

# Levels of Ontological Information

Mark Burgin<sup>1</sup> and H. Roman Krzanowski<sup>2</sup>

<sup>1</sup> UCLA, Los Angeles, California USA

<sup>2</sup> The Pontifical University of John Paul II, Krakow, Poland

One of the authors introduced the concept of ontological information, which is complementary to the concept of epistemic information (Krzanowski, 2020; 2020a; 2020b). Here based on the general theory of information (GTI), we further develop the concept of ontological information.

In the general theory of information, the definition of information in the broad sense is given in the second ontological principle, which has several forms (Burgin, 2010; 2017).

**Ontological Principle O2 (the *General Transformation Principle*).** In a broad sense, *information* for a system  $R$  is the potentiality/cause of formations and transformations (changes) in the system  $R$ .

Thus, we may understand information in a broad sense as a capacity (ability or potency) of things, material, as well as mental and abstract, to change other things. Information exists in the form of *portions of information*.

However, the common usage of the word *information* does not imply such wide generalizations as the Ontological Principle O2 implies. To define information per se, the GTI uses the concept of an *infological system*  $IF(R)$  of the system  $R$  for the information definition. Elements from  $IF(R)$  are called *infological elements*.

**Ontological Principle O2a (the *Special Transformation Principle*).** *Information in the strict sense* or *proper information* or, simply, *information* for a system  $R$ , is the potentiality/cause of formations and transformations (changes) of the structural infological elements from an infological system  $IF(R)$  of the system  $R$ .

Information in the strict sense is stratified according to the global structure of the world represented by the *Existential Triad* of the world, which is composed of the top-level components of the world as a unified whole reflecting the unity of the world. This triadic structure is rooted in the long-standing tradition coming from Plato and Aristotle and consists of three components: the Physical (Material) World, the Mental World, and the World of Structures (Burgin, 2010; 2017). The Physical (Material) World represents the physical reality studied by natural and technological sciences, the Mental World encompasses different forms and levels of mentality, and the World of Structures consists of various kinds and types of ideal structures.

The Existential Triad entails the differentiation of information into two fundamental classes: ontological information and mental information.

*Ontological information* is the potentiality/cause of formations and transformations of structures in the physical world, i.e., of physical systems.

As ontological information functions in the physical world, it is natural to treat it as a natural phenomenon (Krzanowski, 2020).

*Mental information* is the potentiality/cause of formations and transformations of structures in the mental world, i.e., of mental systems.

Ontological information is orthogonal and complementary to mental information. Epistemic information, which has been studied by different researchers, is a type of mental information and thus, it is orthogonal to ontological information.

It is possible to ask a question how information belonging to the World of Structures can act on physical systems. To solve this puzzle, we introduce two levels of ontological information: information<sub>IO</sub>, which belongs to the World of Structures, and ontological information<sub>O</sub>, which belongs to the Physical World and is studied in (Krzanowski, 2020; 2020a; 2020b).

Connections between these two levels of ontological information are explained utilizing two more ontological principles of the GTI - the Embodiment Principle O3 and the Representability Principle O4. They postulate existence of representations and carriers of information, which in particular, can belong to the Physical World. In this framework, we see that information<sub>O</sub> is a physical (material) representation of information<sub>IO</sub>. Information<sub>IO</sub> is embedded in physical objects becoming information<sub>O</sub> and acquiring ability to act on physical systems. In the same way, the mind embedded in the human body is able to operate in the physical world,

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