TIL as Hyperintensional Logic for Natural Language Analysis

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Outline

New TIL Project

- previous GAČR project P401/10/0792, 2010–2012
- new GAČR project GA15-13277S (P406), 2015–2017
- Hyperintensional logic for natural language analysis
- 4.823 mil Kč
- staff:
    - VŠB-Technical University of Ostrava:
        - Marie Duží, Marek Menšík
        Lukáš Vích, Vladimír Jarotek, Břetislav Paláček
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        Marek Medveď

- main topic – Transparent Intensional Logic

The Main Topic

- the goal – computer-aided linguistic and logical analysis of natural language, in particular English and Czech.
- logical framework of Transparent Intensional Logic (TIL)
- complete the design and development of the TIL inference machine (via TIL-Script)
- apply tools from computational linguistic, logic, philosophy and computer science

Objectives

1. Logical theory; further development of TIL, in particular research on
   - the analysis of tenses, presuppositions, epistemic verbs, events and ambiguities in natural language;
   - procedural isomorphism and the problem of synonymy;
   - TIL sequent calculus

2. Linguistic and logical analysis;
   - improvement of the Normal Translation Algorithm in order to increase its preciseness and accuracy
   - bi-lingual analysis for Czech and English

3. Communication and agents' attitudes
   - transformation of a dialogue into the knowledge base
   - the TIL inference machine, the TIL-Script functional programming language

Milestones	Theoretical results	Applications	
		Logical analysis	Inference
1st year (2015)	Study of procedural isomorphism and synonymy; questions and answers with presupposition; logic of dynamic discourse, tenses and events	Computer-aided analysis of individual attitudes in present, future and past tenses and their representation in the knowledge base	Substitution and existential generalization into the three kinds of context while respecting partiality
2nd year (2016)	Resolving ambiguities in natural language; specification of the algorithm of anaphora resolution	Computer-aided analysis of dynamic dialogue based on knowledge bases and ontologies of autonomous agents	Implementation of the algorithm of anaphora resolution in dynamic discourse
3rd year (2017)	Definition of TIL proof calculus; TIL vs. intuitionistic proofs and epsilon calculus	Effective methods of question answering based on knowledge bases and ontologies of autonomous agents	Implementation of the TIL calculus as specified by the theoretical group

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Future Directions

Do what we can do the best – use and develop the techniques of

- parsing
- valency processing
- corpus context analysis

in multiple languages

to manage large coverage logical analysis