EUCogII, Members' Conference, Hamburg 10/11.10.2009
Workshop B "AI as a formal science"

Summary of Discussion

By workshop chair: Vincent C. Müller

Jürgen Schmidhuber: "AI as a formal science"
Gregor Schöner (respondent): "Can a 'new AI' become a formal science?"
'Flash Talks' [see their slides]

Characteristics brought out in the discussion

Aim: AI as a formal science: the optimal general problem solver in arbitrary environments
Solution: New General AI, the Gödel machine (a formal approach to AI, not just a formal theory of a cognitive system)
- general
- top down
- assumptions made:
    - cognition is information processing, namely problem solving
    - "any kind of problem is a utility maximizing problem"

Problems raised

Application & Correctness
- Real cognitive systems have limited resources (space, time)
- Where does the utility come from, the preferences?
- The world (and probably our brains) are continuous systems, not digital computers
- Cognition is not action selection: there is often no "next action" to be selected, actions are contiguous and changing continuously
- "Deep embodiment" (di Paolo) and situatedness: cognition is not problem solving (even less utility maximization)
- material dynamics not captured in this model

Status of the theory
- AI is not a formal theory and should not be; it is engineering or empirical science
- This looks unfalsifiable, all-embracing (Schmidhuber agreed with most points raised in presentations)
- This is theoretical AI, how does it relate to practical AI? (As maths to physics?)
- Is this what real systems are actually doing? Empirical support for the theory?
- What is this theory doing? It seems neither empirical, nor engineering, nor formal.
- Will this Baysean system lead to a system that successfully pursues goals; flexible (adaptive) and autonomous? (The main challenge for AI)