

The Notion of Affinity in Semantic Structures

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Example:

Semantic structure S_1 :

"I live in and my name is."

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

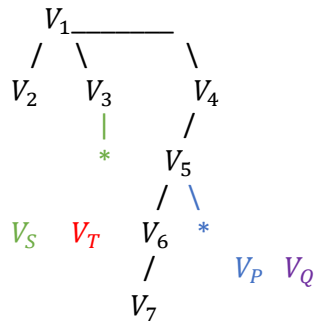
$text(V_1) = \text{"live"}$

$text(V_S) = \text{"a car"}$

$text(V_T) = \text{"Sofia"}$

$text(V_P) = \text{"Dimitar"}$

$text(V_Q) = \text{"Poison"}$



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 $V_t(\mathfrak{T}_p)$

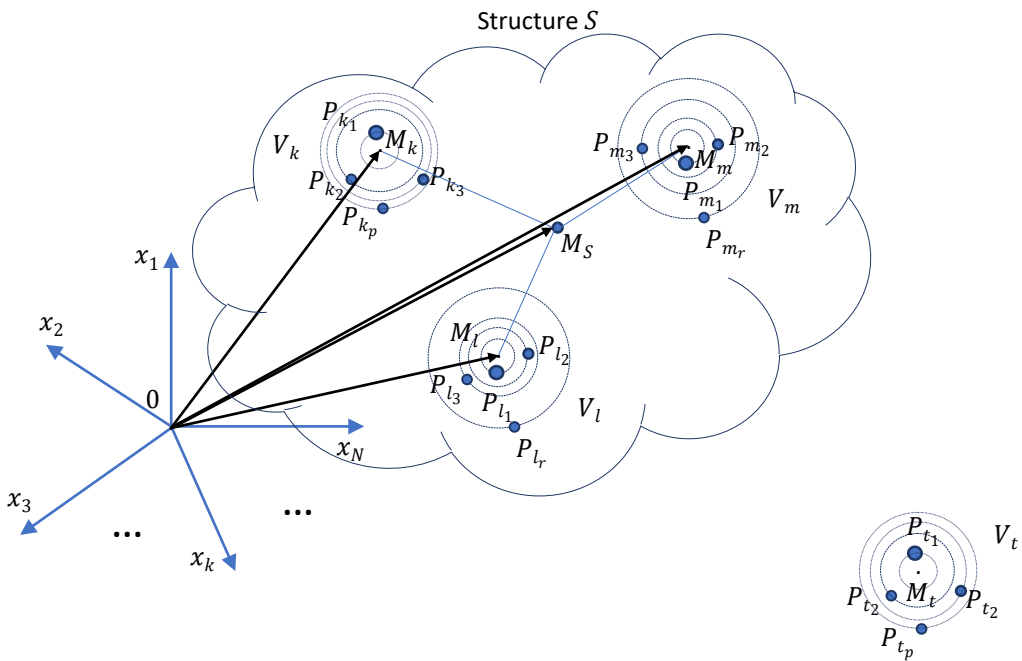
$F(V_i, V_t) = F_i(\mathfrak{T}_p), i \in \mathfrak{V}(S)$

$\mathfrak{V}(S)$ denotes the set of indices of the V -particles in the semantic structure S

\mathfrak{T}_p is the property tree $ptree(V_t)$ of the test particle V_t . We will assume general form of \mathfrak{T}_p .

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

To illustrate how to model the affinity field let us draw an example of a semantic structure S which consists of three particles V_k, V_l and V_m . We would like to estimate the affinity field of the structure S for a test particle V_t .



Affinity Frequency Spectrum