Instructional DRT

A semantic representation which reflects the syntactic structure

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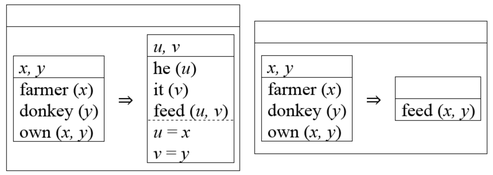
Discourse Representation Theory[3,4]

Dynamic semantic[2,3] theory, which employs a semantic representation called DRS (discourse representation structure).

DRS consists of discourse referents[5] (variables) and conditions on them (predicates). A sentence DRS updates the context DRS.

DRS can contain sub-DRSs to represent complex clauses.

1) If a farmer owns a donkey, he feeds it



Anaphora and presupposition

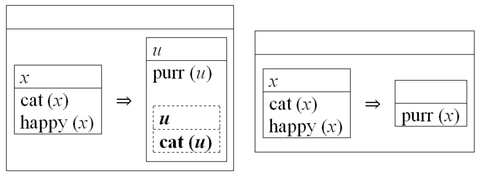
In DRT, anaphoric pronouns and presuppositional expressions (e. g. definite descriptions) are treated in the same way[6,7].

They trigger search through the path of the accessible DRSs for a discourse referent which satisfies the content of the presupposition or is compatible with the pronoun.

A special sub-DRS (A-DRS) is employed to store the content of the presupposition. A main DRS with A-DRSs is called *Preliminary DRS.*

When the antecedent is found, the presupposition is resolved. Discourse referents from the A-DRS are bound to the found discourse referents and the A-DRS is removed. The main DRS becomes *Proper DRS*.

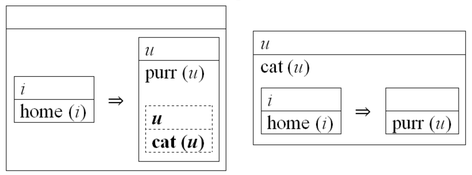
*2) If a cat is happy, **the cat** purrs*



Presupposition accommodation

If not found, the presupposition content can be accommodated, i.e. inserted into a higher DRS, if it does not make it inconsistent. This operation also results in a proper DRS.

*3) When I am at home, **the cat** purrs*



Specific indefinites

Specific indefinites are like definite descriptions in the sense that they are interpreted not in the place where they appear but somewhere higher in the structure.

*4) John intends to visit **a museum** every day*[5]

Some languages have specificity category which includes both definites and specific indefinites.

So, are specific indefinites a special type of presupposition which are normally accommodated rather then bound?[8]

Backgrounding

Bart Guerts[1] suggests to unify specificity and presupposition not by reducing the former to the latter but by subsuming them under a more general term – backgrounding.

He postulates *The Buoyancy Principle*:

- Backgrounded material tends to float up towards the main DRS.

Backgrounded phenomena include:

1. Presupposition
2. Specificity
3. Conventional implicature
4. …

Sub-DRSs as instructions

To mark the boundaries of backgrounded expressions in a DRS we can continue to use A-DRSs (which are now better to be called B-DRSs, backgrounded DRSs).

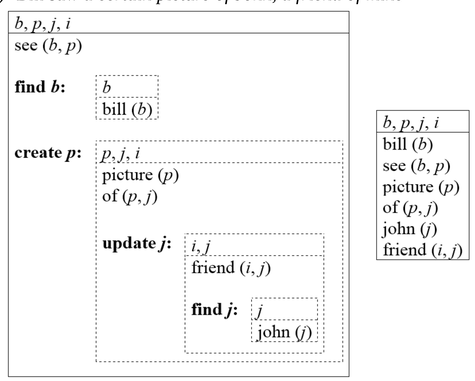
But since we have different types of backgrounded material we have to mark each B-DRS with its type.

Different B-DRS types have different purposes and are processed in different ways:

1. Presupposition B-DRS serve to find a discourse referent.
2. Specificity B-DRS – to insert a discourse referent with initial content.
3. Conventional implicature B-DRS – to update the existing discourse referent (in the background).

Each B-DRS is an instruction for the hearer to find, create or update a discourse referent. So let's mark them with an instruction type and the corresponding discourse referent.

5) Bill saw a certain picture of John, a friend of mine



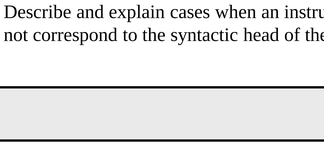
Preliminary DRS (on the left) gives us a tree-like structure which nicely resembles the syntactic tree of the sentence.

Hence, splitting into instructions is the way of building a syntactic tree out of the proper DRS (on the right), which is a mental semantic representation in our mind.

Main DRS instruction

Now it is only natural to treat the main sentence DRS as an instruction as well, since it serves to update the topic referent of the sentence.

6) John sleeps



Sentence production

- Knowledge in our mind is not organized into tree-like sentences. There is no definite root and loops are allowed.
- A proper DRS is a good tool for mental representation:
  - It has model-theoretic interpretation
  - It can be used for logical inferences
- Speaker intention to convey certain information to the hearer splits the content of her mental proper DRS into a number of instructional sub-DRSs, which form a tree.
- A preliminary DRS is a good tool for sentence semantics:
  - It is completely context-independent
  - It captures the information structure
  - It can be used as an interlingua for translation

Sentence comprehension

- A preliminary DRS is built based on the sentence syntax.
- It contains instructions to apply to the hearer's database.
- Once applied, it results in an updated hearer's proper DRS.

Future work

- Proper treatment of quantifiers (again!) in this framework.
- Describe and explain cases when an instruction head does not correspond to the syntactic head of the phrase.

References

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Information

Have a question?

Drop me an email at irygaev@gmail.com.