Incremental Reasoning on RDFS
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**Context**

The Semantic Web enables to:
- describe knowledge from data
- leverage implicit knowledge through reasoning algorithms

The main limitations of current reasoning methods are:
- lack of scalability for large datasets
- inability to reason over knowledge from evolving data

We contribute to solving these problems by introducing Slider, an efficient incremental reasoner.

**Main Features**

- **Parallel and Scalable Execution**: Each inference rule is mapped to an independent module, receiving intended triples and later distributing them to other modules for further processing.
- **Duplicates Limitation**: Vertical partitioning [1] and multiple indexing limit the production of duplicates and avoid unnecessary computation.
- **Data Stream Support**: Slider can handle both dynamic triple streams and static triples sets by employing parallel architecture.
- **Fragment’s Customization**: Slider natively support both RDFS [4] and ρdf [5] fragments, and can be extended to any other fragments.

**Architectural Overview**

**Input Manager**

<table>
<thead>
<tr>
<th>Explicit Triples</th>
<th>Implicit Triples</th>
</tr>
</thead>
</table>

**General Distributor**

**Buffers**

**Thread Pool**

**Rule Modules**

**Distributors**

*Concurrent Access*

**Experimentations**

- Comparison with OWLIM-SE [2]
- Inference on both RDFS and ρdf
- 13 different ontologies
  - 5 generated with BSBM [3]
  - 2 from real-word datasets
  - 6 subClassOf ontologies
- 106.86% improvement for ρdf
- 36.08% improvement for RDFS
- 71.47% improvement in average

**Future Work**

- Implementation of more complex inference rules, to provide reasoning over more complex fragments.
- Just-in-time optimisations of the rules execution’s scheduling.
- Use of previous runs informations to adapt and be more reactive.

**Source Code and Demo**

The source code is available here:
https://github.com/juleschevalier/slider
A demo can be found here:
http://demo-satin.telecom-st-etienne.fr/slider/

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**References**