Unification in the Description Logic $\mathcal{EL}_{trans}$

- unification techniques for $\mathcal{EL}_{trans}$
- theoretical topic
- DL and Term Rewriting (desirable)

Barbara Morawska
Efficient Reasoning with Weighted Automata

• automata on infinite trees reasoning: \( P \)-hard
• special cases, can be improved (NLogSpace)
• is this true also for weighted automata?
• theoretical topic
• automata theory desirable

Rafael Peñaloza
Repairing Techniques in Prob-$\mathcal{EL}$

- Prob-$\mathcal{EL}$ is probabilistic DL
- Undesirable consequences: how to fix them?
- Extend axiom-pinpointing techniques
- theoretical / practical topic
- DL (desirable)

Rafael Peñaloza
Implementation of a Monitor for $\mathcal{ALC}$-LTL Formulae

- $\mathcal{ALC}$-LTL monitoring has high complexity
- implement algorithm
- on-the-fly optimisations
- practical topic
- JAVA programming preferred
- DL, LTL and automata theory desirable

Marcel Lippmann
Towards fine-grained optimizations for the $\mathcal{EL}$ reasoner \texttt{jCEL}

- $\mathcal{EL}$: subsumption can be tested in polynomial time
- $\mathcal{EL}+$ implementation: \texttt{jCEL} reasoner
- Bottle necks:
  - Memory capacity: Loading of large KBs
  - Else?
- Profiling of the reasoner + adaptation of reasoning to OS conditions

Anni-Yasmin Turhan
(together with group of Prof. Härtig)
Build DL KBs from sensor data

- Sensor data: numeric
  DL: symbolic
- DL TBoxes: defined concepts & primitive concepts
- How to “populate” primitive concepts?
  Instances of . . .
    - defined concepts can be inferred
    - primitive concepts are generated by \textit{preprocessors} (e.g.: high-load, medium-temperature, . . .)
- Example Application: virtual DB system

Anni-Yasmin Turhan
(together with group of Prof. Lehner)