Observations on the use of QuantML

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Definiteness and Determinacy

Determinacy: semantic property of referring to some particular entity or collection of entities (Coppock & Beaver, 2015; Peters & Westerstahl, 2013; Westerstahl, 1985) – the *'reference domain'* or *'context set'.*

Definiteness: familiarity and novelty (Heim, 1982), salience (Lewis, 1979), uniqueness and existence presuppositions (Coppock & Beaver, 2015).

QuantML: 'contextually distinguished', because of familiarity, salience, recency,.. with presupposed existence and uniqueness *within the reference domain*.

Indefinite NPs, definite plural NPs, mass NPs: existence presupposition, represented in QuantML by discourse referents that designate non-empty sets.

"the five judges" (Quantification Challenge 12):

$[X \mid x \in X \leftrightarrow \text{judge}_0(x), |\text{judge}_0|=5]$

"the judge": $[x \mid \text{judge}_0(x), |\text{judge}_0|=1]$

Nonstandard distribution

- Besides ‘collective’ and ‘individual’ (a.k.a. ‘distributive’), also:
  - ‘single’ for singular proper names, singular personal pronouns, and singular definite descriptions;
  - ‘parts’ for homogeneous mass NP quantification;
  - ‘unspecific’ if reference domain contains individuals and sets of individuals
- Plural proper names may quantify collectively (distribution: “single”) or individually:
  “The Marx Brothers appeared in several movies”.

Event scope

- Event quantification:
  - *“Everybody will die”.*
  - Quantification Challenge 8, 9, 10. e.g. *“Anne needed to sneeze twice”.*
- Quantification over participants usually scopes over event quantification (Champollion, 2015: always). In QuantML, event scope is by default “narrow”.
- Singular proper names and definite descriptions do not really quantify, have no scope: event scope in QuantML “free”; in semantics, correspondents of quasi-quantifying expressions may freely move around.

Negation

Polarity in participation link structures: “neg-wide” or “neg-narrow”

Quantification Challenge sentence 5: *“The editors didn’t see a misprint”.*

Plausible scopings:

a. NP1 – NP2 – NEG
b. NP1 – NEG – NP2
c. NEG - NP1 – NP2
d. NP2 – NEG – NP1

In QuantM:

a. NP1 > NP2, NP1: neg-narrow, NP2: neg-narrow
b. NP1 > NP2, NP1: neg-narrow, NP2: neg-wide
c. NP1 > NP2, NP1: neg-wide, NP2: neg-wide
d. NP2 > NP1, NP2: neg-narrow, NP1: neg-wide

Negation

Combination of polarity specification in participation link structures and relative scoping is sufficiently expressive in annotations.

Semantically, compared to the ISO Working Draft and the TiU Technical Report, an extension is needed for combining negated DRSs. This is quite straightforward, e.g.

(1) $\sim K_1 \cup \sim K_2 =_D \sim(K_1 \cup K_2)$

(2) $K_1 \cup^* \sim K_2 =_D K_1 \cup^* \neg K_2$

Complex quantitative specifications

“two or three times”

“at least seven and a half yards”

“between 2.5 and 3.7 mol per liter per second”

Etc.

Detailed absolute quantitative specifications: ISO 24617-11, Measurable Quantitative Information. Possible plug-in.

Vague indications of involvement:

“quite a few”, “lots of”, “not much”, “hardly any”,… ??

Limitations and plug-ins

- Generics and habituals
- Quantitatively detailed or vague involvement and domain size
- Reciprocals
- Reflexives
- Details of temporal and spatial quantification by other quantifiers than NPs
- Anaphoric possessives

Possible use of ‘annotation scheme plug-ins’ (Bunt, IWCS 2019), based e.g. on ISO 24617-11 and on ISO 24617-9 Reference Annotation Framework.

Also of potential interest: plug-ins for semantic roles, time and space.

Loose ends – not covered in QuantML

- Generics and habituals
- Quantitatively detailed involvement and domain size
- Reciprocals
- Reflexives
- Anaphoric possessives

Some of these may be dealt with by means of ‘annotation scheme plug-ins’ (Bunt, IWCS 2019), based e.g. on ISO 24617-11 Measurable Quantitative Information and on ISO 24617-9 Reference Annotation Framework.

Also of potential interest: plug-ins for semantic roles, time and space.

Issues for discussion

- Is the treatment of phenomena that are covered in QuantML acceptable? (E.g., events as participants in other events??) Possible improvements?
- Should some of the phenomena that are currently not covered be added to the scope of QuantML? (E.g., generics? habituals?)
- Possible improvements in specification, documentation, terminology, guidelines.
- Tools to support annotation of quantification.