

## Geography as War and Peace

Position Paper, Workshop on Geographic Ontologies Grounding and Vagueness, in Ilkley, UK, 17th April 2008.

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Our world is a dangerous world, and yet we wander through it with such natural skill and ease that we ignore the fact that we're continually asking a single question of every thing we see:

"That the heck *is* that thing?"

Even before we ask, "Where is that thing?", or "How will it act?", or "How does it related to other things?", we want to know *what* something is. Once we know what something is, we can give it a position in the knowledge-system of half-remembered facts and metaphors slooping around in our brains, and start to ask useful questions of it: "will it fall on us?"; "will it eat us?"; "do we want to mate with it?" Errors in understanding an object, say confusing a potential mate with a receptacle for letters, are likely to cause significant difficulties and/or get us arrested.

With this in mind, you might have thought that GIS, which aims to represent this dangerous world, would have got the representation of objects down pat. However, as we're all aware, this is not as simple a process as we might imagine.

First, we have issues with what constitutes a particular object: how we decide which sensations should be grouped together and/or delimited to define the coherent "thing" that we are interested in. How, for example, would we recognise a "group of people" on a busy street? Second, we then have difficulty attaching a name to the "thing" – a name which is only important, really, in the sense that it represents a position in our knowledge about the potential properties and actions of the object. Very complex issues, for example, come to play when we decide to call our "group of people" a "riot" as opposed to a "crowd".

These problems rarely bother us as individuals. We can construct an individual ontology which has a place for almost any form of object we care to recognise. We are the rulers of this ontology, the expert users; kings, nay, gods, of our own internal ontological territory.

The real issues come when we want to talk to other petty-tyrants about the world. Now, outside of mothering comforts of our own heads, others may *also* consider us experts in some domain. Some people are. In which case, society may very well kneel at our feet and allow us to decide what constitutes an object and what it means. However, this is not the way most people deal with other people, day to day. Indeed, even if it was, we would undoubtedly find ourselves in a position sooner or later in which two of these Platonic Titans disagreed over the form of an object or what it represented. It is in the nature of human beings, who are continually bending their tools to deviant uses, that multiple ontologies are bound to be used in the same problem-area sooner or later, and when this happens conflict will raise its ugly head.

In some senses, it's a wonder that such conflict doesn't happen more often. I may have a completely different view to you of what constitutes a desk (I may, for example, use the term to single out the

element you'd call a "desk top") and I may have different views as to the uses of a desk. However, in our day to day lives you and I can quite happily co-exist without knocking seven-bells out of each other over where we keep our pens, papers, Gonks etc. The problem is that conflicts do occur, and when they do, they tend to cause people very definitely to knock seven-bells out of each other. You and I, were we only slightly less reasonable people, might well decide to tear chunks off each other over the boundary between Germany and France. Even if we lived in a world where all boundaries were agreed, we might well, casting our eyes around for an alternative, decide to have a good go at obliterating each other over whether an area should be called "Israel" or "Palestine". In these cases the problem is not that there aren't enough self-professed and elected experts with ontologies, and moreover, ontologies which they are willing to contribute in the charmingly reified form of steel and lead.

Even if we don't take these extremes, such conflicts are only too likely within GIS. This is because of the ways in which GIS are used. Marking the position of objects of a single type is not, despite the efforts of GIS manufacturers, the thing most GIS are used for. Most people wanting to use GIS want to compare very different datasets. People want to look at the spatial relationships between different things and, often to a greater degree, want to look at what kinds of things are going on in a single place: "how does the amount of cancer in an area related to the amount of dioxins in the soil?"; "how will my house price change given proximity to the new nuclear plant?"; "how many paedophiles live within lynching distance of my home?", etc.

At root, therefore, defining something within a knowledge-framework is not the most difficult part of dealing with geographical data. The problem is rather that the definition of a geographical form, and the associated position within one or more ontologies, will have more or less probability of conflicting with somebody else's understanding of the world.

And so, to come to the point. The most important research direction we can move in is not the construction of ontologies or the formalization of particular representations of geography, but in building tools that enable and enhance the process of negotiation between users.

As I've already highlighted, these tools are not always necessary. People have been using datasets labelled "*roads*" in GIS for years, and everyone has quite peacefully co-existed without going into a fit of blackened angst over what constitutes a "*road*". However, at some point there may have to be negotiation to resolve what *does* constitute a "*road*". Ontologies can certainly be used to elucidate the issues; we can even decide which definition might be more accurate and appropriate for a given problem. If this is the case, great, we've resolved the problem automatically. With AI we might even get around the issues of the very large combinatorial potential of some of the possible conflict-spaces. However, it is my contention that because the large majority of these conflicts will arise externally to any GIS – in social space – we need to provide new tools aimed specifically at ameliorating and resolving these conflicts through social negotiation. Moreover, if conflicts cannot be resolved, we need ways of ensuring parties can agree to disagree and still maintain the data, and to flag the areas of conflicting understanding for others.

In short, one can see tools to aid processes along a continuum from:

- a) Silent agreement where use-cases do not conflict, even though people's understanding of the form and meaning of the objects do<sup>1</sup>.
- b) Deterministic picking of the best form and ontology (or combination of ontologies where a representation can safely span them).
- c) AI picking of the best way to understand the objects in question.
- d) Social negotiation to pick the best way to understand the objects in question<sup>2</sup>.
- e) Social negotiation to combine, resolve, and re-draft different understandings of space.
- f) The management of entrenched conflicts between different understandings of space.

Despite the fact that as a species we do (a), (e), and (f) an awful lot, it seems to me that very little is done to build these important social processes for negotiating understanding into our systems for capturing and manipulating geographical objects. However, if we are to increase the knowledge borne by our spatial data to a realistic level, and therefore concomitantly increase the potential for war between the various understandings of our shared space, we also need to provide the tools for ensuring peace is both encouraged and within easy reach.

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<sup>1</sup> Here we might include techniques such as Supervaluation Semantics and Multi-Criteria Evaluation, in the sense that there are explicitly differences in the geographical understanding of each person involved, but each isn't explicitly highlighted in the final results.

<sup>2</sup> To a degree folksonomies and collaborative filtering technologies like "*Amazon Recommends*" indicate one promising pathway for collecting data on agreed and conflicting uses of terms, but these barely begin to cover the range of functionality that would be needed to cope with the social negotiation necessary to resolve conflicts in geographical understanding.