DualCL: Dual-Level Contrastive Learning Model for Multi-modal Knowledge Graph Completion

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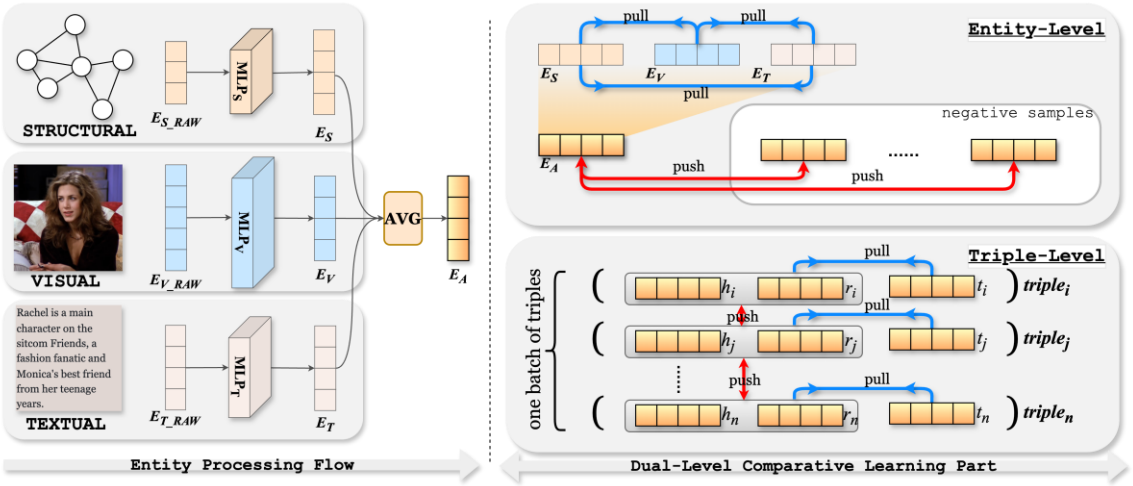
Frontiers of Computer Science, DOI: 10.1007/s11704-025-50184-8

Problems & Ideas

- two major challenges remain:
  - how to effectively align and integrate embeddings from structural, visual, and textual modalities to improve the quality of entity representations;
  - how to strengthen the connections among head entities, relations, and tail entities in correct triples, making their associations more cohesive, thereby more clearly distinguishing between correct and incorrect triples.
- Ideas: A model includes dual-level contrastive learning that optimizes entity representations and strengthens the cohesion of correct triples.



The overall framework for DualCL. The left half of the figure depicts the flow of processing entities. The right side of the figure shows the contrastive learning part of the model at the entity-level and at the triple-level.

Main Contributions

- Contributions:
  - A new dual-level contrastive learning (DualCL) model is proposed, which fully leverages multi-modal information to improve multi-modal knowledge graph completion.
  - In DualCL, contrastive learning is employed at both the entity and triple levels to obtain better representations of entities and relationships.
  - Experiments on benchmark datasets are conducted, and the results show that DualCL outperforms recent strong baselines, demonstrating its ability to accurately capture the complex semantic relationships between entities and relations in multi-modal knowledge graph completion.disparity maps.

Model	WN9-IMG				FB15K-IMG				DB15K			
	MR		Hits@10(%)		MR		Hits@10(%)		MR		Hits@10(%)	
	Raw	Filter	Raw	Filter	Raw	Filter	Raw	Filter	Raw	Filter	Raw	Filter
TransE	170	165	73.2	87.1	205	121	37.83	49.39	1163	894	30.52	45.83
IKRL	18	12	82.26	93.25	179	104	37.48	47.87	935	748	32.40	47.25
TBKGE	14	9	83.78	94.84	134	53	47.19	64.5	867	670	36.05	47.83
MMKRL	12	6	83.59	95.22	127	48	47.94	66.14	890	687	35.46	47.36
IMF	14	7	83.93	95.8	82	27	76.35	91.37	744	556	38.27	50.36
AdaMF	15	8	83.62	95.33	91	34	69.28	87.36	795	584	37.76	48.72
NativE	12	6	84.02	96.03	75	25	77.28	91.35	723	537	39.24	51.23
DualCL	**11***	**5***	**85.64***	**96.82***	**73***	**24***	**78.82***	**92.12***	**704***	**527***	**40.27***	**52.05***