

KIIS: Kunstig Intelligens & Intelligente Systemer

Artificial Intelligence & Intelligent Systems

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Presentation of a course, Autumn Semester 2005

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The big philosophical question

Can a machine be intelligent?

To answer:

Define what we mean by "intelligent"
— " — " — " — " — " — "machine"

Does "intelligence" require body, senses, emotions, consciousness — and what is "consciousness"???

The big philosophical question

Can a machine be intelligent?

To answer:

Define what

— " — "

***Really, I don't care!
The question does not interest
me at all!!***

Does "intelligent" mean

emotions, consciousness and what is

"consciousness"???



My pragmatic definition

"Artificial intelligence" is a property of devices that perform task which normally is assumed to require an intelligent human.

Examples:

The first mechanical calculators were the AI of their time, e.g., the Pascaline; B.Pascal (1623-1662)

Modern diagnosis system

Automatic control systems

Observation

Artificial intelligence (AI) is often a tool applied to assist natural intelligence (NI)

For some tasks:

$$NI + AI > NI$$

where ">" means "smarter than"

NB: Notice analogy with paper-and-pencil, standard computer programs,...

This course

- An overview of the area:
 - Basic concepts
 - Important applications
 - ... and techniques
- In depth with specific topics
- Book: *M. Negnevitsky: Artificial Intelligence, A Guide to Intelligent Systems, 2nd ed., Addison-Wesley, 2004*
- Complemented with
 - Articles
 - Course notes
 - Practical exercises, practical exercises, etc.!

Overall goals

- You get an overview of AI and AI methods so that
 - you can participate in AI development projects (e.g., student projects)
 - you get an idea of present state of the art
- You will be presented for current research topics, reflection (or course) the teachers' research interests
 - ideas for MsC theses and new research

Preliminary sketch of possible topics

- Rule-based expert system
(forward, backward chaining, etc.)
- Reasoning in logic based systems:
 - Deduction, Induction & Abduction modelled in logic programming.
 - Applications for diagnosis, natural language understanding (discourse analysis ...)
- Uncertainty: Statistics, Bayesian reasoning, related machine learning techniques
- To level of "know-about":
 - Fuzzy logic, neural nets, data mining techniques
- Evolutionary computation, genetic programming

We need to introduce some tools

Most likely central tools:

- Prolog
- Constraint Handling Rules

Additional specialized tools

- PRISM (T.Sato & al) for parameter learning
- some ILP (Inductive logic programming) tool
- some genetic programming system

Maybe we need to dig in to 1st order logic (as little as possible)

Practical

- Course runs on Tuesdays,
 - starting September 6, (check exact hours and room)
- We aim at:
 - Each course day is seen as a whole, so practical exercises reflects the day's theoretical material
- We combine
 - traditional lectures
 - practical & theoretical exercises
 - workshop: mixing it all together
- Exam
 - You give in some assignment(s) during course
 - Oral exam in January

See you Tuesday next week!