

# Philosophy of Science and Computational Liguistics

Debate session

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## **Outline for Today**

- Short introduction and presentation of debate topics
- ➤ Smaller groups in breakout rooms: Prepare for debate (30–45 minutes)
- ► Debates (15 minutes per topic)
  - ► Each group introduces their point of view (1–2 minutes)
  - Debate among the two groups
  - Questions and comments from the audience



#### **Debate topics**

- Is language technology a science?
- ► Was their an "empirical scientific revolution" in the 1990s in Kuhn's sense?
- ▶ Is Hume's problem relevant to language technology? (How? Why?)



### Language Technology as a Science

- Is language technology science or engineering?
  - Is it a scientific goal to beat the state of the art?
  - What is the research question/hypothesis?
- If science, what is its object of study?
  - ► Natural language from a computational point of view (CL)
  - Computational models applied to natural language (NLP)
  - Natural language as an example of intelligent behavior (AI)
  - **.** . . .
- If engineering, how is it grounded in science?
  - Data description from linguistic theory
  - ▶ Theoretical models from mathematics and statistics
  - Algorithms from computer science
  - ...



#### **Science**

- Characteristics of science: (Overton opinion)
  - 1. It is guided by natural law
  - 2. It has to be explanatory by reference to natural law
  - 3. It is testable against the empirical world
  - Its conclusions are tentative, i.e. are not necessarily the final word
  - 5. It is falsifiable



# Scientific Change

- Traditional view:
  - Science advances in a cumulative fashion
- ► Kuhn's notion of paradigm (normal science)
  - A set of shared theoretical assumptions
  - ► A set of accepted problems and methods ("puzzle solving")
- Scientific revolutions
  - Accumulation of anomalies lead to crisis and revolution
  - ▶ Old paradigm abandoned only if new paradigm available
  - ► Copernicus, Darwin, Einstein



Thomas Kuhn (1922–1996)



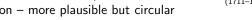
## Language Technology Changes

- ► The "empirical revolution" in language technology
  - ▶ Before 1990: Rationalist approaches and qualitative evaluation
  - ► Today: Empirical approaches and quantitative evaluation
- ► What happened?
  - Paradigm shift in Kuhn's sense?
  - ▶ Just another swing of the pendulum?
  - Language technology becoming a mature science?
  - ...



#### Hume's Problem of Induction

- Induction presupposes "uniformity of nature"
- ► How can we rationally justify this assumption?
  - ► By deduction safe but impossible
  - By induction more plausible but circular





David Hume (1711-1776)

- Conclusion:
  - ► The principle of induction cannot be rationally justified!



# **Debate topics**

- Is language technology a science?
  - ► Group 1: yes
  - ► Group 2: no
- ▶ Was their an "empirical scientific revolution" in the 1990s in Kuhn's sense?
  - Group 3: yes
  - ► Group 4: no
- Is Hume's problem relevant to language technology?
  - ► Group 5: yes (how?)
  - ► Group 6: no (why?)



# Coming up

- ► First literature seminar, Monday Sep 14
  - On Zoom for all groups
  - Check on the web page if you will present an article at the first seminar
  - ► All students read all articles
- ▶ Take home exam
  - ► Handed out: September 9 (morning) in Studentportalen
  - ► Hand in: September 17, 23.59 in Studentportalen
  - Anonymous