

Relations between Semantic Structures

D. Gueorguiev 11/4/2021

Let us consider the semantic structures S_i and S_j in specific context C .

Is-a relation:

$S_i \leftrightarrow S_j$: S_i is-a S_j

Is-not relation

$S_i \nleftrightarrow S_j$: S_i is-not S_j

Has-a relation:

$S_i \rightarrow S_j$: S_i has-a S_j

Has-not relation

$S_i \nrightarrow S_j$: S_i has-not S_j

Equivalent relation:

$S_i \Leftrightarrow S_j$: S_i is true iff S_j is true

Not-equivalent relation:

$S_i \nLeftrightarrow S_j$: if S_i is true then it does not follow that S_j is true **or** if S_j is true then it does not follow that S_i is true

Implication:

$S_i \Rightarrow S_j$: if S_i is true then S_j is true

Not-Implication:

$S_i \nRightarrow S_j$: if S_i is true then it does not follow that S_j is true

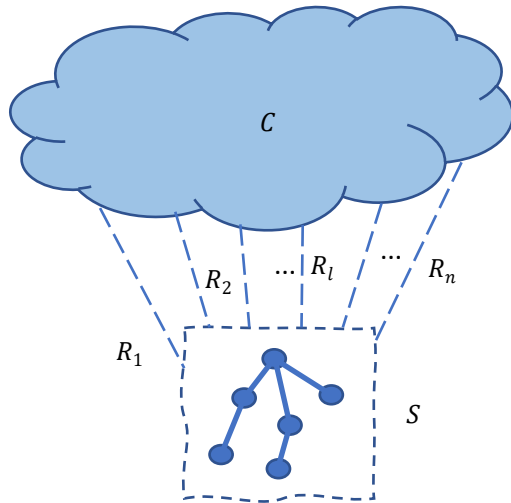
General relationship:

Let G is a semantic DAG, $V(G)$ is the set of vertices of G and $A(G)$ is the set of arcs of G . We say that S_i is related to S_j when S_i and S_j are subgraphs of G .

$S_i \leftrightarrow S_j$: the structures S_i and S_j have the same semantic meaning. Two semantic structures have the same semantic meaning when the semantic distance between them is small enough. Evaluating semantic distance involves evaluating their respective semantic signatures. We need to consider all possible **semantic association chains** when we evaluate the structures in the given context. We will discuss an algorithm constructing augmented semantic structures S_i^+ and S_j^+ from S_i and S_j respectively.

Constructing Augmented Semantic Structure

Let us have a semantic structure S in the context C . S is related to the context C by a set of relationships $R_1, R_2, \dots, R_l, \dots, R_n$.



In the future we will denote this picture by the notation $[C\langle R_1, R_2, \dots, R_n \rangle S]$.

The approach to construct R_1, R_2, \dots, R_n is reminiscent to the process discussed in [Semantic Parsing](#).

We are attaching a set of match-seeking particles MA_i and match-repelling particles MR_j to substructures of S and to substructures of C .