec
CNN
image
FC
BiLSTM
Mean Pooling
node heterogeneous contents encoding
(c)
NN-2
type-base neighbors
BiLSTM
Mean Pooling
same type neighbors aggregation
(d)
NN-3
K types neighbors
type-1
type-2
type-K
self
α_1
α_2
α_k
α_0
types mixture with attention

Application

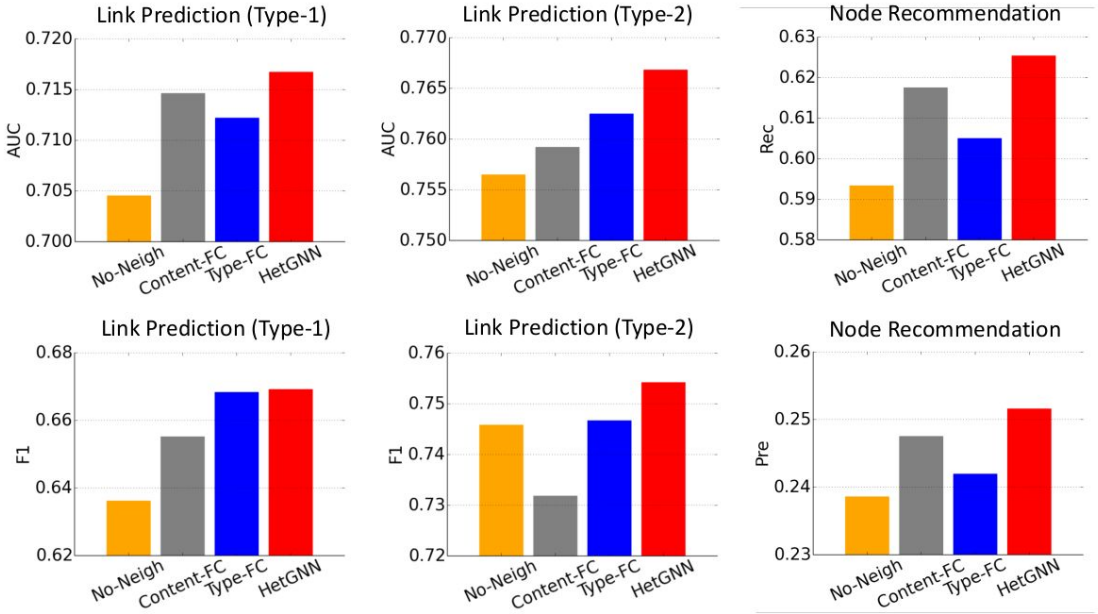


Figure 4: Performances of variant proposed models.

Thank you!