The Objective

Logics have been developed in large variety for artificial intelligence (AI). Among them are so-called non-monotonic logics that are especially useful in dealing with new information that can contradict previous knowledge. In cognitive science there has been recently a turn towards applying such logics to model human inferences, i.e. predicting human responses. In this seminar we will focus on non-monotonic logics and some findings from psychology and ask, if it is possible to model these findings by these logics. This seminar continues the successful seminar series consisting of self-study parts (i.e., the assigned logics and the psychological phenomena) and developing and defending an own approach (e.g., showing why or why not a logic can model the inferences).

Cognitive Modeling is a research discipline at the boundary of psychology and natural sciences such as computer science, which aims at explaining human behavior on a computational level. Apart from matching the observable properties of human cognition as closely as possible, cognitive modeling is invested in the advancement of a general understanding of cognition. Instead of relying solely on abstract mathematical formalization such as neural networks, models are supposed to offer a means of interpretation while striving for functional equivalence to the mental processes.

Requirements

This block seminar will take place on May 23rd-25th, 09:00-17:00. Presence is mandatory. Requirements:

1. Study the introductory articles:
2. Register in HiSinOne for the seminar
3. Think about these questions in your assigned group of three students:
   - Can your logic explain the results on an aggregated level?
   - Can your logic explain the results on an inter-individuel level (see data in repository)?
4. Answer the following questions by May 5th
   - Can you model the aggregated results of the Wason Selection Task by propositional logic? If so, how, if not why not (proofs!)
5. Study your respective logic (Reiters Default Logic, System P, $\epsilon$-entailment of System P, Weak Completion Semantics, OCF)
6. Prepare a 10 min presentation explaining the respective logic
   - Explain the theory with examples
   - Describe the theory on an algorithmic level
7. Develop and implement your logics inferences and to explain it in a presentation (20 min per student).
   - Develop a flowchart describing the core processes
   - Describe your implementation on an algorithmic level
   - List all additional assumptions required for your implementation
   - Discuss possible improvements of your model
   - Pro/Cons of the theory
   - Think about the scope of your theory: Can it predict single participant answers?
   - Your presentation must be a single PDF document.
8. Present (6) and (7) with slides (30 min) during the seminar.
Timetable

Presence during the Seminar is mandatory. Submissions later than the deadlines given will not be accepted.

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Meeting</td>
<td>16.04.18, 15:00</td>
<td>02-017, Building 101</td>
</tr>
<tr>
<td>Registration</td>
<td>16.-25.04.18</td>
<td>hisinone.uni-freiburg.de</td>
</tr>
<tr>
<td>Topic Preferences</td>
<td>16.-25.04.18</td>
<td><a href="mailto:elfleinl@tf.uni-freiburg.de">elfleinl@tf.uni-freiburg.de</a></td>
</tr>
<tr>
<td>Proofs</td>
<td>05.05.18</td>
<td><a href="mailto:elfleinl@tf.uni-freiburg.de">elfleinl@tf.uni-freiburg.de</a></td>
</tr>
<tr>
<td>Group &amp; Topic Assignment</td>
<td>&lt; 3.05.18</td>
<td>-</td>
</tr>
<tr>
<td>Complete Presentation</td>
<td>17.05.18</td>
<td><a href="mailto:elfleinl@tf.uni-freiburg.de">elfleinl@tf.uni-freiburg.de</a></td>
</tr>
<tr>
<td>Seminar</td>
<td>23.-25.05.18, 09:00-17:00</td>
<td>SR 00-010/014, Building 101</td>
</tr>
</tbody>
</table>

Topics

All logics (except of the OCFs) can be found in the lecture Knowledge Representation and Reasoning slides from the previous semesters

**Topic 1: Reiter’s Default Logic**


**Topic 2: System P**


**Topic 3: Weak Completion Semantics**


**Topic 4: Ordinal Conditional Functions (OCFs)**

Topic 5: $\epsilon$-entailment


Additional notes regarding the presentation

- There is a presentation on ’How to give a Presentation’:
  ais.informatik.uni-freiburg.de/teaching/ws16/seminar_robotnav/GivingAPresentation.pdf.
- There is also a lecture where you can learn about giving presentations:
  gki.informatik.uni-freiburg.de/teaching/ws1718/prosem/index_de.html