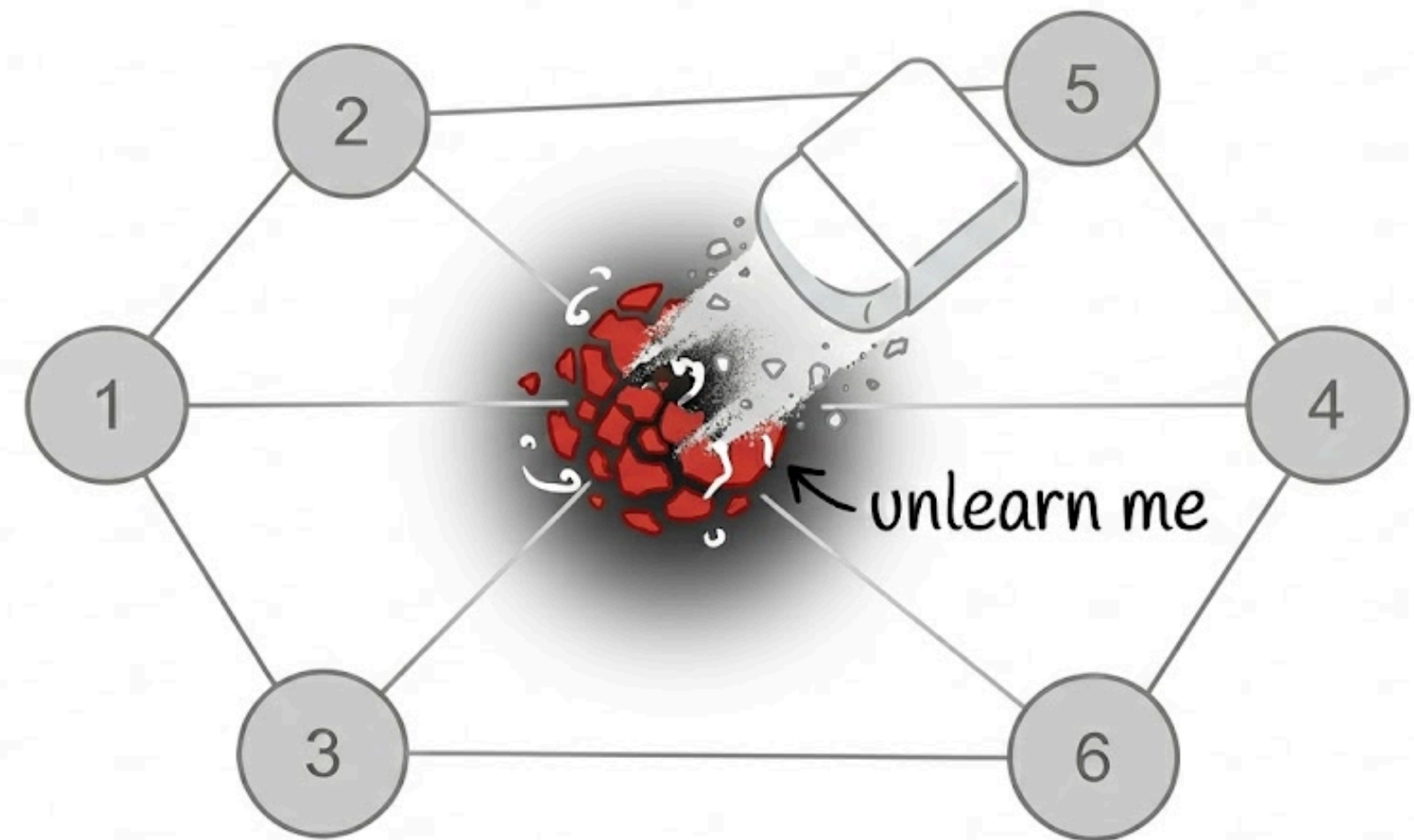
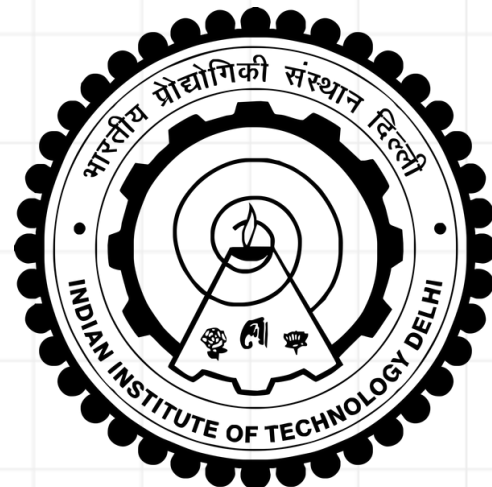


Is Graph Unlearning Ready for Practice? A Benchmark on Efficiency, Utility, and Forgetting

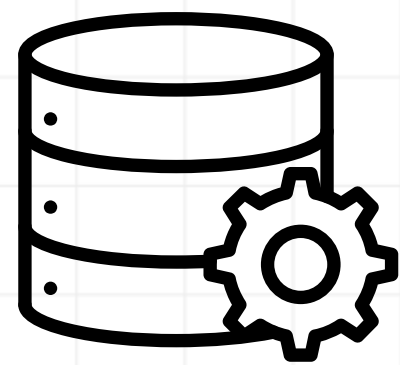
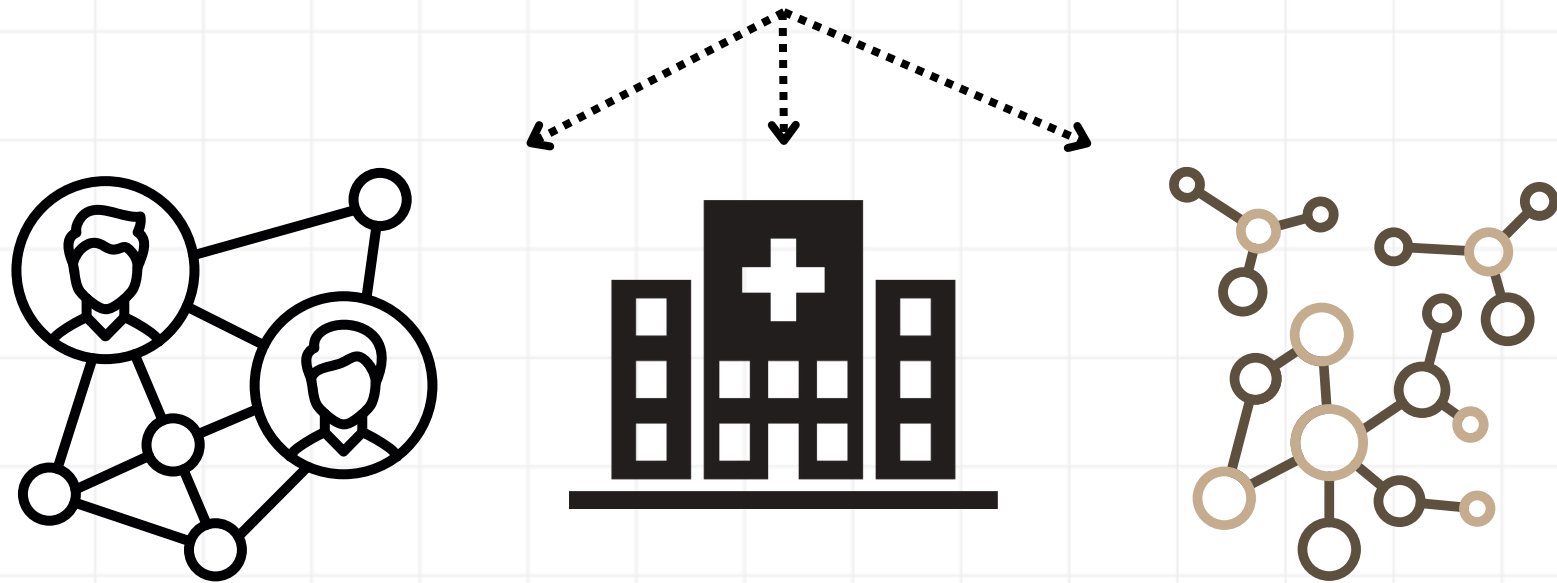
Samyak Jain* · Ronak Kalvani* · Sainyam Galhotra · Sayan Ranu

Indian Institute of Technology, Delhi



Introduction

Graph Neural Networks



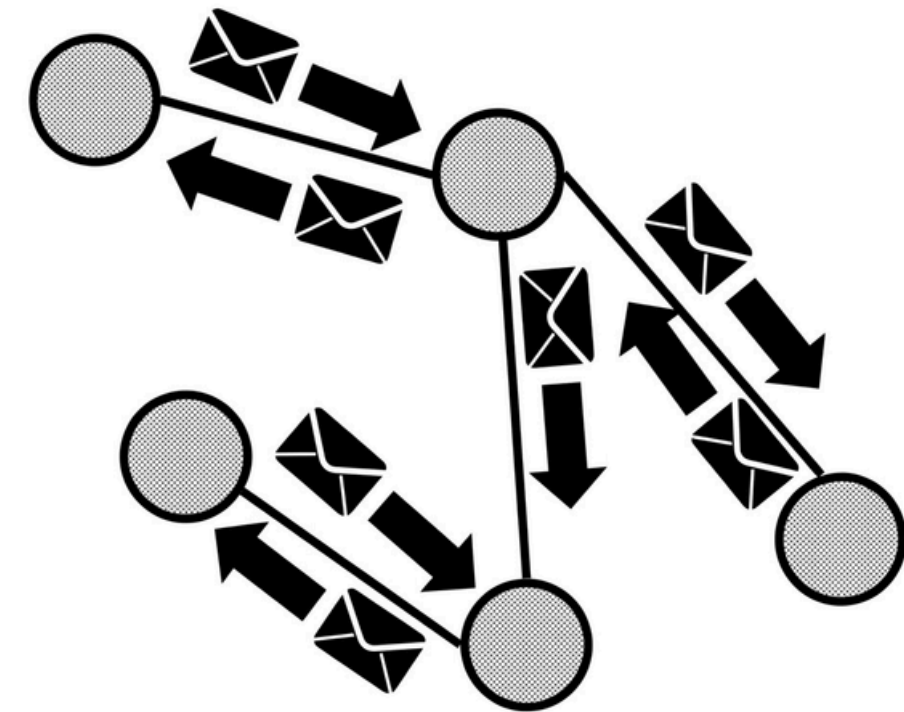
Unlearning request comes on data

Retrain from scratch

Machine Unlearning

GDPR

Right to be forgotten



Difficulty specific to GNNs

Problem Statement

Provide a practical benchmark for evaluating graph unlearning across existing unlearning techniques

07

Graph Datasets

12

**Unlearning
Techniques**

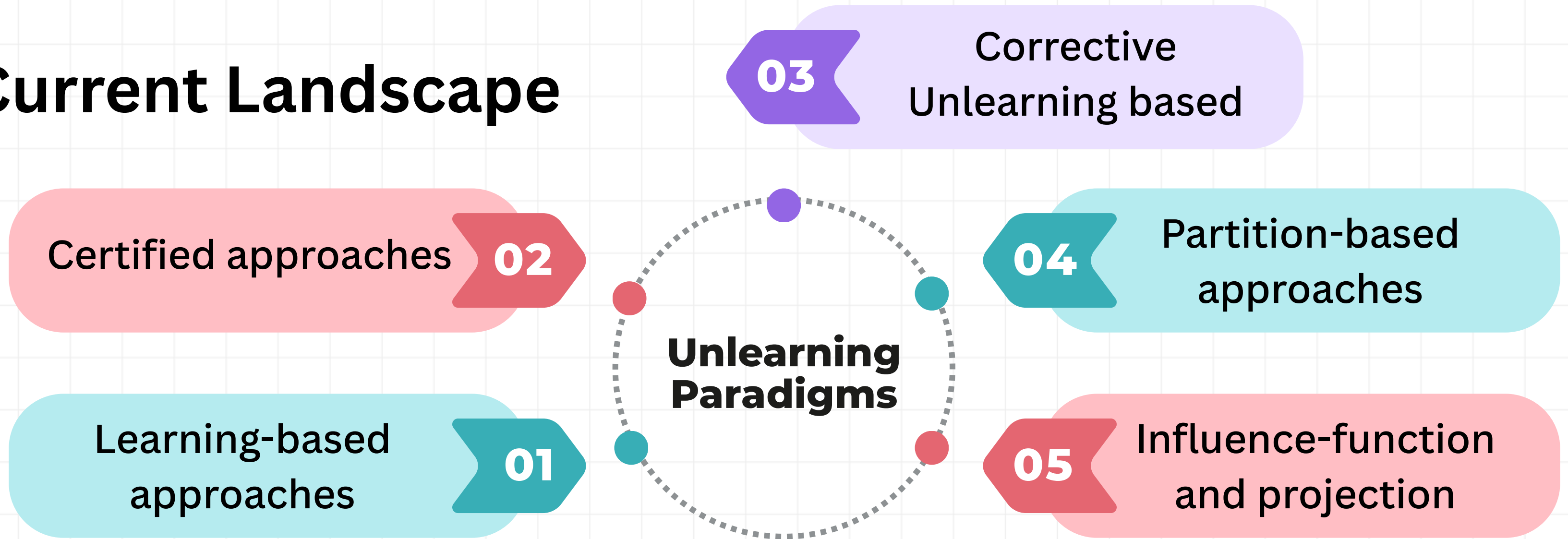
**UNLEARNING
REQUEST**

Nodes

Edges

Features

Current Landscape



Benchmarking Framework

Utility

Is unlearned model close to a model retrained from scratch model?

Forgetting

Have unlearned model forgot the training influence of deleted nodes?

Efficiency

Is unlearning technique fast enough to run at large scale compared with retraining from scratch?

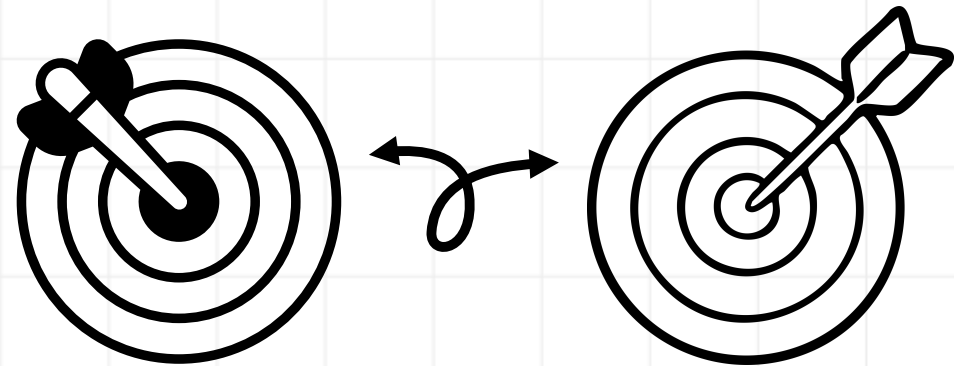
Robustness

Is unlearning consistent across different data removal workload distributions.

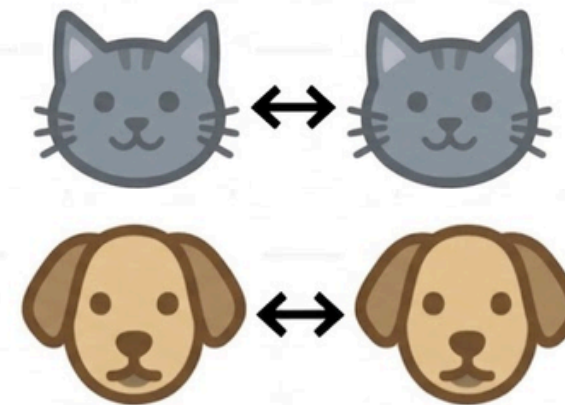
Unlearning Utility

Comparison of Unlearned model with Retrained from scratch in terms of

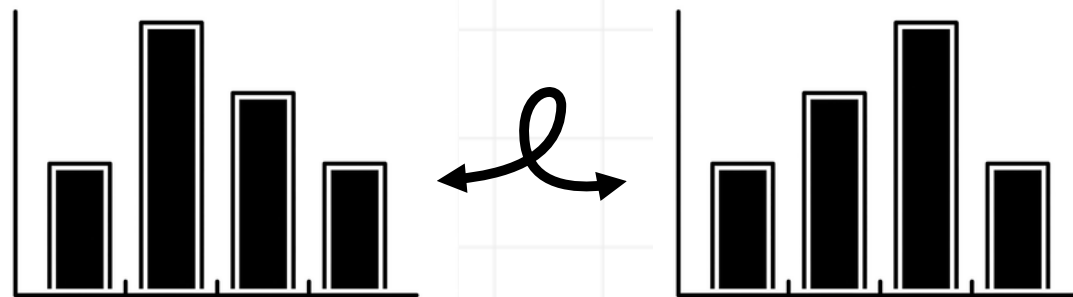
Accuracy



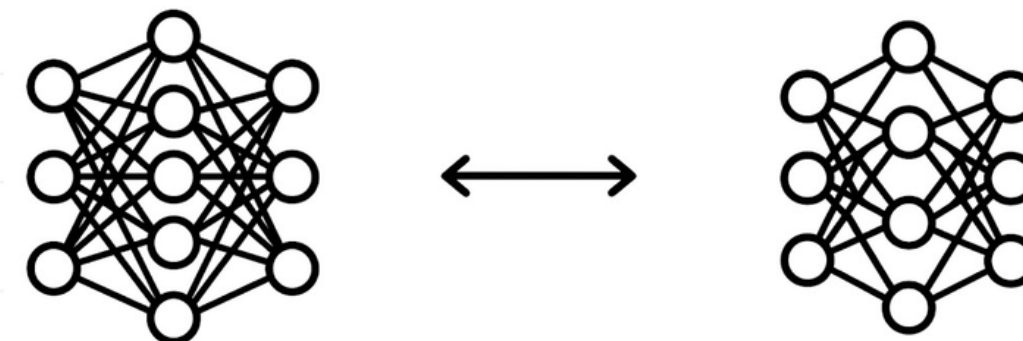
Fidelity



Logit distance

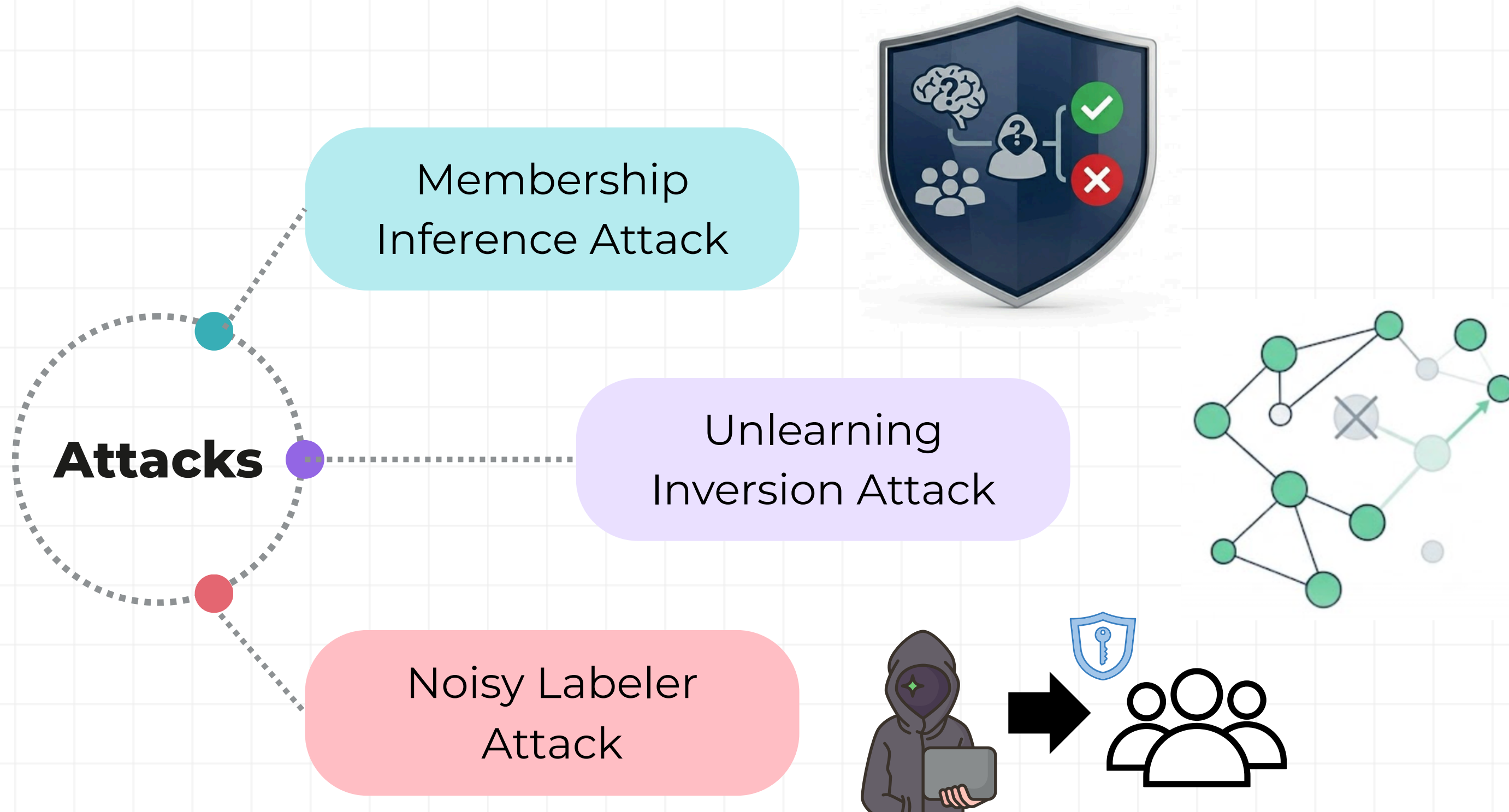


Weight distance



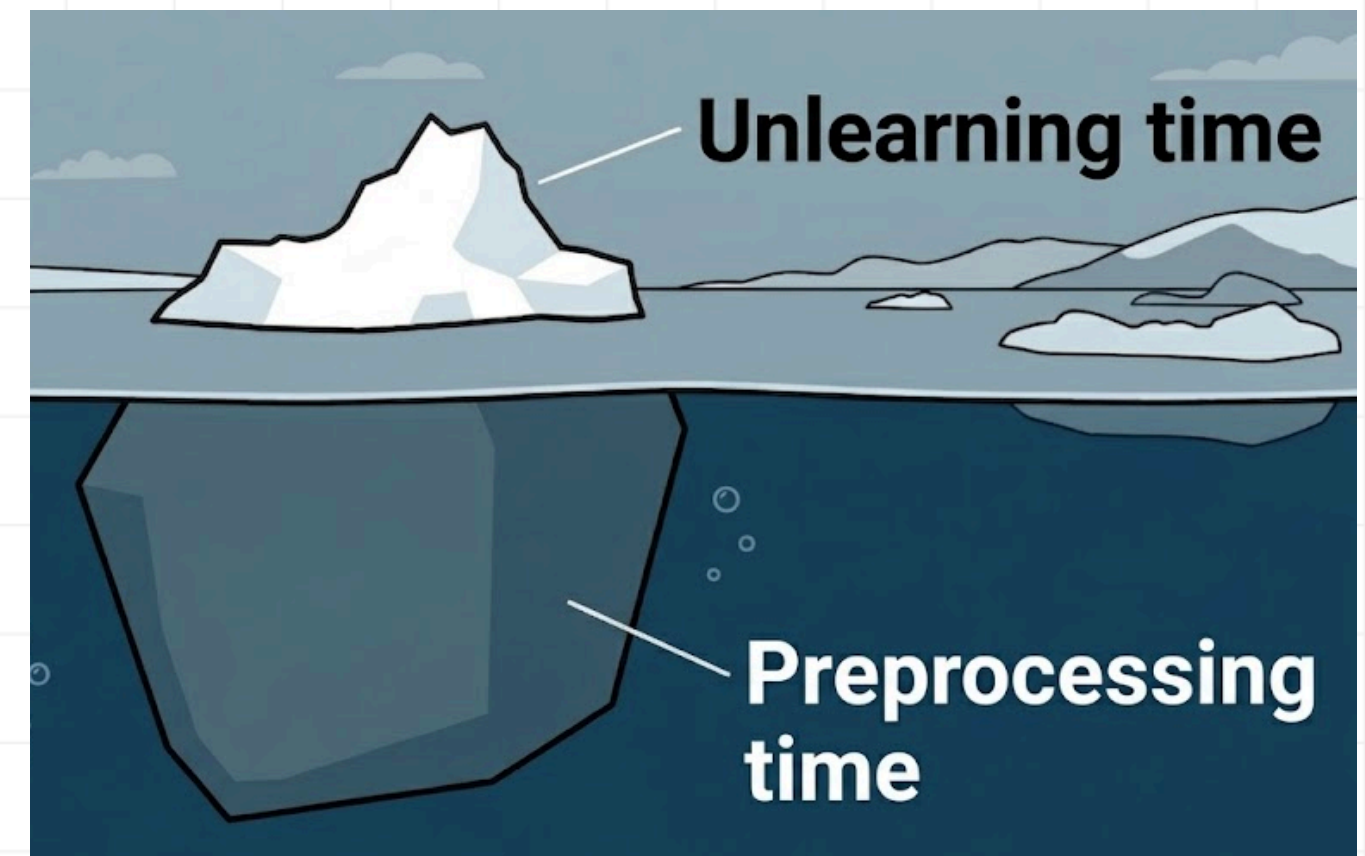
Forgetting

Three different types of attacks to measure forgetting



Efficiency

- How much time and memory does each method truly need at scale?
- What is breakdown of time for each unlearning technique?



Robustness

How stable are
Unlearning techniques

Across Large deletion scenarios

When deletion requests have
non-random distributions

Result and Conclusions

Limited Efficiency & Scalability

Utility requires metrics beyond accuracy

No method fully satisfies all three pillars

Best practical choice depends on setting

Technique	Efficiency	Utility	Forgetting
GUIDE	✗	✓	✓
PROJECTOR	✓	✓	✗
GNNDELETE	✓	✗	✗
GNNERASER	✗	✓	✗
GIF	○	✓	✓
IDEA	○	✓	✓
MEGU	○	✓	✓
COGNAC	✗	○	○
ETR	○	○	✓



Satisfaction



Partial Satisfaction



Violation

Want to know more?

Scan for paper here



Scan for codebase here



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