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# Outsourced Privacy-preserving Classification Service over Encrypted Data

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## Abstract

With the diversity of cloud services, remote data services based on the machine learning classification have been provided in many applications including risk assessment and image recognition. In a classification service, a classifier owner that acts a service provider establishes a protocol to allow a user to query for the evaluation of his/her data. However, such an owner has to keep on-line continuously and equip with enough bandwidth and computing resources. Although the owner can outsource the service to a powerful service, there remains a challenge that is protecting the privacy of the data and the classifier. In this paper, we propose a novel scheme for a classifier owner to delegate a remote server to provide the privacy-preserving classification service for users. In the proposed scheme, we design efficient classification protocols for two concrete classifiers respectively. We implement the prototype of the scheme and conduct experiments. The experimental results show that the scheme is practical.

*Keywords:* Privacy Preserving, Machine Learning, Cloud Service

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