Privacy in GNNs

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What is Privacy in GNNs?

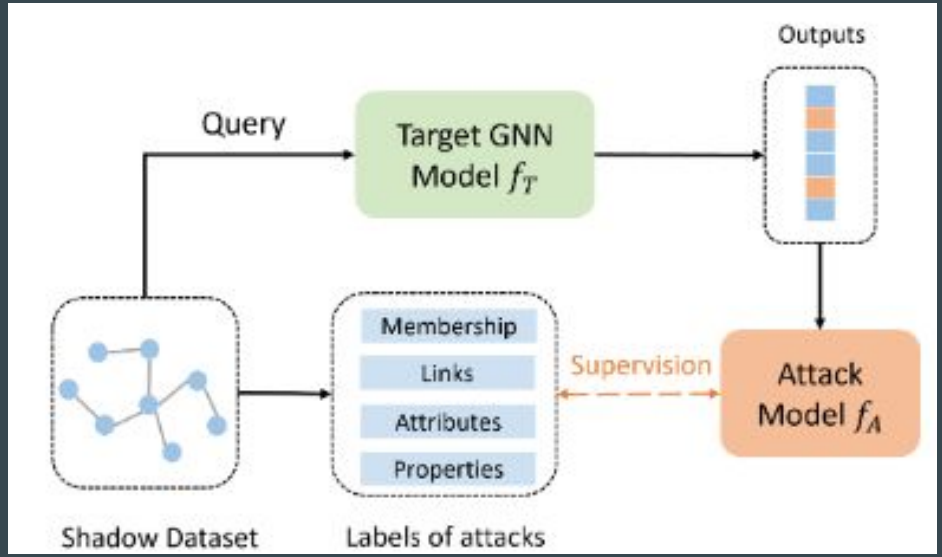
- Data Isolation
- Sensitive Information on human related variables
- Personal information

Types of Privacy Attacks

- Membership Inference Attack
- Reconstruction Attacks
- Property Inference Attack
- Model Extraction Attack

Framework for attacks

- Create Shadow dataset of samples with high confidence scores.
- Train new ensembles of model from shadow dataset which mimics appropriate task.



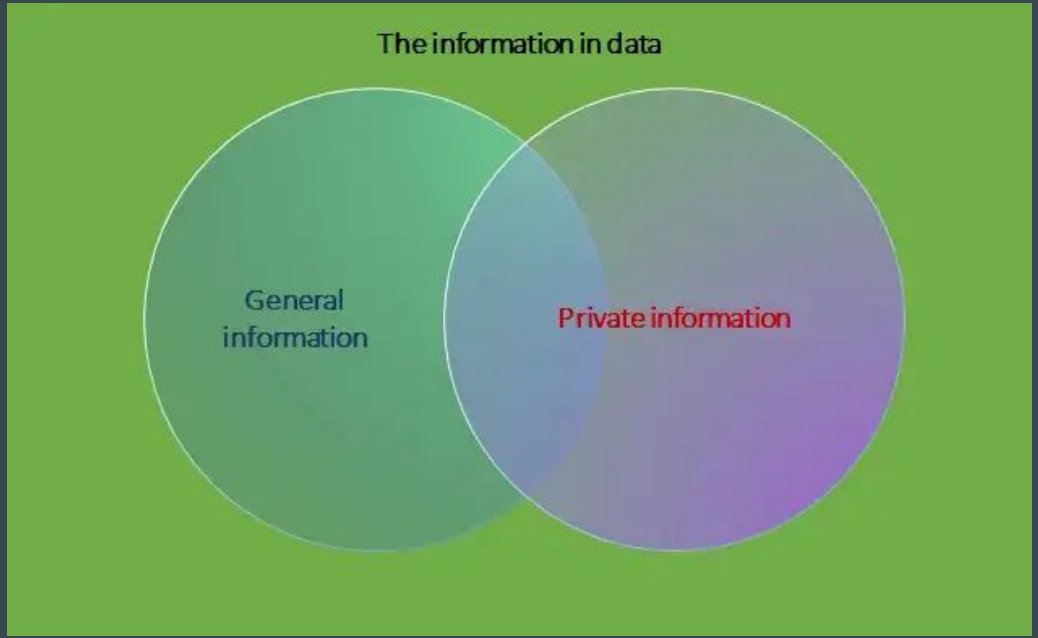
Differential Privacy

What is Differential Privacy?

What does it guarantee?

What does it not guarantee?

How does it work?



Current Research and Related Works

Locally Private Graph Neural Networks

Federated Graph Neural Network Framework for privacy-preserving personalization

Semi-Supervised Knowledge Transfer For Deep Learning from Private Training Data

Releasing Graph Neural Networks with Differential Privacy Guarantees

Our Work

Use the approaches mentioned in the following papers:

- Locally Private Graph Neural Networks
- Semi-Supervised Knowledge Transfer For Deep Learning from Private Training Data
- Releasing Graph Neural Networks with Differential Privacy Guarantees

And train them on Flickr dataset and study and the understand the Privacy vs Accuracy Trade-off

Flickr Dataset

Number of photos: 14460

Total Number of Tags: 52857

Total Number of Groups: 32450

Features based on Neighbours:

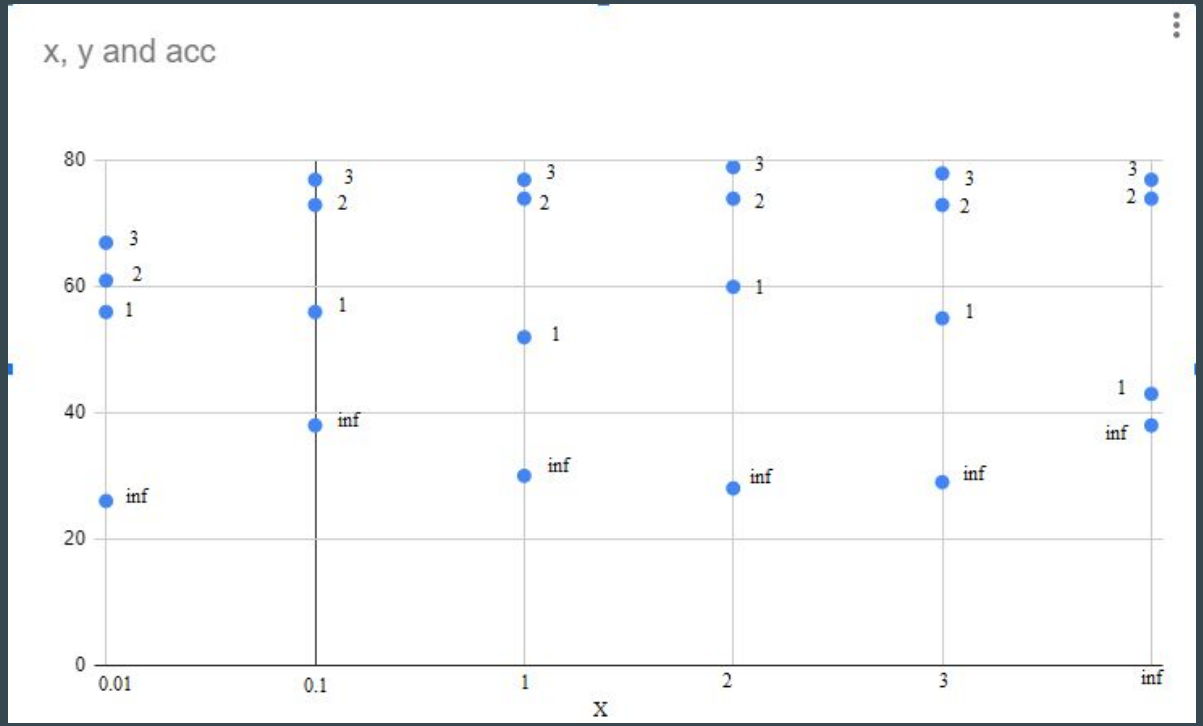
- The number of common tags, groups, collections, and galleries.
- Whether both photos were taken in the same location.
- Whether both photos were taken by same user.
- Whether both photos were taken by contacts/friends.

LPGNN

Implemented the LPGNN paper using pytorch framework.

Feature Privacy Budget

Label Privacy Budget



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Thank You