SAMPLE TEST BED AND EVALUATION TIPS FOR INFORMATION DEFINITIONS AND THEORIES

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Abstract*: A sample test bed and tips for a corresponded evaluation for the new as well as for existing information theories and/or definitions are outlined in this paper. The sample test bed may be used as a platform for testing and comparing the information theories and definitions.*

Keywords*: Information Theories Evaluation, Foundation of Information Science, FIS.*

ITHEA Keywords*: A.1 Introductory and Survey.*

Introduction

During the years, the growing number of definitions as well as the scientific and practical research has shown the need of comparison of the theoretical results and, especially, the raised definitions and theories that concern concept “information” and its consequences.

This paper is aimed to make a little step toward evaluating the information definitions and theories. It is a result of fruitful collaboration between leading scientists united by an informal endeavor promoted by Michael Conrad and Pedro C. Marijuán in early 90’s, called the FIS initiative (Foundations of Information Science). It has been an attempt to rescue the information concept out from its classical controversies and use it as a central scientific tool, so as to serve as a basis for a new, fundamental disciplinary development – Information Science [Marijuán, 2020]. The FIS discussion

list has been and still is an essential instrument to keep alive the Foundations of Information Science initiative [FIS List, 2020].

Let remember that at the FIS, rather than the discussion of a single particularized concept, information becomes the intellectual adventure of developing a “vertical” or “trans-disciplinary” science connecting the different threads and scales of informational processes, which demands both a unifying and a multi-perspective approach. Above all, the solution of the numerous conundrums and conceptual puzzles around information becomes the patient task of a community of scholars, in which the ideas and speculations of each individual thinker can be shared and experienced upon by the other colleagues, so that a sort of “group mind” develops (paraphrasing L. Hyde, 1979): one that is capable of cognitive tasks beyond the power of any single person [Marijuán, 2020].

To evaluate any information theory or definition we need more less common platform to receive compatible results. Such sample platform, usually called “test bed” is outlined below. A “test bed” is a platform for conducting rigorous, transparent, and replicable testing of scientific theories, hence including computational tools, and new technologies [Test Beds, 2019].

In the next chapter, the sample test bed is presented. The chapter after the next outlines some tips for providing good evaluating. Paper is finalized by concluding remarks and bibliography.

Sample Test Bed

For a sample test bed we have chosen a part of a letter of Gottlob Frege written to Philip Jourdain in 1914. Frege had written [Frege, 1997]:

> “Without a sense, we would have no thought, and hence also nothing that we could recognize as true.
>
> Let us suppose an explorer travelling in an unexplored country sees a high snow-capped mountain on the northern horizon.

By making inquiries among the natives he learns that its name is 'Aphla'.

By sighting it from different points he determines its position as exactly as possible, enters it in a map, and writes in his diary: 'Aphla is at least 5000 meters high'.

Another explorer sees a snow-capped mountain on the southern horizon and learns that it is called Ateb. He enters it in his map under this name.

Later comparison shows that both explorers saw the same mountain.

Now the content of the proposition 'Ateb is Aphla' is far from being a mere consequence of the principle of identity, but contains a valuable piece of geographical knowledge. What is stated in the proposition 'Ateb is Aphla' is certainly not the same thing as the content of the proposition 'Ateb is Ateb'.

Now if what corresponded to the name 'Aphla' as part of the thought was the reference of the name and hence the mountain itself, then this would be the same in both thoughts.

The thought expressed in the proposition 'Ateb is Aphla' would have to coincide with the one in 'Ateb is Ateb', which is far from being the case.

What corresponds to the name 'Ateb' as part of the thought must therefore be different from what corresponds to the name 'Aphla' as part of the thought.

This cannot therefore be the reference which is the same for both names, but must be something which is different in the two cases, and I say accordingly that the sense of the name 'Ateb' is different from the sense of the name 'Aphla'.

Accordingly, the sense of the proposition 'Ateb is at least 5000 meters high' is also different from the sense of the proposition 'Aphla is at least 5000 meters high'. Someone who takes the latter to be true need not therefore take the

former to be true. An object can be determined in different ways, and every one of these ways of determining it can give rise to a special name, and these different names then have different senses; for it is not self-evident that it is the same object which is being determined in different ways.

We find this in astronomy in the case of planetoids and comets. Now if the sense of a name was something subjective, then the sense of the proposition in which the name occurs, and hence the thought, would also be something subjective, and the thought one man connects with this proposition would be different from the thought another man connects with it; a common store of thoughts, a common science would be impossible.

It would be impossible for something one man said to contradict what another man said, because the two would not express the same thought at all, but each his owns.

For these reasons I believe that the sense of a name is not something subjective (crossed out: in one's mental life), that it does not therefore belong to psychology, and that it is indispensable" [Frege, 1997].

In this example:

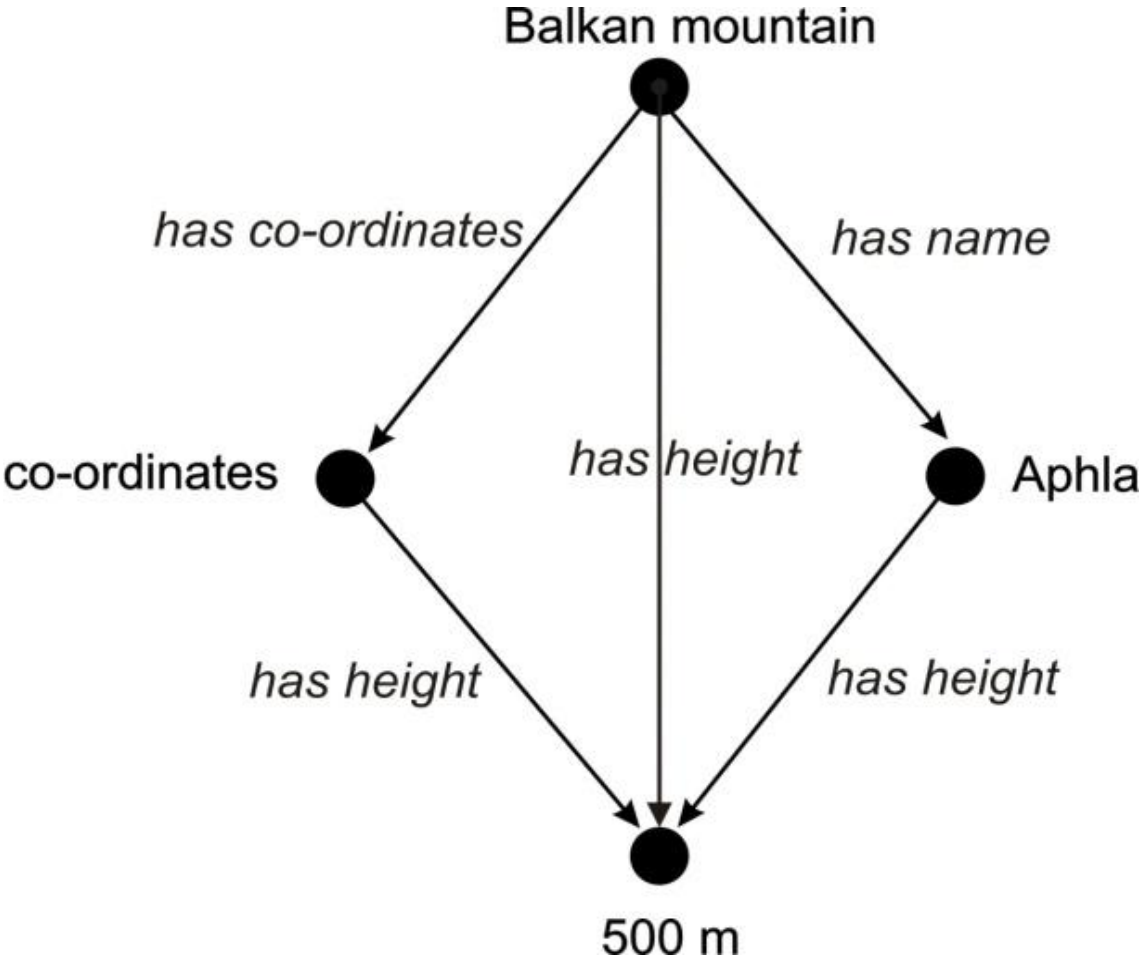
- The names Ateb and Aphla refer different parts of the same natural object (a mountain, let call it "Balkan");
- The position of the referred object (mountain) is fixed by any artificial system (geographical co-ordinates) which is another name of the same object;
- The names and the co-ordinates correspond one to another and both to the real object but without the explorer's thought represented in a map, respectively – in the explorer's diary, it is impossible to restore the correspondence;
-

- At the end, the names Ateb and Aphla are connected hierarchically to the name Balkan and the relations are:
    - Aphla is_a_South_Side_of Balkan;
    - Ateb is_a_North_Side_of Balkan.

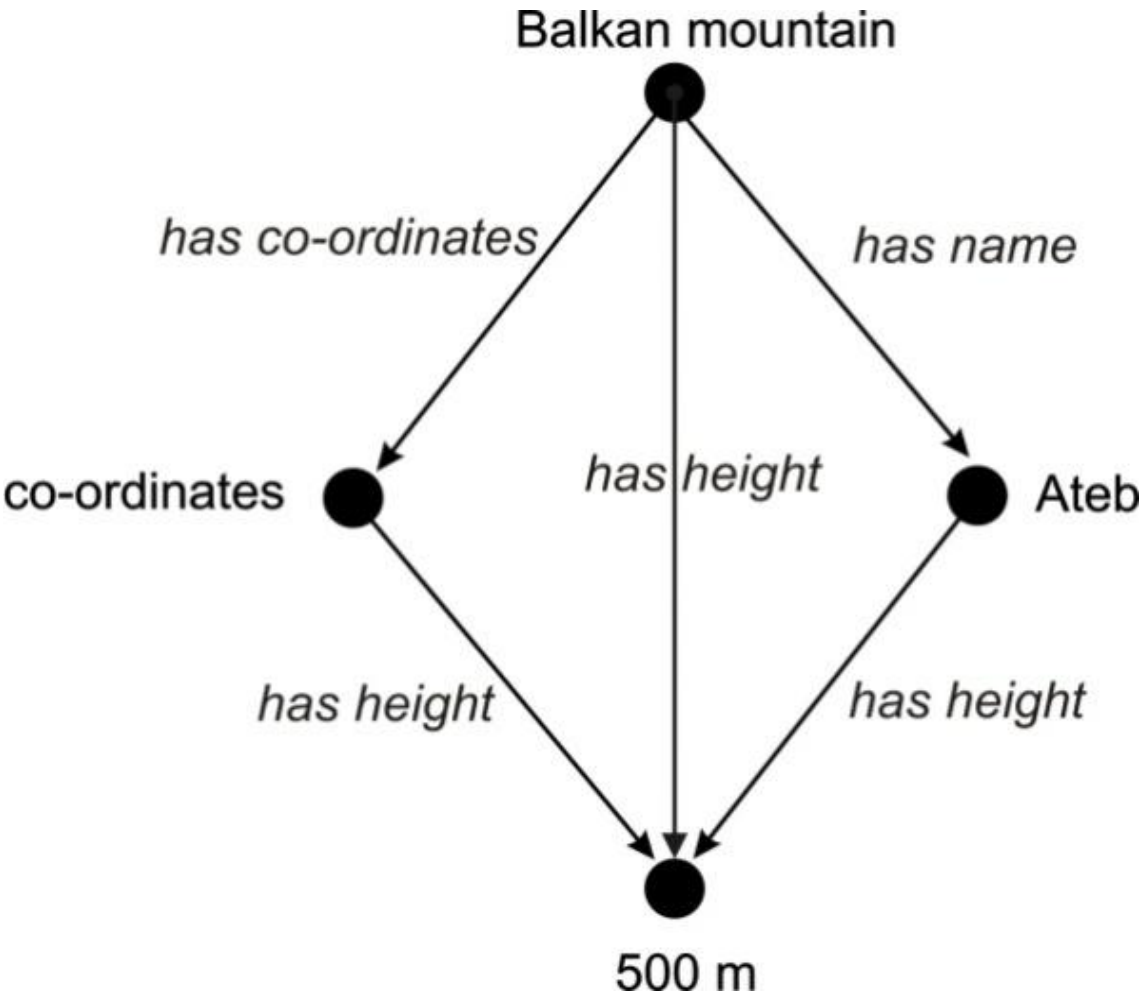
The last case forms a simple vocabulary:

name	*definition*
Aphla	The South Side of Balkan mountain
Ateb	The North Side of Balkan mountain
Balkan	A mountain in the unexplored country with co-ordinates (x,y)

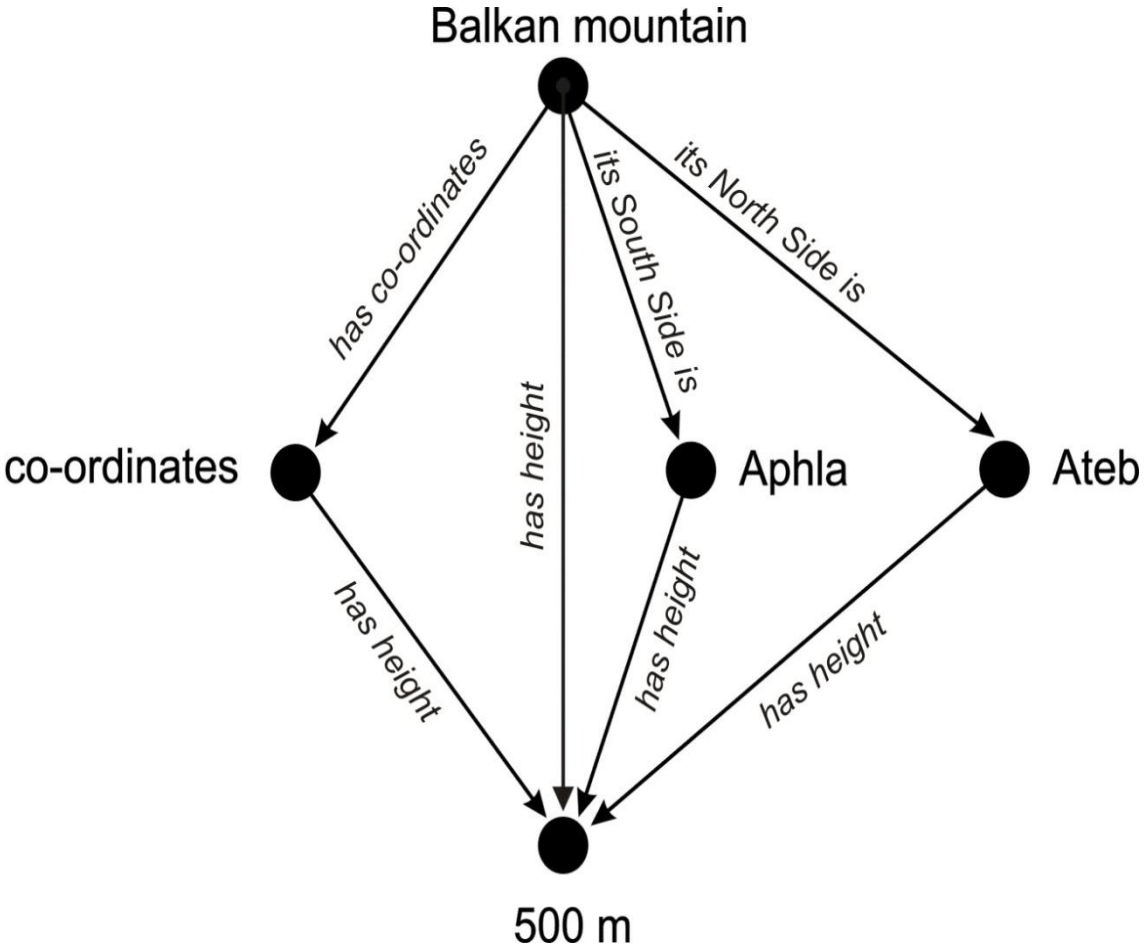
Let the interconnected thoughts of the first explorer may be represented by the following diagram:



Let the interconnected thoughts of the second explorer may be represented by the following diagram:



Finally, let the interconnected thoughts of the of the first and second explorers after their communication may be represented by the following diagram:



Evaluation Tips

The main goal of evaluation is to show main features of the definitions and theories. Because of this, it should be very short and clear without many details to make result incompatible. As a first step it may be answering the following questions:

1) Does the concept “information” is primary or “secondary”? If it is primary than easy understandable examples have to be presented. In the second case, if it is secondary concept, the primary concepts used for its defining have to be as little as possible, not the natural language at all.

2) Is it possible to give clear answer of the question what is the “information”?

3) If different types or categories of given term, for instance “information”, are defined, what they have in common to call them by the same name, though with additional adjectives?

4) Applying the definition and/or theory to the test bed it is recommended to:

- Clearly explain the difference between “Information” and “Data”.
- Clearly explain if for the proposed new term “information” and connected to it terms there exist already established terms, why it is needed to call with the new term already termed?
- Clearly explain and analyze the causal connections in the test bed.

Conclusion

The goal of this paper was to make a step toward understanding differences and similarities between information definitions as well as information theories. A sample test bed and tips for a corresponded evaluation for the new as well as for existing information theories and/or definitions were outlined in this paper. The sample test bed may be used as a platform for testing and comparing the information theories and definitions.

Further work has to be concerned to creative discussions and refining the proposed ideas.

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