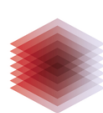




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BLINKG: A Benchmark for LLM-Integrated Knowledge Graph Generation

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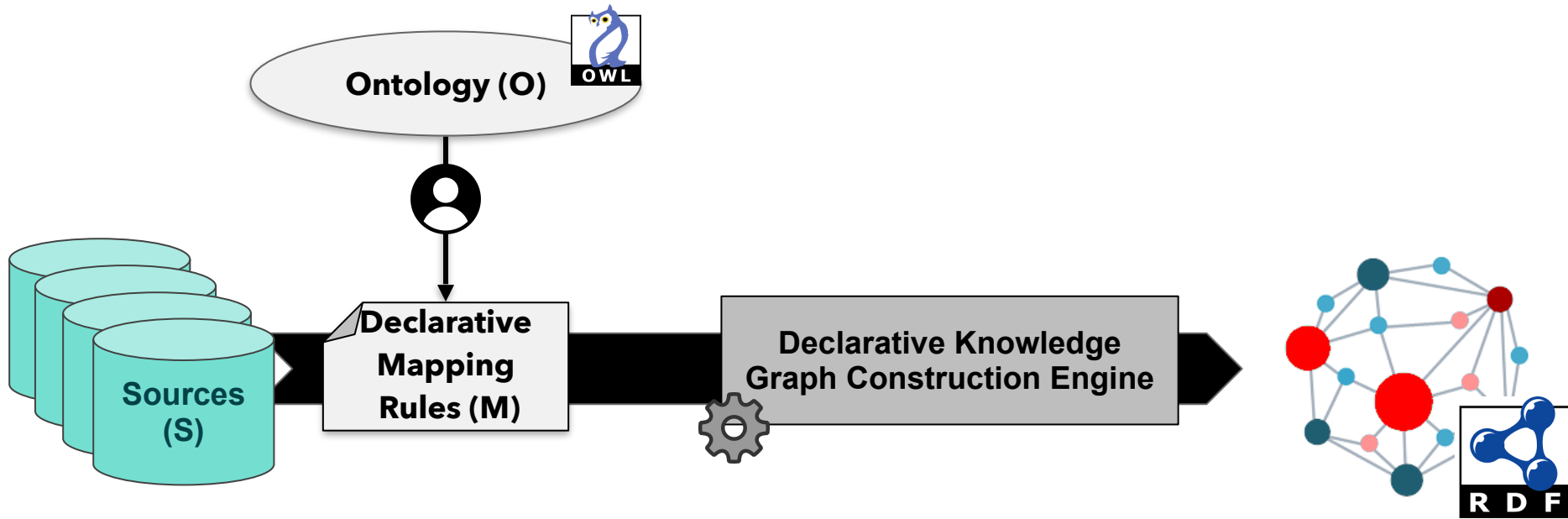


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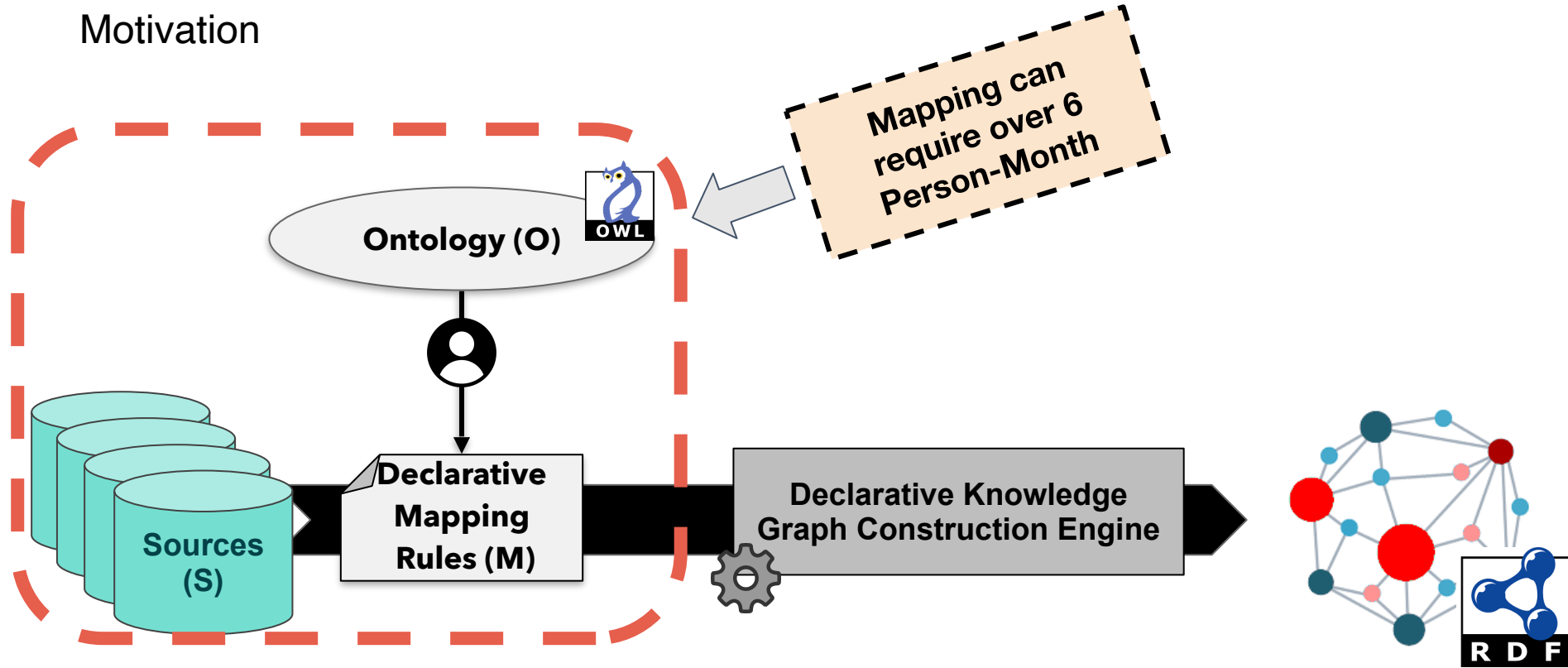


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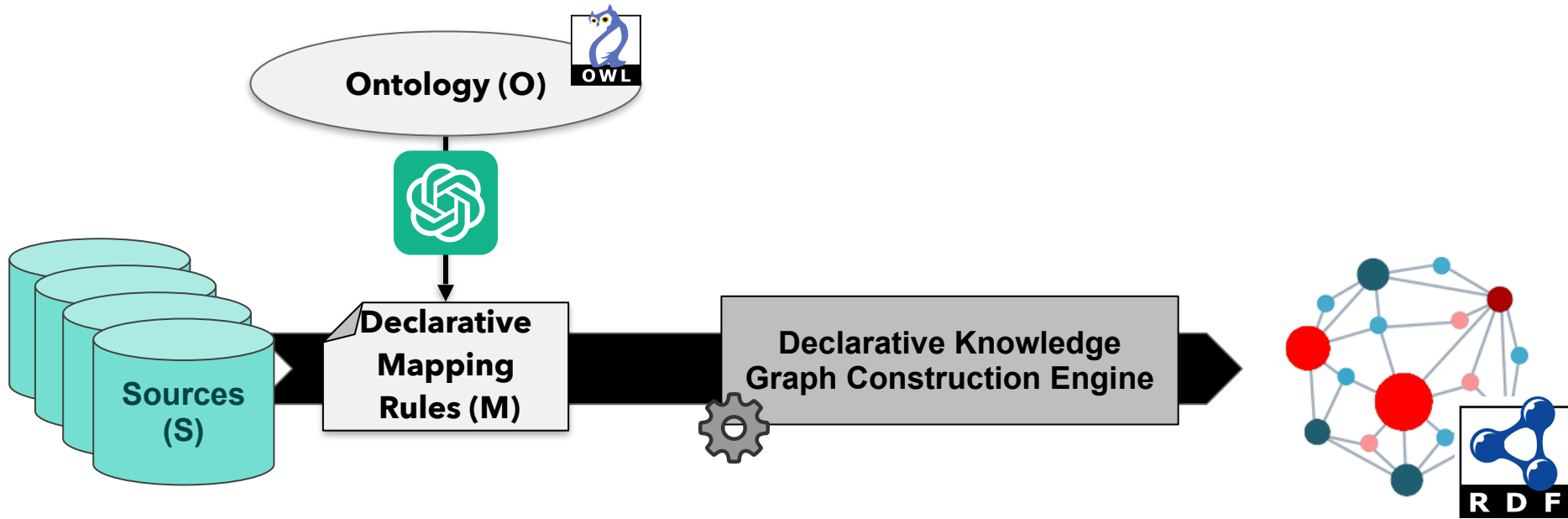
Motivation



Motivation



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Benchmark for evaluating the semantic decisions behind KG construction

- Atomic Tasks & Three Scenarios
- Mapping-language-independent output
- Baseline LLM evaluation

BLINKG: Tasks & Scenarios

KG Construction Atomic Tasks:

- Ontology Class Identification
- Subject Generation
- Ontology Property Identification
- Data Reference Identification
- Related Entity Class and Joins
- Language Annotation
- Datatype Annotation
- Transformation Functions

Three scenarios with varying schema distance and task complexity:

1. RML-inspired cases:
 - aligned schemas & basic tasks
2. Transport (GTFS):
 - aligned schemas & complex tasks
3. Public Procurement
 - distant schemas & complex tasks



Expected Output (excerpt from scenario 2)

Data Reference	Ontology Property	Entity Class	Rel. Entity Class	Subject Generation	Join	Datatype
shape_id	gtfs:id	gtfs:Shape		:shape/{shape_id}		xsd:string
shape_pt_lat	gtfs:latitude	gtfs:ShapePoint		:shapePoint/{shape_id}_ {shape_pt_sequence}		geo:lat
shape_pt_lon	gtfs:longitude	gtfs:ShapePoint		:shapePoint/{shape_id}_ {shape_pt_sequence}		geo:lon
shape_pt_sequence	gtfs:pointSequence	gtfs:ShapePoint		:shapePoint/{shape_id}_ {shape_pt_sequence}		xsd:int
shape_dist_traveled	gtfs:distanceTraveled	gtfs:Shape		:shape/{shape_id}		xsd:float
shape_id	gtfs:shapePoint	gtfs:Shape	gtfs:ShapePoint	:shape/{shape_id}	shape_id = shape_id	

Expected Output (excerpt from scenario 2)

Data Reference	Ontology Property	Entity Class	Rel. Entity Class	Subject Generation	Join	Datatype
shape_id	gtfs:id	gtfs:Shape		:shape/{shape_id}		xsd:string
shape_pt_lat	gtfs:latitude	gtfs:ShapePoint		:shapePoint/{shape_id}_{shape_pt_sequence}		geo:lat
shape_pt_lon	gtfs:longitude	gtfs:ShapePoint		:shapePoint/{shape_id}_{shape_pt_sequence}		geo:lon
shape_pt_sequence	gtfs:pointSequence	gtfs:ShapePoint		:shapePoint/{shape_id}_{shape_pt_sequence}		xsd:int
shape_dist_traveled	gtfs:distanceTraveled	gtfs:Shape		:shape/{shape_id}		xsd:float
shape_id	gtfs:shapePoint	gtfs:Shape	gtfs:ShapePoint	:shape/{shape_id}	shape_id = shape_id	

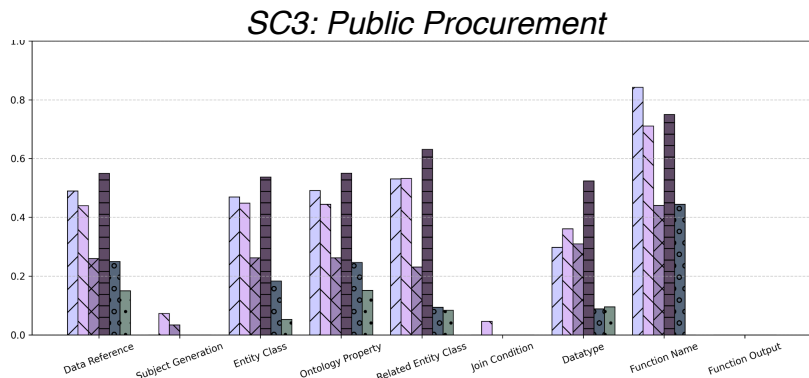
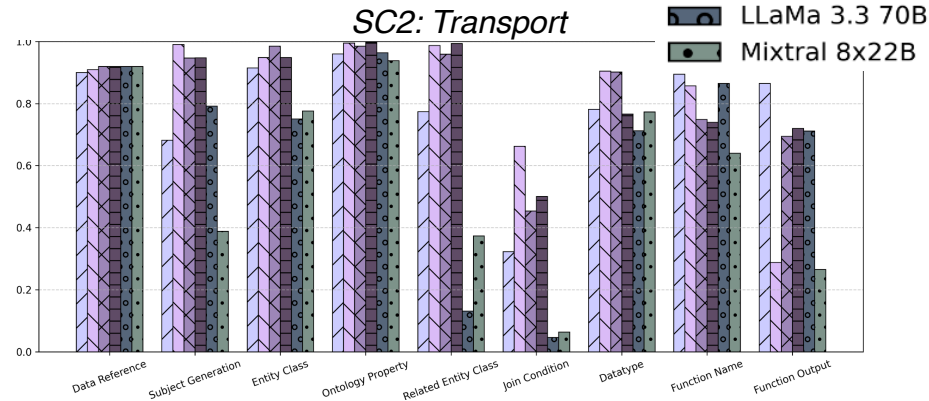
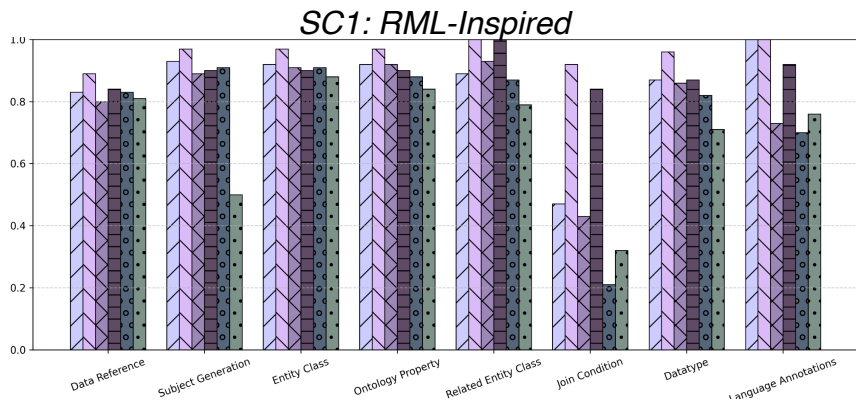
Expected outputs are independent of the mapping language

Evaluation

	RML-inspired cases	Transport (GTFS)	Public Procurement
Setting	8 atomic cases	Aligned schemas Complex tasks	Distant schemas Complex tasks
Ontology	Ad hoc	LinkedGTFS	Subset of ePO
Input data	1–3 CSVs per case	13 CSV files	CODICE XML entry
Main features	Core mapping tasks	Interacting tasks and transformations	Mapping across distant schemas

- Six LLMs, zero-shot, three runs per prompt.
- Additional one-shot and few-shot experiments with DeepSeek-R1 on Scenario 3.
- Expert, raw and post-processed evaluation.

Results (F1)



- Models perform **well on class and property identification** when schemas align.
- **Schema distance exposes major limitations**, especially in subject generation.
- **Joins remain challenging** even with aligned schemas.



<https://github.com/citiususc/blinkg>

Conclusions & Future Work

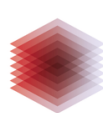
Shaped by reviewer feedback:

- **Timely contribution:** task-level evaluation of semantic mapping decisions.
- **Potential data leakage:** distinguishing reasoning from memorization remains an open challenge.
- **Broader coverage:** additional domains, formats, and synthetic data to test generalization.
- **Community resource:** open to new scenarios, methods, and results.





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