⑧ NNCLR — NNCLR

infoNCE: $$\ell_i^{\text{infoNCE}} = -\log \frac{\exp(z_i \cdot z_i^+/\tau)}{\exp(z_i \cdot z_i^+/\tau) + \sum_{z^- \in N_i} \exp(z_i, z^-/\tau)}$$

$$\ell_i^{\text{simCLR}} = -\log \frac{\exp(z_i \cdot z_i^+/\tau)}{\sum_{k=1}^{K} \exp(z_i, z_k^+/\tau)}$$

NNCLR: $$\ell_i^{\text{NNCLR}} = -\log \frac{\exp(NN(z_i;\theta) \cdot z_i^+/\tau)}{\sum_{k=1}^{K} \exp(NN(q, z_i) \cdot z_k^+/\tau)}$$

where, $NN(z_i;\theta) = \arg\min_{v \in Q} \|z_i - v\|_2$ key points.