Towards Scalable, Efficient and Privacy Preserving Machine Learning
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To cite this version:
Rania Talbi, Sara Bouchenak. Towards Scalable, Efficient and Privacy Preserving Machine Learning, Middleware ’18 Doctoral Symposium, Dec 2018, Rennes, France. hal-01956155

HAL Id: hal-01956155
https://hal.archives-ouvertes.fr/hal-01956155
Submitted on 14 Dec 2018

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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 (1)
- Data protection (2)
- Privacy Preservation techniques

Design principles

- Cryptographic based protection (data model, training data, classification queries and responses)
- Partial homomorphic encryption (PHE) based building blocks
- Combine PHE with cryptographic blinding (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