DIVERSITY AS A FEATURE

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Diversity as *local maximum*

*Thanks to Claudia!*
Diversity as *pervasive local maximum*

... in the *world descriptions*

... as well as

... *in the world*
Diversity pervasive in the *world descriptions*

**In language**
- How many names do you have for snow? *(the role of weather)*
- “Bug as disease” *vs.* “bug as food” *(the role of domains)*

**In data**
- “Transportation is on foot” *vs.* “transportation is by plane” *(the role of time)*
- “The President is Obama” *vs.* “the President is Berlusconi” *(the role of space)*

**In knowledge**
- “There are 2 types of music: traditional and modern” *vs.* “there are 50 types of music further refined in 100 types (pop, pop-country, …)” *(the role of goals/needs/competence)*

**In opinions**
- “Bugs are great food” *vs.* “how can you eat bugs?” *(the role of culture)*
- “Climate *is/not* an important issue” *(the role of schools of thought)*
The main cause of the semantic gap between our globalized conceptualizations of the world, expressed using language, and our local experience of the world, whose most direct representations are media.
Handling Diversity

Diversity as a bug (up to the early Web). The current implementation of the web is an “implementational mistake”: we can pretend it is like querying a centrally designed data base.

Diversity as a must (the Semantic Web). Diversity is unavoidable, it is the reason for diverging viewpoints and conflicts: we need semantics in order to “absorbe” diversity and reduce it to the centrally designed data base approach.

Diversity as a feature. Diversity is a local maximum: we should make it traceable, understandable, and use it to develop better technology, e.g., diversity aware classification, navigation and search in large scale, long living (eternal), heterogeneous multimedia datasets (e.g., the Web of to day).

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Handling diversity: the vision

The world, our experience about the world, our data and knowledge about the world are strongly influenced by diversity in, e.g., geographical contexts, weather and time of the day, cultural backgrounds, schools of thought, ... and many others.

Time and evolution add a further dimension making diversity an even further intrinsic and unavoidable property of the world, and our data and knowledge of the world.

Diversity is a local optimum!

We envisage a future where data and knowledge management tools (implementing, e.g., search, navigation, reasoning, ...) will trace, understand, exploit diversity in very large multimedia datasets (in particular, the Web itself) and, therefore, will produce more insightful, better organized, easier-to-understand output.
... How to implement the vision?

From decomposable, localizable global language and knowledge …

… to the local experience (data and media) of the local world (data being expressed in the global language)

… and back!
Handling diversity in language: Background knowledge, domains, facets

Localization = context dependent application of the mechano property on global domains and facets
Handling diversity in data, knowledge and opinions: Context

Global Knowledge = combination of multiple diverse local theories (contexts) of the world, also of the same world phenomena.

A context is a 4-tuple:

\(< \text{URL}, \text{Cxt}, \text{M}, \text{IA} >\)

- **Cxt:** Context – it codifies, in a local language the local knowledge of the world.
- **M:** a set of mappings – they codify the semantic relations existing between (elements of) contexts.
- **IA:** a finite but unbound set of assertions, which allow for the representation of implicit assumptions.
A real world example: Partial agreement between catalogs

Ex.: <Id, Drills, Cutting machine (other), subsumes>
Handling diversity in media: Events

Events: from global concepts to local diversity in media
An example: G-20 Summit London (April 2, 2009)

Event ‘G-20’ → time (e.g., GMT), place (GPS, London), entities (G-20 nations, protestors, police, media, …)

- Event ‘protest’
- Event ‘death of Ian Tomlinson’

Event driven media creation (global → local): retrieve event structure and instantiate it with media (experience enrichment) and entities / metadata (attributes) about entities (knowledge enrichment)

Media global dynamics (Wisdom of the crowds: local → global → local): publication, e.g., in a blog, of a (partially) instantiated event structure and media, enrichment (add media, entities, entity attributes) by others who participated to the same event (collective event) or did not (add entity tag to photo), link to related events and concepts

Media local dynamics (Event and media life cycle: local → local): Same enrichment as above, in time, “me on my data” (user in the loop)
Events as the primary means for organizing and indexing media

Events are entities with attributes and relational attributes (links) to other entities (e.g., events, locations, people, media)

Related events (event network):
- Sub-event relationship (granularity)
- Cause-effect relationship (causality)
- Temporal relationship (continuity)
- ...

Media populate events:
- Events contextualize media (experiential dimension)
- Many-to-many relationship (viewpoints):
  - One media linked to many events
  - One event linked to many media
… The big picture
Managing diversity as **logical peer-to-peer** knowledge management

**Thanks to Francesco!**
From *logical peer to peer* to *Social* Knowledge Management

Individual, from/to Social from/to Universal Knowledge
References


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