Classification Protocols with Minimal Disclosure⋆

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Abstract
We consider multi-party protocols for classification that are motivated by applications such as e-discovery in court proceedings. We identify a protocol that guarantees that the requesting party receives all responsive documents and the sending party discloses the minimal amount of non-responsive documents necessary to prove that all responsive documents have been received. This protocol can be embedded in a machine learning framework that enables automated labeling of points and the resulting multi-party protocol is equivalent to the standard one-party classification problem (if the one-party classification problem satisfies a natural independence-of-irrelevant-alternatives property). Our formal guarantees focus on the case where there is a linear classifier that correctly partitions the documents.

Keywords
classification, e-discovery, machine learning