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manuscript: “Beyond Shannon is beyond AI” by Hans Grassmann

In a first step, the article discusses message transmission -which usually is discussed as an engineering problem -, from the perspective of physics: Shannon's requirement, that the message received and the message sent should ideally be identical, cannot be verified experimentally, without sending the transmitted message back to the sender, in order to verify whether the returned message matches the original.
Which amounts to saying, that there must be a one to one mapping of input and output objects, and therefore a corresponding mathematical structure.

In a second step, the tool board example illustrates the generalization of this idea particularly well: it is indeed true, that with 30 fixed tool positions, one yes-or-no observation per position is enough to distinguish more than a billion possible configurations, maintaining a one to one mapping between the set of tools and the set of descriptions.
And it is true, that an information processing system of this kind, which can tell whether each tool is in its place, could therefore describe configurations it had never seen during training.

It would be worth investigating, whether information processing systems could use the structure of more complex recognition tasks to achieve the same accuracy with less computation, as suggested in the outlook.

All in all it is good to see, that physics can contribute to a problem, which often is seen only under an engineering point of view, thereby creating a generalization of traditional arguments, with the potential to go beyond AI.