# ReduCE: A Reduced Coulomb Energy Network Method for Approximate Classification

slightly less complete) and also that the classi er is able to induce new knowledge

Fig. 1. The structure of a Reduced Coulomb Energy network.

Note that normally

input

$TrSet = f\langle x_i; h_Q(x_i)$

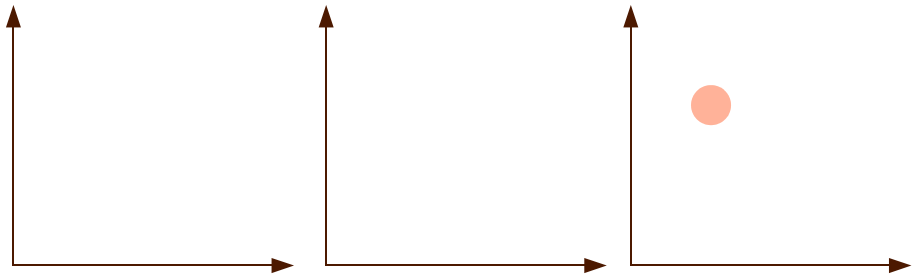

Fig. 3. Evolution of the model built by a RCE network: the centers of the hyperspheres represent the prototypical individuals.

### 2.3 Classi cation

The classi cation of a query individual $x_q$ using the trained RCE network is quite simple in principle. As shown in the basic (*vanilla*) form of the classi cation algorithm depicted in Fig. 4, the set $N(x_q)$ *TrSet*

Fig. 5. A representation of the model built by an RCE network used for classi cation: regions with di erent colors represent di erent classi cations for instances therein. The areas with overlapping colors or outside of the scope of the hyperspheres represent regions of uncertain classi cation (see the proposed enhanchment of the procedure in this case).

the $k$NN procedure [4]. It is convenient to decompose the decision function $g(x)$ in three components corresponding to the values $v \in V$ : $g_v(x)$ and use those

would be: $8a;b:\ s(a;b) = 1 \quad d(a;b)$ or $s(a;b) = 1 = d(a;b)$. The latter case needs

Table 1. Facts concerning the ontologies employed in the experiments.

| ontology | DL language | #concepts | #object prop. | #data prop. | #individuals |
|---|---|---|---|---|---|

Table 2. Results of the rst session with uncertainty threshold =

Table 3. Results of the second session with uncertainty threshold = .7 and minimum

[4] C. d'Amato, N. Fanizzi, and F. Esposito. Query answering and ontology population: An inductive approach. In S. Bechhofer and et al., editors, *Proceedings of*