The Notion of Affinity in Semantic Structures

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Example:

Semantic structure S_1:

"I live in and my name is."

$ssig(S_1) = \begin{bmatrix} V_1 \ A_{1,2} \ V_2 \ A_{1,3} \ V_3 \ A_{1,4} \ V_4 \ A_{4,5} \ V_5 \ A_{5,6} \ V_6 \ A_{6,7} \ V_7 \end{bmatrix}$

$text(V_1)$ = "live"

$text(V_S)$ = "a car"

$text(V_T)$ = "Sofia"

$text(V_P)$ = "Dimitar"

$text(V_Q)$ = "Poison"

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   V1_____
  /  \       \
V2    V3      V4
      |      /
      *     V5
           /  \
VS   VT   V6   *
         /     VP  VQ
        V7
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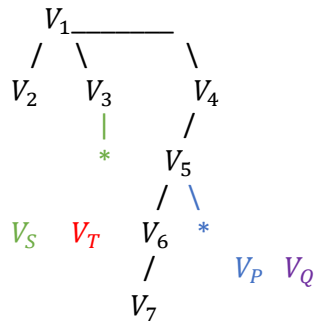
We have semantic particles which demonstrate affinity for specific properties. This means the particle attracts unconnected V-particles with specific combination of properties in their signature. It also demonstrates anti-affinity i.e. repels unconnected V-particles which have different combination of properties in their signature.

Affinity field of the semantic structure S – a discrete field which defines affinity / anti-affinity force $F(V_i)$ between the particle V_i of the semantic structure S and a test particle $V_{test}(P)$

$F(V_i, V_{test}) = F_i(P), i \in v(S)$

$v(S)$ denotes the set of indices of the V-particles in the semantic structure S

P is the properties tree $ptree(V_{test})$ of the test particle V_{test}. We will assume general form of P.

The affinity force $F_i(P)$ is a function that maps the property tree P to a signed real number. The function $F_i(P)$ identifies specific features of the property tree such as the presence of specific subtree $\mathfrak{T} \subset P$ or a specific set of properties $\mathcal{S} \subset P$ toward which V_i has strong affinity (attraction). Note that F_i has implicit dependence on S as well i.e. in a context different than S F_i could have different values for the same P.