

# The Notion of Affinity in Semantic Structures

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Example:

Semantic structure  $S_1$ :

"I live in and my name is."

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

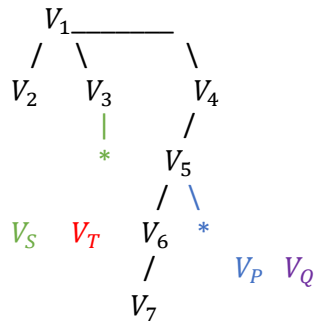
$text(V_1) = \text{"live"}$

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

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

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

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



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  $V_{test}(P)$

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

$\mathbb{V}(S)$  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  $P$ .