Escola Tècnica Superior d'Enginyeria
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[DEIM]

Approximate Reasoning

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Introduction to Approximate Reasoning

MESIIA – MIA

Approximate reasoning

- Most words and evaluations we use in our daily reasoning are not clearly defined in a mathematical manner. This allows humans to reason on an abstract level.
- Sometimes, things are not true or false, they can be fulfilled to some degree.
- Approximate reasoning deals with uncertainty and imprecision.
- Is it the same “uncertainty” than “imprecision” ?

Uncertainty and Imprecision

- Sentences can be more or less imprecise.
- If know that: "Temperature is above 20ºC", what is the truth of the following sentences:
  1. "Temperature is 25ºC"

     Precise and uncertain
  2. "Temperature is higher than 15ºC"

     Imprecise and certain

Reasoning with rules

- We will focus on problems in which we have a knowledge base (a set of rules)
- From a set of new evidences we have to calculate the truth of a some conclusions

Rules: evidences $\rightarrow$ conclusion (e$\rightarrow$c)



Look at each image and answer. Is it going to rain today?

Models

- Probabilistic Approach
- Quasi-probabilistic methods: Certainty Factors
- Possibilistic Approach: Fuzzy Logic
- Existential Approach: Dempster-Shafer Theory

Videos

- Uncertainty in control of vehicles
- Confidence and uncertainty in weather forecasting