Towards Scalable, Efficient and Privacy Preserving Machine Learning
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Context and Motivation

C: Company

B: Local bank transactions of C

A: Fraud detection company

M: Data mining for fraud detection

Context and Motivation

Central Supervision Authority

Data Mining for fraud detection

Local bank transactions of Ciphermed framework [8].

We compare our work to the transactions

This fraud detection in a B2B network.

We have used a synthetic dataset for

We compare our work to the Ciphermed framework [8].

Objectives

- Minimize the computational costs incurred by privacy preservation.
- Provide an end-to-end privacy preserving outsourced data classification service.
- Enable a set of mutually untrusted data owners to have a global vision on the union of their data without breaching the privacy of each one of them.
- Enable dynamic data model updates when new training data samples are available.

Related work

Different ML algorithms

- Clustering (1)
- Classification (2)
- Association Rule Mining (3)

Different Privacy-preservation objectives

- ML output protection
- Data protection

Privacy Preservation techniques

Cryptographic techniques (SMC/HE, GC, OT)

Different architectures

- Distributed (4)
- Outsource (5)

Design principles

- Cryptographic based protection (data model, training data, classification queries and responses)
- Partial homomorphic encryption (PHE) based building blocks
- Combine PHE with cryptographic binding (DTPKC cryptosystem) [6]
- We implemented the VFDT incremental decision tree learning algorithm [7]

Preliminary results

We have used a synthetic dataset for fraud detection in a B2B network.

This dataset contains 1000 bank transactions with 9 attributes each.

We compare our work to the Ciphermed framework [8].

References