Introduction to Geoinformatics – IFGI-Munster SS 2015

Assignment #4 – An essay on "Geographical Ontologies"

In this assignment, you will discuss the issues related to geographical ontologies. The literature on ontologies is large and there are many different and conflict approaches. In this assignment, you will be presented to some of these views.

The Smith and Mark paper ("Geographical categories: an ontological investigation") takes a cognitive approach to the problem, and tries to measure if there are general agreements about what are geographical terms.

The Frank paper ("Ontology for Spatiotemporal databases") provides an overview of the way we build geographical representations. He does not build an ontology. His emphasis is on describing how humans create information about the world, starting from observations and leading to concepts that are shared between communities.

To illustrate the practical problems in building and using ontologies, we will examine of the most comprehensive efforts to date: the development and use of LCCS (Land Cover Classification System), a major attempt by FAO (Food and Agriculture Organization of the United Nations) to harmonize the classification of land areas in the Earth.

LCCS is relevant to the geospatial ontology debate because it has now become an international standard. The fundamental structure of LCCS became the International Organization for Standardization ISO 19144–1 'Classification Systems – Part 1: Classification system structure' standard in 2009. This standard establishes the structure of a geographic information categorisation system, together with the mechanism for defining and registering the parameters. It defines the technical structure of a register of parameters in accordance with ISO 19135. Furthermore, LCCS was used as the basis for the ISO 19144–2 'Classification Systems – Land Cover Meta Language' standard established in 2012. LCML comes with a Unified Modelling Language (UML) diagram (see www.glcn.org) that provides insights into the categorisation rules.

We will read two papers on LCCS. The first paper, by Herold et al. ("A joint initiative for harmonization and validation of land cover datasets"), describes the aims and expected impact of LCCS. The second paper, by Jansen et al. ("Land-cover harmonisation and semantic similarity: some methodological issues") describes the application of LCCS in a practical case and draws some lessons.

Based on these four papers, write an essay on geographical ontologies (400-1000 words). Please present your vision of the topic and also consider the following issues:

1. What are geographical ontologies and what is their importance? What is the origin of the term 'ontology'?

2. What is aim of the Smith and Mark paper? What are their main findings? How much generalization is possible from the paper's conclusions?

3. What are the tiers of ontology proposed in Frank's paper? Where does he start his narrative? Where does he place the concepts of 'fields' and 'objects'? Does Frank see a conflict between 'fields' and 'objects'? According to Frank, what is the role of social agreements on the representation of the world as 'objects'?

4. What is the basic hypothesis of the LCCS ontology, as outlined by Herold et al.? What is the importance and impact of LCCS, according to the authors? Did the authors expect that LCCS would solve the semantic interoperability problem in land cover classification?

5. What did Jansen et al. report about the practical use of LCCS in trying to harmonize land classifications from different agencies? What were the problems they faced? What are the lessons learned?

6. Comparing the optimistic views of the papers by Smith and Mark and by Herold et al with the practical findings of Jansen et al., where do you stand? Are you optimistic or pessimistic about the possibilities of ontologies to solve the problems of semantic interoperability? Why?