

COGNITIVE COMPUTATIONAL NEUROSCIENCE

Kriegeskorte & Douglas (2018) Nature Neuroscience

October 5, 2018 | Journal Club | Julia Sprenger | INM-6

Historical Background

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'¹

Historical Background

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'¹

Allen Newell (1973)

- 'You can't play 20 questions with nature and win'
- Hypothesis testing needs to be complemented by the construction of comprehensive task-performing computational models

Historical Background

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'¹

Allen Newell (1973)

- 'You can't play 20 questions with nature and win'
- Hypothesis testing needs to be complemented by the construction of comprehensive task-performing computational models

Richard Feynman (1988)

- 'What I cannot create, I do not understand'

Historical Background

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'¹

Allen Newell (1973)

- 'You can't play 20 questions with nature and win'
- Hypothesis testing needs to be complemented by the construction of comprehensive task-performing computational models

Richard Feynman (1988)

- 'What I cannot create, I do not understand'

Cognitive Science (1980)

introduction of task-performing computational models

Different Approaches

Cognitive sciences

- interdisciplinary, scientific study of the mind and its processes²
- how humans learn & think

Different Approaches

Cognitive sciences

- interdisciplinary, scientific study of the mind and its processes²
- how humans learn & think

Computational Neuroscience

- how brains adapt and compute

Different Approaches

Cognitive sciences

- interdisciplinary, scientific study of the mind and its processes²
- how humans learn & think

Computational Neuroscience

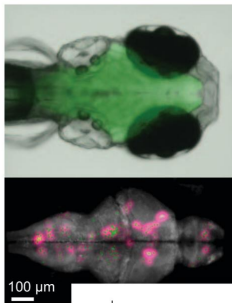
- how brains adapt and compute

Artificial Intelligence

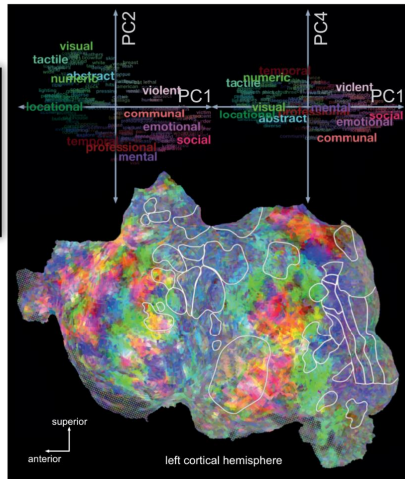
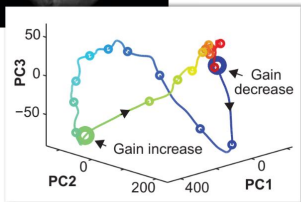
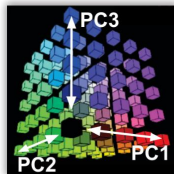
- how to generate intelligent behaviour

Modern Imaging Techniques

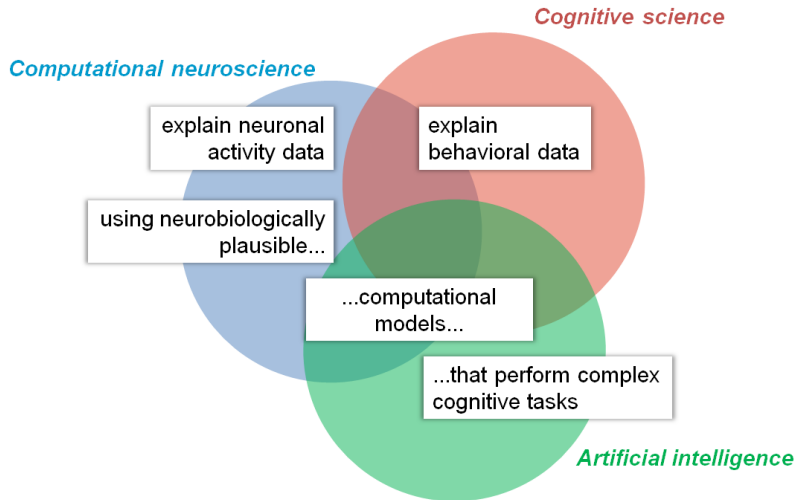
a



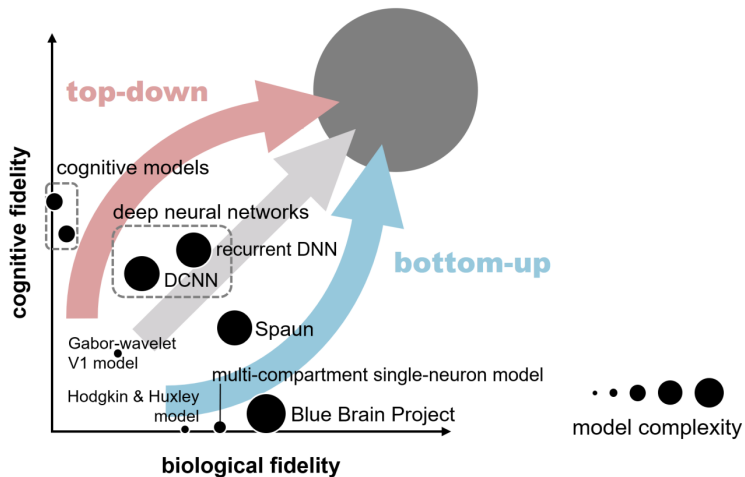
b



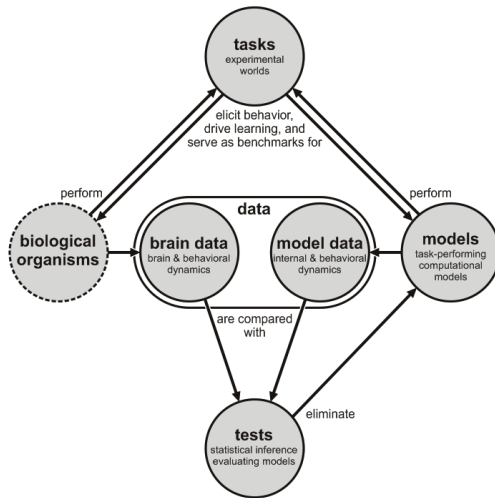
Disciplines



The Space of Process Models



Interaction Among Sharable Components



Motivation

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'³

Motivation

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'³

Allen Newell (1973)

- 'You can't play 20 questions with nature and win'
- Hypothesis testing needs to be complemented by the construction of comprehensive task-performing computational models

Motivation

Cognitive psychology

- study of mental processes such as 'attention, language use, memory, perception, problem solving, creativity, and thinking'³

Allen Newell (1973)

- 'You can't play 20 questions with nature and win'
- Hypothesis testing needs to be complemented by the construction of comprehensive task-performing computational models

Richard Feynman (1988)

- 'What I cannot create, I do not understand'