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Potential and Impact Information

Based on the general theory of information and contemporary theoretical physics, two types of information are explicated: Potential information reflects possibility of changes (transformations), i.e., it a potential for performing information work; Impact information, or information force, performs changes (transformation) in the course of information work. In this context, it is possible to define information work or structural work as the size (amount) of structural changes (transformation) times the measure of impact information. We apply this concept to epistemic information, which changes knowledge of a system. To measure epistemic displacement, we use epistemic measures and describe an epistemic space as a network of finite sets (systems) of knowledge units defining the distance between two units equal to 1 as the first approximation to the epistemic metrics. For instance, if knowledge is represented by logical formulas of the proposition calculus, we take elementary propositions as units of knowledge. To measure displacements in an epistemic space, we observe that transformation of knowledge systems is performed by two elementary operations: addition and elimination of knowledge units. With this in mind, we determine the displacement as the number of elementary operations performed in this transformation. Assuming that the transformation is performed under the action of impact information (information force), we have to measure this force. In the case of epistemic information, it is natural to suppose that information comes to the system in the form of data. Then it is possible to measure the impact information by the size of input data, e.g., in bits or in bytes. This gives us the following mathematical formula for information work $WI = m(I) \cdot D$ where D is the epistemic displacement and $m(I)$ is the measure the impact information I . Examples of other measures of epistemic information are Shannon's entropy, Hartley measure, and Fisher information.