The Notion of Emotions

Emotions are a type of regulatory feedback mechanism that plays important role in making future decisions within the Semantic State Machine. Emotions record negative or positive historical experiences and influence future decisions which are semantically related to past decisions and past experiences to which there have been attributed emotions of similar sign and order of magnitude. It is important to understand that in order to experience positive or negative emotion the current environment (or context) does not need to be identical or equivalent to a past context. Rather it needs to bear a sufficient degree of semantic similarity. To put this definition on more precise footing let us define the following objects:

E_0: original state of the environment
C_0: a historical context at moment t0
CT_0: a chain of thoughts $T_0 \rightarrow T_1 \rightarrow T_2 \rightarrow \ldots \rightarrow T_k$ in context C_0
D_0: decision resulting from the context C_0 and the thought chain CT_0
$E_{changed}$: state of environment modified after the execution of decision D_0
$C_{changed}$: a changed context created after the execution of decision D_0
CT^0: a chain of thoughts $T^0(D_0) \rightarrow T^1(D_0) \rightarrow T^2(D_0) \rightarrow \ldots \rightarrow T^l(D_0)$ generated in the context $C_{changed}$. All the thoughts in the chain are conditionally dependent on the decision D_0 which is one of the reasons for the changed environment $E_{changed}$.
SE_0: a set of Sensibility structures affected by the changed environment $E_{changed}$.
EM_0: a set of emotions produced after the Sensibility structures SE_0 interact with the changed environment $E_{changed}$ through a chain of thoughts $CT^0\left(E_{changed}\right)$ generated as a result of $E_{changed}$.

The set of emotions EM_0 are associated with the semantic signature $sig\left(CT_0(C_0)\right)$ of the chain of thoughts CT_0 in the context C_0. Let us assume that after some period of time a context C_1 is created and a chain of thoughts CT_1 is generated in it. Let us assume that there is a subset of semantic dimensions $\mathfrak{D}$ in which $sdist\left(sig\left(CT_0(C_0)\right)[\mathfrak{D}], sig\left(CT_1(C_1)\right)[\mathfrak{D}]\right) < \gamma$ where γ is some threshold distance. Then a set of Emotions EM_1 will be associated with the chain of thoughts $CT_1(C_1)$ such that $\|EM_0 - EM_1\| < \delta(\gamma)$ when γ is small enough. In other words the set of emotions EM_1 will converge asymptotically with the chosen norm to EM_0 with the decrease of the semantic distance between $CT_0(C_0)$ and $CT_1(C_1)$ conditioned on the signature dimensions subset $\mathfrak{D}$. If the set of emotions EM_1 is generally negative (think *negative definite matrix*) a future decision D_1 resulting from the chain of thoughts $CT_1(C_1)$ will be inhibited by a measure corresponding to the strength of the .