

Forschungspraxis

[identification] Typicality verifier in Deterministic Identification

Identification is a communication scheme that allows rate advantages over transmission, with the tradeoff that identities cannot be decoded (as messages do) but can only be verified. More precisely, while in transmission the receiver tries to determine the message m encoded by the sender, in identification the receiver is interested in his own specific identity i and wants to verify whether the sender encoded i or not, without any attempt at figuring out which i' was exactly encoded.

The rates achievable by identification are remarkably dependent on whether stochastic or only deterministic encoders are allowed.

Here, we consider only deterministic identification.

The seminal work that started identification with deterministic encoders can be found at

- <https://ieeexplore.ieee.org/abstract/document/4568126>

while identification with stochastic encoders was initiated in

- <https://ieeexplore.ieee.org/document/42172>
- <https://ieeexplore.ieee.org/document/42173>

Identification comes with the possibility of rendering feasible the use of typicality.

In transmission, random codes and typicality decoders are impractical due to the exponential cost of defining and running such encoders and decoders, as every conditionally typical set of each possible codeword must be checked.

However, since in identification we only want to verify a specific message, only a single conditionally typical set needs to be verified, opening the possibility of rendering typicality a valid and efficient solution for the receiver.

The goal of the project is to study the complexity and capacity of such a typical verifier both analytically and numerically, in the case of q -ary alphabets.

Related works on deterministic identification can be found at

- <https://ieeexplore.ieee.org/document/9585608>
- <https://arxiv.org/abs/2010.10010>
- <https://arxiv.org/abs/2107.06061>

Prerequisites

Knowledge of typical sequences and typical sets is recommended, but not required.

Advisors

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