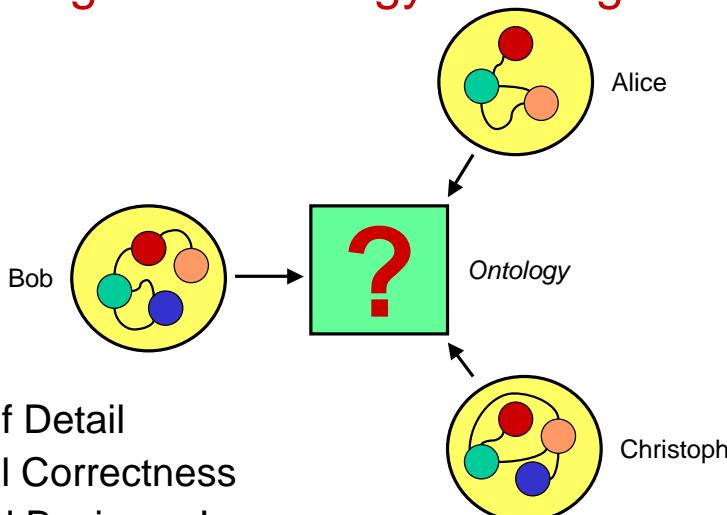


Ontologies – How far can we go?

Position of Dominik Kuropka

Challenges of Ontology Building



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- Sample for Level of Detail (Traveling Scenario):

- Type-level: Service-Book-Train(departure-city, arrival-city)?
- Sub-Type-level: Some services e.g. Deutsche Bahn can only be used for German cities. How to model this?
- Instance-level: Some services can only be used for German cities, but also for some cities near to Germany. Does it really makes sense to model all cities in the ontology?

- Sample for Political Correctness

- China's point of view: Taiwan is province of China.
- Taiwan's point of view: Taiwan is an country of it's own.
- No real chance for an agreement on one consistent ontology!

- A common ontology might make chargeable things obsolete or put a competitor in a better position. This hindered a lot of Standards (an Ontology is similar to a standard).

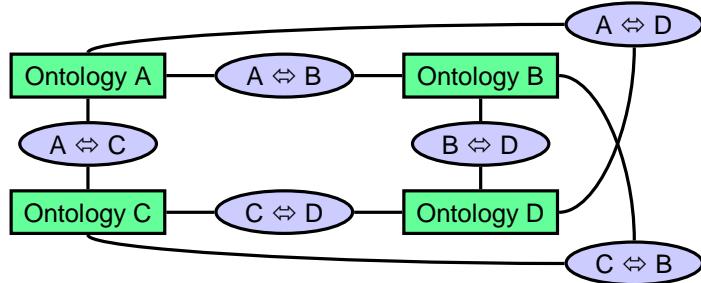
My 1st thesis

- The ...
 - fewer the number of involved people, and
 - smaller the represented domain

the better and easier it is to

 - create a consistent ontology, and
 - successfully use an ontology.
- One single ontology trying to represent all aspects of the world is doomed to failure!

Challenges of Ontology Mediation



- How to resolve inconsistencies?
- How many mediators do we need?
- Who is interested in creating and maintaining mediators and who pays them?

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- Sample: How to resolve inconsistencies

- Ontology A is saying light is a particle, for this reason a photo disc gets dark at the position where it's hit by a light particle. A gap in a wall will result in a single light spot.
- Ontology B is saying light is a wave, for this reason a gap in a wall will result in a diffraction. There is no explanation why a photo disc gets dark.

- Sample: How many mediators so we need?

- Let's assume the concept car is represented in Ontologies C, A and D but not in B. In this case we need an explicit mediator $C \Leftrightarrow D$.
- Are there scenarios thinkable where we also need $A \Leftrightarrow D$ and $C \Leftrightarrow B$? Yes, if every ontology contains parts which are missing in some ontologies but which are also existent in other ontologies.

- Sample: Who is interested in...

- For instance the translation of ontology concepts from one to the other is laborious (e.g. For City-Names)

My 2nd thesis

- Mediators are not a feasible solution to merge all ontologies to one “virtual” world ontology.
- For this reason the Semantic Web will never work as intended on the world-scale!
But it might work well for small, delimited domains if only a few ontologies are involved.

So what shall we do now?

- Maybe we should take a look at how humans “solve” the ontology issues.
- First observations:
 - Humans use natural languages for communication and ontology representation.
 - Humans natural language ontologies are inherently fuzzy and sometimes inconsistent.
 - When two humans communicate they do internally the following things:
 - Exchange of information about internal ontologies, in case misunderstanding is detected.
 - Creation of internal Just-In-Time “Mediator”.
 - Adaptation of internal ontology towards the partners ontology.
- We should try to adapt this behavior for our computer agents!