Implementing Defeasible Reasoning and Justification for KLM-Style Extensions of Description Logic

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Overview

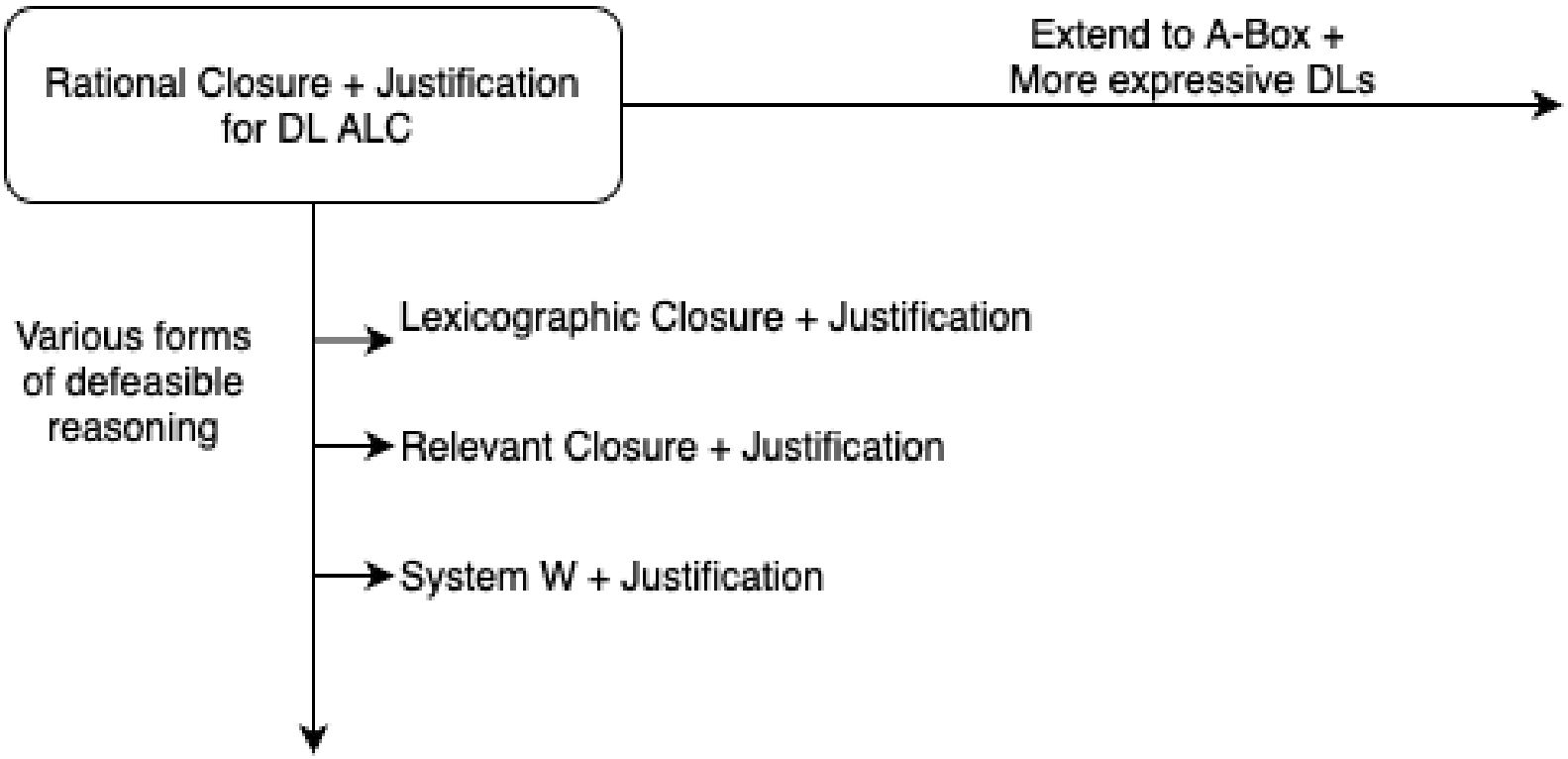
Previous work

- Implementing rational closure and justification for rational closure in propositional logic. [1]

Planned Work

- Implementing and analyse defeasible reasoners with justification for description logics

Planned Work



Defeasible Reasoner with Justification for DLs

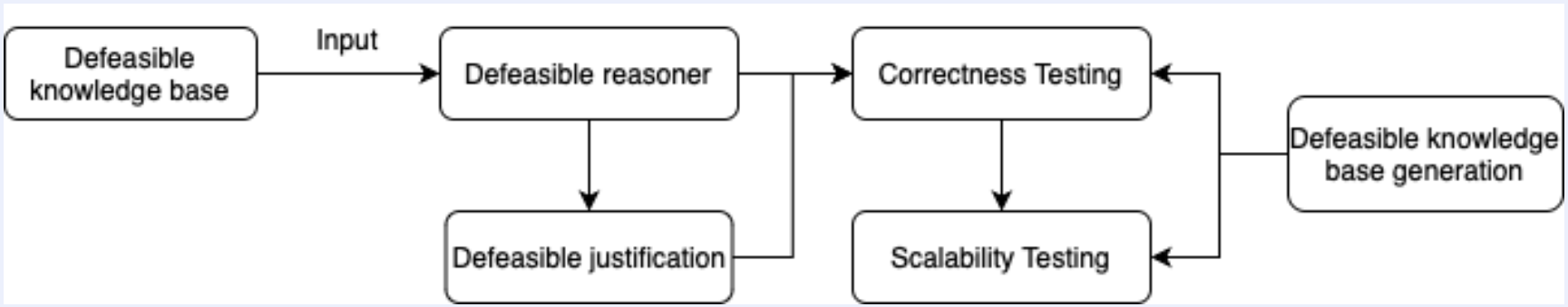
Theoretical Foundations

- Defeasible extension (KLM-style) of DLs. [2,3]
- Defeasible reasoning (including: Rational Closure[4], Lexicographic Closure[5], Relevant Closure [6] and System-W [7])
- Defeasible Justification [1]

Defeasible Reasoner with Justification for DLs

Practical Aspects

- Defeasible knowledge base generation
- Implement defeasible reasoners
- Implement defeasible justification
- Testing correctness and scalability



Defeasible Reasoner with Justification for DLs

Procedure Outline

- Iterative and incremental approach to build the defeasible reasoning and justification tool.
- In each iteration:
  - We anticipate a fully functional practical implementation along with its theoretical contributions and foundations.
  - The implementation will be validated and tested for correctness.

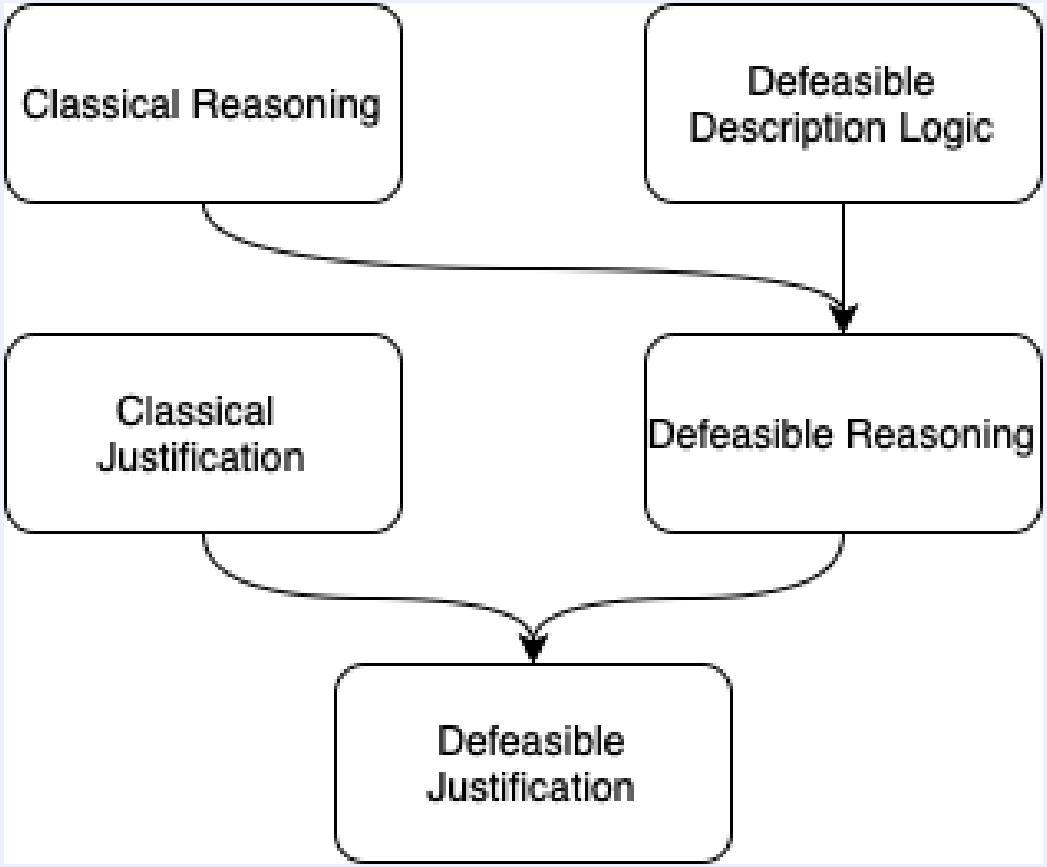
Defeasible Reasoner with Justification for DLs

Iteration Specifications

1. Rational Closure and Justification in DL $\mathcal{ALC}$.
2. Lexicographic Closure and Justification in DL $\mathcal{ALC}$.
3. Relevant Closure and Justification in DL $\mathcal{ALC}$.
4. System W and Justification in DL $\mathcal{ALC}$.
5. Extend to include A-Box for the above defeasible reasoning and justification.
6. Extend to more expressive form of description logic.
7. Testing the tool's scalability.

Rational Closure with Justification for $\mathcal{ALC}$

Building blocks



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