The Singularity, the MiniMaxularity, and Human Development

Selmer Bringsjord & Alexander Bringsjord

Are Humans Rational?

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Q7

• All the Swedes in the room are skiers.

• Some of the skiers in the room are athletic.

  • Therefore:

• Some of the Swedes in the room are athletic.
Q7

• All the Swedes in the room are skiers.

• Some of the skiers in the room are athletic.

• Therefore:

• Some of the Swedes in the room are athletic.

Logically invalid!
Q7

• All the Swedes in the room are skiers.
• Some of the skiers in the room are athletic.
  • Therefore:
  • Some of the Swedes in the room are athletic.

Logically invalid!

• All the cars on the lot are certified.
• Some certified cars are super bargains.
  • Therefore:
  • Some cars on the lot are super bargains.
Purely symbolic route:
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Q7: Use the propositional rules:
- \( A \): All the sneaks
- \( S \): Some of the skiers
- \( Sx \): Some of the sneaks
- \( k_x \): skiers

\[ A \rightarrow Sx \]
\[ Sx \rightarrow k_x \]
\[ k_x \rightarrow \neg A \]

For all \( x \) \( (Sx \rightarrow k_x) \)
For some \( x \) \( (k_x \land Ax) \)

Q8:

(b) \( A \rightarrow B \)
(c) \( B \rightarrow C \)
(d) \( C \rightarrow D \)

If the four statements are all true, according to truth-table:
- \( A \) is true, \( B \) is false.
- \( C \) is true, \( D \) is false.

Assume \( A \) is true, \( k_x \) is random individual.
\( S \rightarrow k_x \)
\( k_x \land A \rightarrow \neg A \)

We can directly deduce the \( A \) from the second conjunct in the second premise.
But we cannot get \( S \).
So it is invalid.
The Singularity Approaches ...
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A:
Premise 1  There will be AI (created by HI and such that AI = HI).
The Singularity Approaches ...

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The Singularity Approaches ...

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Premise 1  There will be AI (created by HI and such that AI = HI).
Premise 2  If there is AI, there will be AI⁺ (created by AI).
Premise 3  If there is AI⁺, there will be AI++ (created by AI⁺).
The Singularity Approaches ...

\[ A: \]
Premise 1  There will be AI (created by HI and such that AI = HI).
Premise 2  If there is AI, there will be AI\(^+\) (created by AI).
Premise 3  If there is AI\(^+\), there will be AI\(^{++}\) (created by AI\(^+\)).

\[ \therefore \]
\[ S \]
There will be AI\(^{++}\) (= S will occur).
The Singularity Approaches ...

\( A: \)

Premise 1  There will be AI (created by HI and such that AI = HI).
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\[ \therefore \] \( S \)  There will be AI\(^{++}\) (= \( S \) will occur).
The Singularity Approaches ...

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Premise 1  There will be AI (created by HI and such that AI = HI).
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\[\therefore S\]
There will be AI\(^{++}\) (= \(S\) will occur).

(Good-Chalmers Argument)

(Kurzweil is an “extrapolationist.”)
A Realistic Timeline

seen    foreseeable    claimed
past    present        future

Deep Blue  AI    MiniMax  Sing  AI
<HI     =HI     >HI

Watson
Logicist Agent-based Economics: Foci …

- Formal Science of Science: Economics
- Hypercomputation: Economics/Innovation
- Mixed Rationality in Stylized “Tests”: Irrationality and Rationality in Deviant Bi-Pay Auctions
- Deliberative Multi-agent Strategy:
  - Corporate: Chain Store Paradox
  - Military: Nuclear Strategy (e.g., Iran)
- Detection: Fraud: Ponzi Scheming
- Microfinance: Roscas/Group Lending
- Effects of Future Robust AI on Human Employment
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Recall Your Required (Quick) Reading


- http://kryten.mm.rpi.edu/SBringsjord_ABringsjord_SingularityBiz_0915151500.pdf
Who Else Has Seriously Thought About the AI-Employment Question?
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- S Bringsjord, J Johnson, A Bringsjord
A Realistic Timeline

- **Past**:
  - Deep Blue
  - AI

- **Present**:
  - Watson
  - MiniMax
  - AI

- **Future**:
  - AI
  - AI < H1
  - AI = H1
  - AI > H1

- **Seen**:
  - claimed

- **Foreseeable**:
  - MiniMax
A Realistic Timeline

- Deep Blue: past
- Watson: present
- MiniMax: foreseeable
- Sing: claimed
- AI: seen
- AI<HI
- AI=HI
- AI>HI

Creativity
A Realistic Timeline

seen  foreseeable  claimed
past  present  future
Deep Blue  AI  MiniMax  AI<HI  AI=HI  AI>HI
Watson  $?
creativity  creativity
A Realistic Timeline

- **Past**
  - Deep Blue
  - AI

- **Present**
  - Watson
  - MiniMax

- **Future**
  - Sing
  - claimed

Creativity

- seen
- foreseeable
- claimed

- $?$
Further Reading for Rationalists
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- Certain theorems inform our thinking, and specifically make The Singularity formally brittle, and perhaps just a pipe dream.
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• “Belief in The Singularity is Logically Brittle”

• http://kryten.mm.rpi.edu/SB_singularity_math_final.pdf
Creativity in the Human Case, in Action
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The Singularity (superhuman machine intelligence) is near!!
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Is that so? And how are you measuring intelligence, pray tell?
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Creativity in the Human Case, in Action
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Polynomial Hierarchy
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$P \subseteq NP \subseteq PSPACE = NPSPACE \subseteq EXPTIME \subseteq NEXPTIME \subseteq EXPSPACE$
Creativity in the Human Case, in Action

Checkers: Chinook

Polynomial Hierarchy

$P \subseteq NP \subseteq \text{PSPACE} = \text{NPSPACE} \subseteq \text{EXPTIME} \subseteq \text{NEXPTIME} \subseteq \text{EXPSPACE}$
Creativity in the Human Case, in Action

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Creativity in the Human Case, in Action
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Polynomial Hierarchy

P ⊆ NP ⊆ PSPACE = NPSPACE ⊆ EXPTIME ⊆ NEXPTIME ⊆ EXPSPACE

Go: AlphaGo
Checkers: Chinook
Creativity in the Human Case, in Action

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Creativity in the Human Case, in Action

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Creativity in the Human Case, in Action

Polynomial Hierarchy

- Jeopardy!
- Checkers: Chinook
- Go: AlphaGo

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Creativity in the Human Case, in Action

Polynomial Hierarchy

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Go: AlphaGo

Checkers: Chinook

Jeopardy!
Creativity in the Human Case, in Action

Arithmetical Hierarchy

Polynomial Hierarchy
- Jeopardy!
- Checkers: Chinook
- Go: AlphaGo

$P \subseteq NP \subseteq \text{PSPACE} = \text{NPSPACE} \subseteq \text{EXPTIME} \subseteq \text{NEXPTIME} \subseteq \text{EXPSPACE}$
Creativity in the Human Case, in Action

Arithmetical Hierarchy

<table>
<thead>
<tr>
<th>Polynomial Hierarchy</th>
<th>Go: AlphaGo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jeopardy!</td>
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P ⊆ NP ⊆ PSPACE = NPSPACE ⊆ EXPTIME ⊆ NEXPTIME ⊆ EXPSPACE
Creativity in the Human Case, in Action

Arithmetical Hierarchy

“Hey, do these two Java programs compute the very same function?”

Polynomial Hierarchy

Go:AlphaGo
Checkers:Chinook

Jeopardy!

P ⊆ NP ⊆ PSPACE = NPSPACE ⊆ EXPTIME ⊆ NEXPTIME ⊆ EXPSPACE
Creativity in the Human Case, in Action

Analytical Hierarchy

Arithmetical Hierarchy

Polynomial Hierarchy

“Hey, do these two Java programs compute the very same function?”

P ⊆ NP ⊆ PSPACE = NPSPACE ⊆ EXPTIME ⊆ NEXPTIME ⊆ EXPSPACE

Go: AlphaGo

Checkers: Chinook

Jeopardy!

Σ0

Σ1

Σ2

Π1

Π2