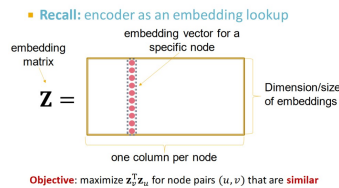
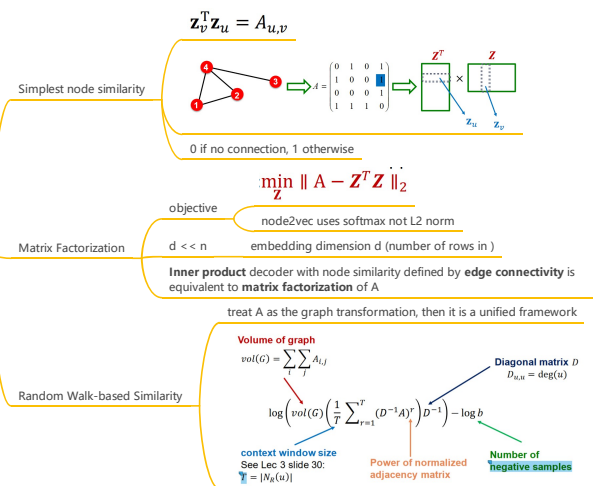


Matrix Factorization and Node Embeddings

Embeddings & Matrix Factorization



Connection to Matrix Factorization



limitations

Limitations of node embeddings via matrix factorization & random walks

1. no embedding for nodes **not in the training set**
needs to recompute all node embeddings
2. Cannot capture **structural similarity**
solution anonymous walk
3. Cannot utilize node, edge and graph features
solution GNN

Summary

- PageRank
 - Measures importance of nodes
 - efficiently computed by power iteration of adjacency matrix
- Personalized PageRank (PPR)
 - Measures importance of nodes w.r.t a set of nodes or a particular node
 - efficiently computed by random walk
- Node embeddings based on **random walks** expressed as **matrix factorization**
- Viewing graphs as matrices plays a key role