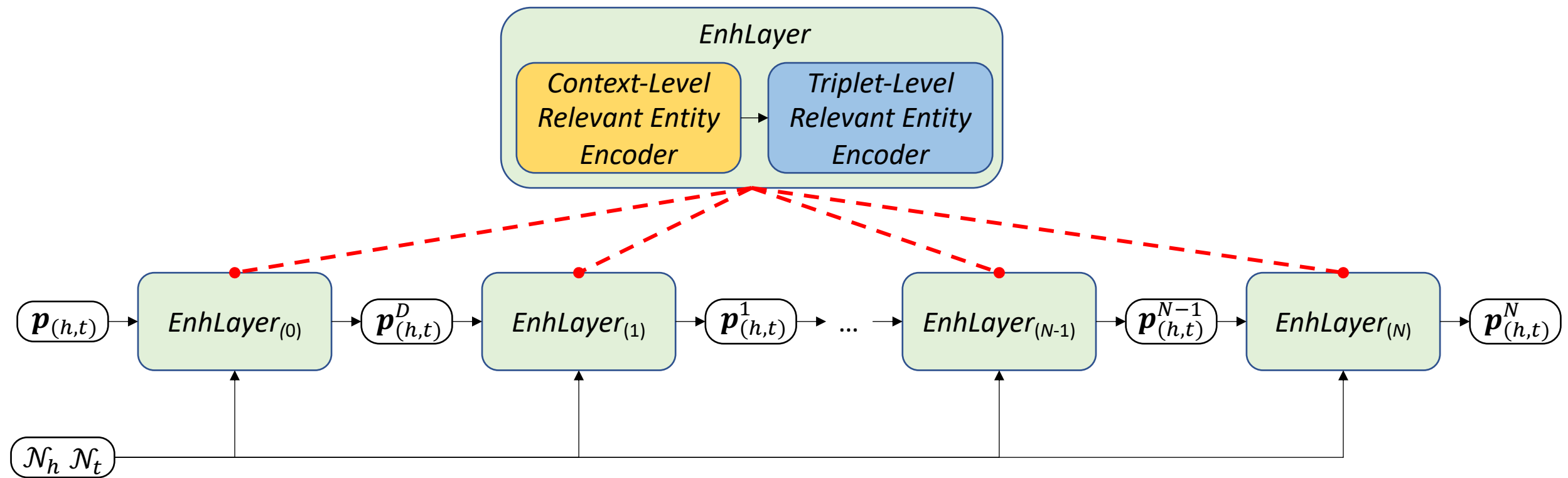# (a) *Cascaded Embedding Enhancement Network*

Neighbor entity sets: $\mathcal{N}_h$, $\mathcal{N}_t$
Input entity pair embedding: $\boldsymbol{p}_{(h,t)}$
Enhanced entity pair embeddings: $\boldsymbol{p}^D_{(h,t)}$, $\boldsymbol{p}^i_{(h,t)}$ $(i = 1,2,3 \dots N)$

EnhLayer

Context-Level Relevant Entity Encoder → Triplet-Level Relevant Entity Encoder

$\boldsymbol{p}_{(h,t)}$ → EnhLayer$_{(0)}$ → $\boldsymbol{p}^D_{(h,t)}$ → EnhLayer$_{(1)}$ → $\boldsymbol{p}^1_{(h,t)}$ → ... → EnhLayer$_{(N-1)}$ → $\boldsymbol{p}^{N-1}_{(h,t)}$ → EnhLayer$_{(N)}$ → $\boldsymbol{p}^N_{(h,t)}$

$\mathcal{N}_h$ $\mathcal{N}_t$

(b) *Supervised Relational Learning Module*

Dual entity pair embeddings: $\boldsymbol{p}^{CL}_q$, $\boldsymbol{p}^{TL}_q$
Enhanced entity pair embedding of the query q : $\boldsymbol{p}^N_q$
Enhanced entity pair embeddings of the support set $\mathcal{S}_r$: $\boldsymbol{p}^N_{s^k_r}$ $(k = 1,2,3 \dots)$

Dual Contrastive Learning

$\boldsymbol{p}^N_{(h,t)}$ → Context-Level Relevant Entity Encoder → $\boldsymbol{p}^{CL}_q$

$\mathcal{N}_h$ $\mathcal{N}_t$

Dual Contrastive Loss $\mathcal{L}_{Dual}$

$\boldsymbol{p}^N_{(h,t)}$ → Triplet-Level Relevant Entity Encoder → $\boldsymbol{p}^{TL}_q$

$\mathcal{N}_h$ $\mathcal{N}_t$

Metric Learning

$\mathcal{S}_r$

$\boldsymbol{p}^N_{s^1_r}$
$\boldsymbol{p}^N_{s^2_r}$
$\boldsymbol{p}^N_{s^3_r}$
...

Generating few-shot relation embedding $\boldsymbol{R}_q$ → $\boldsymbol{R}_q$

Similarity function ϕ → Classification Loss $\mathcal{L}_c$

q
$\boldsymbol{p}^N_q$