

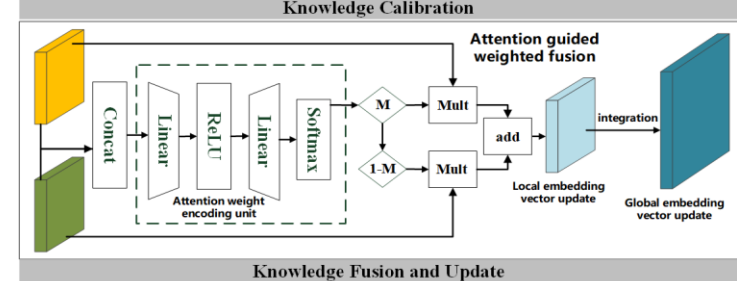
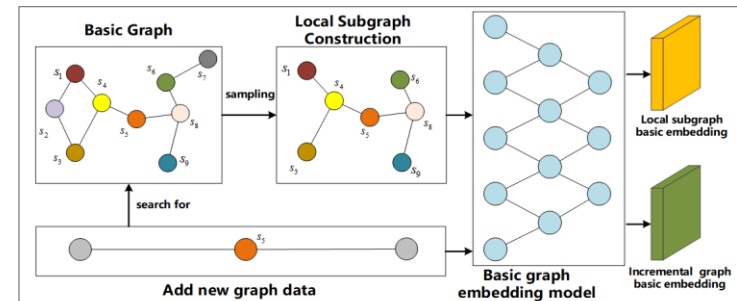
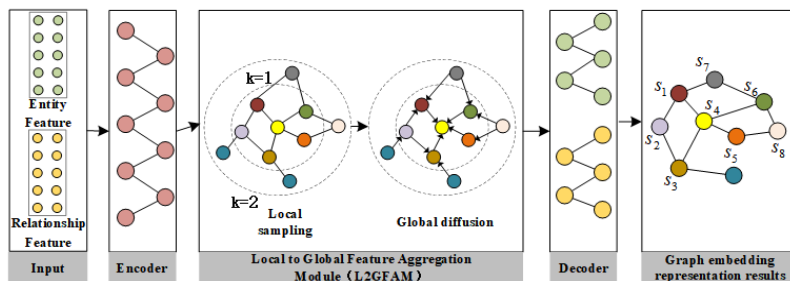
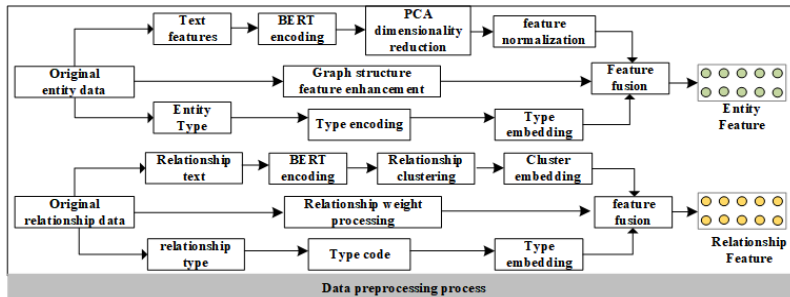
# A Graph Embedding-based Dynamic Update Method for Intelligence Knowledge Graphs

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# Problems & Ideas

- Problems of Dynamic Update Methods:
  - Dynamic knowledge graph updates face inaccuracies due to incremental data complexity and nois.
  - Traditional static-batch methods neglect the dynamic evolution of intelligence data, potentially leading to deviations during data collection and organization.
- Ideas: We propose GEDUM, a graph embedding-based dynamic update method for intelligence knowledge graphs, handling dynamic data evolution and optimizing updates via embedding networks.



# Main Contributions

- Contributions:
  - We propose GEDUM, a graph embedding-based dynamic update method for intelligence knowledge graphs, tackling information dispersion/uncertainty while enabling autonomous calibration and fusion of new knowledge.
  - We propose a local-to-global feature aggregation module for graph embedding learning, addressing semantic inconsistencies between new and base graph data.
  - We propose AWFS, an attention-guided weighted fusion strategy leveraging correlation/complementarity between new and existing intelligence data to enable local/new subgraph embedding fusion.
  - We present a multi-dimensional intelligence knowledge graph using large-scale real-world data, validated for dynamic intelligence data handling.

Model	PR_AUC	MRR	Hits@10	Hits@3	Hits@1
Baseline	0.9372	0.3877	0.4264	0.2438	0.1279
+LFAM	0.9591	0.3924	0.4531	0.2620	0.1493
+GFAM	0.9618	0.3936	0.4798	0.2587	0.1545
+L2GFAM	<b>0.9844</b>	<b>0.4022</b>	<b>0.5697</b>	<b>0.2928</b>	<b>0.2148</b>

Model	PR_AUC	MRR	Hits@10	Hits@3	Hits@1
TransE [8]	0.9423	0.3939	0.4148	0.2364	0.1182
RotatE [26]	0.9439	0.3965	0.4455	0.2375	0.1341
S2GAE [27]	0.9517	0.3968	0.3884	0.2598	0.1890
SAN [28]	0.9662	0.3973	0.4886	0.2724	0.2110
GEDUM	<b>0.9844</b>	<b>0.4022</b>	<b>0.5697</b>	<b>0.2928</b>	<b>0.2148</b>