

Philosophy of Information, some thoughts

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In [1] a theory which binds together basic concepts of information was developed. The theory may be conceived as an expansion of basic elements of what is nowadays referred to as Shannon Theory. Apart from applications to more mathematical disciplines, applications to areas within statistical physics, mainly related to maximum entropy analysis, were also presented. Technically, simple game theory (two-person zero-sum) was exploited. Philosophical considerations played a pronounced role as motivation. The modeling is abstract, and thus not based on probabilistic thinking. This follows thoughts of researchers such as Ingarden, Urbanik and also Kolmogorov who around 1970 stated that “*Information theory must precede probability theory and not be based on it*”.

Though abstract, the theory is quantitative. A brief indication: The key is a notion of (*description*) *effort*. This is a bivariate function which for each “truth instance” gives the effort an observer has to allocate in order to gain insight about the phenomenon, depending on the *control* the observer exercises over the system. This control is thought to depend on the *belief* the observer has about the system studied. Here we follow the mantra, due to Good, that “*belief is a tendency to act.*” Minimal effort for a given fixed truth instance, one could call *necessity*, however, in view of standard probabilistic applications, we call this quantity *entropy*. The redundant effort is *redundancy* or *divergence*.

Emphasis in the presentation will be on philosophical considerations and their possible relevance for model building of physical systems. This may well be a bit risky as the author is neither a philosopher nor a physicist. Anyhow this is the plan. To give just one indication, we ask the question “*What can be known?*”. And the answer we suggest is that “*You can only know what you can describe.*”. As description is tied to the effort function this is not an empty statement.

[1] F. Topsøe, Entropy, **19**, 70 (2017).