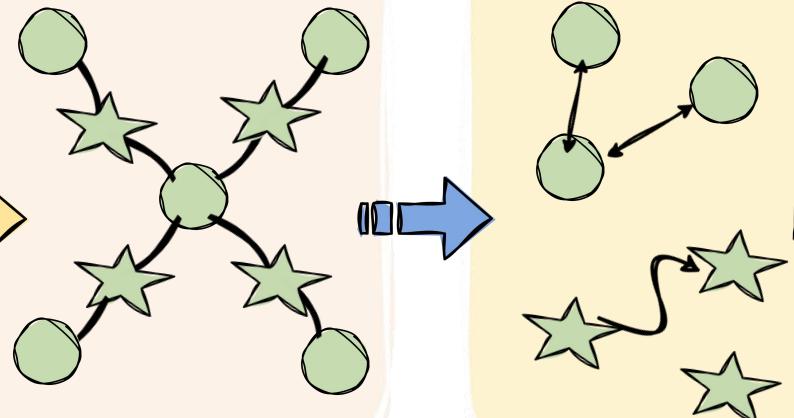
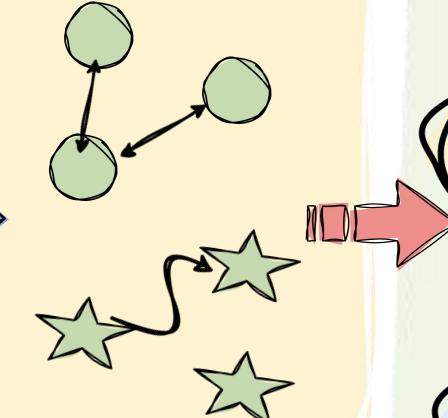


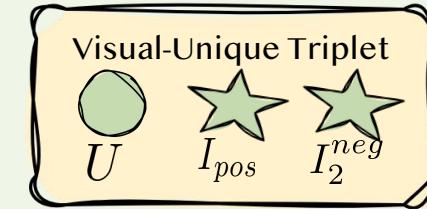
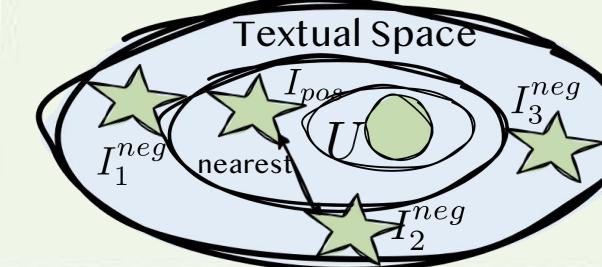
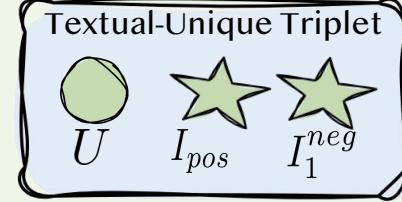
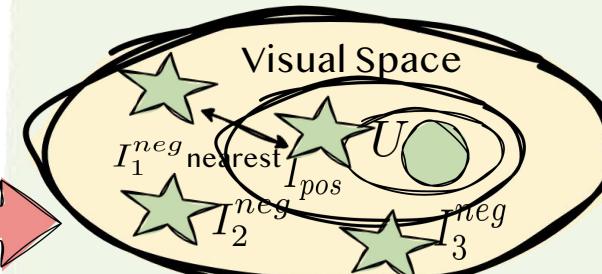
Heterogeneous Graph



Homogeneity Graph

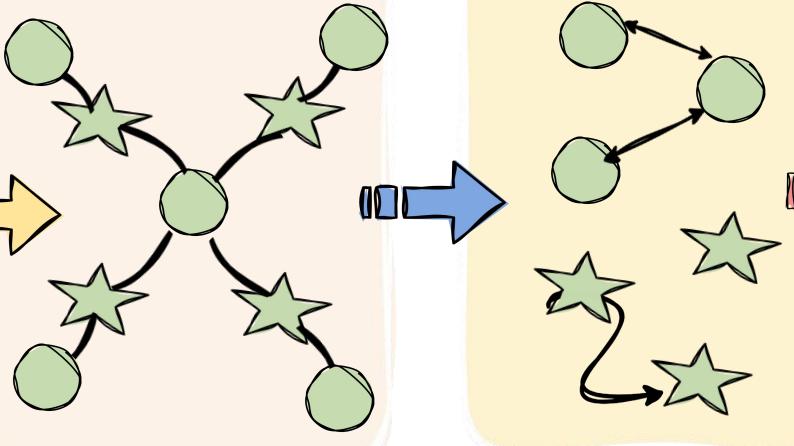


Cross-modal Hard Negative Sampling for Unique Information Learning

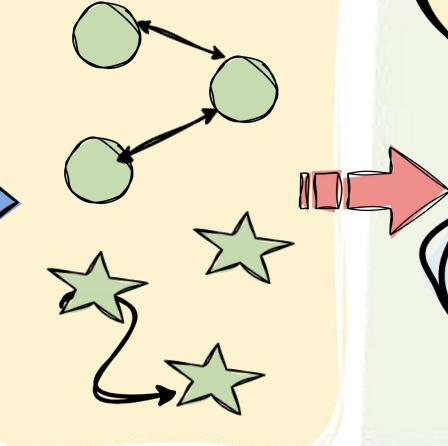


Syngy
Uni-1 Rdncy Uni-2

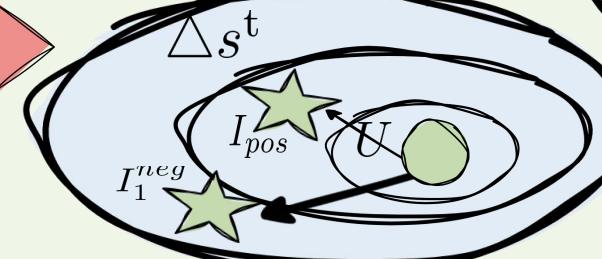
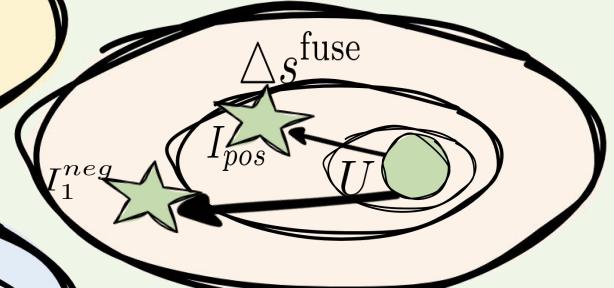
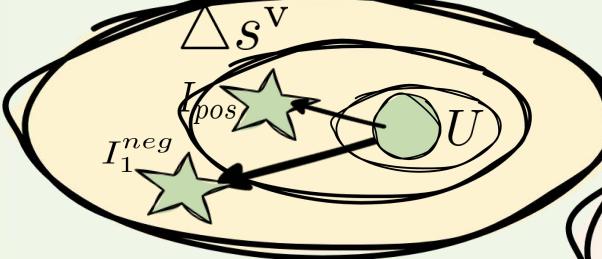
Heterogeneous Graph



Homogeneity Graph

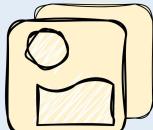


Synergy BPR Loss for Synergistic Information Learning

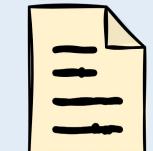


$$L_{\text{Synergy-BPR}} = \log[\Delta s_{uij}^{\text{fuse}} - \max(\Delta s_{uij}^{\text{text}}, \Delta s_{uij}^{\text{visual}}) - \theta]$$

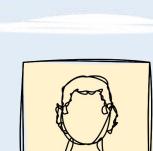
Item Embedding



Visual Embedding



Text Embedding



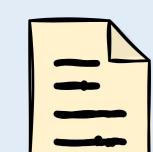
User Preference



Item Embedding



Visual Embedding



Text Embedding

