

From AI of the Past and Present to AI of the Future

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[{.html, .pdf}](http://www.rogerclarke.com/EC/AICI)

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The Original Conception of Artificial Intelligence (AI Old)



- Based on "the **conjecture** that every aspect of **learning** or any other feature of **intelligence** can in principle be so precisely described that a **machine can be made to simulate it**"
- "The **hypothesis** is that a physical symbol system [of a particular kind] has the necessary and sufficient means for **general intelligent action**"

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McCarthy et al. (1955)
Simon (1958, 1969, 1975; 1996, p.23)

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From Conjecture and Hypothesis To Fervid Belief

"Within the very near future - much less than twenty-five years - we shall have the technical capability of **substituting machines for any and all human functions** in organisations.

"**Duplicating problem-solving and information-handling capabilities of the brain** is not far off ... surprising if it were not accomplished **within the next decade**" (1960)

"**By the end of the 2020s** [computers will have] intelligence indistinguishable to biological humans" (2005)

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Simon (1960)
Kurzweil (2005, p.25)

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How to Recognise 'an AI'

Intelligence is exhibited by an artefact if it:

- (1) *evidences **perception and cognition** of relevant aspects of its environment*
 - (2) *has **goals**; and*
 - (3) ***formulates actions** towards the achievement of those goals*
- and?*
- (4) ***implements those actions***

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esp. Albus 1991, Russell & Norvig 2009, McCarthy 2007

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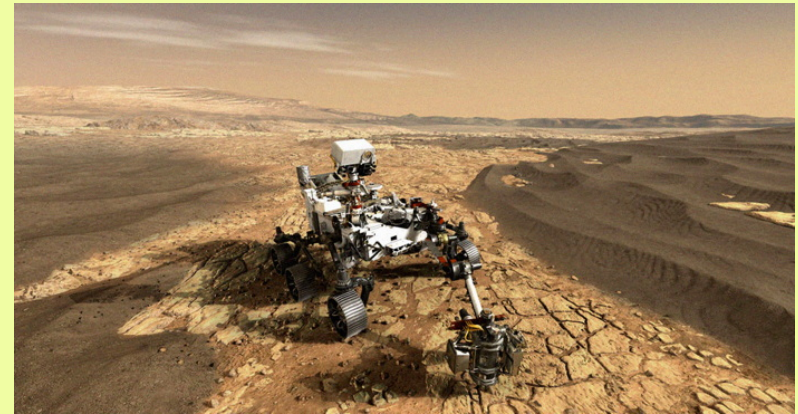
Embodiments of AI

- **Computers**
- **Robots**
'A Computer that Does' &
'A Machine that Computes'
- **Humanoid Robots**
Androids Gynoids
Fembots
- **Vehicles**
Terrestrial (Road, Rail),
Airborne, Water-borne,
Submerged
- **Bus-Stops**
And other everyday Things
- **Cyborgs**
A Human whose natural
capabilities have been enhanced
by technological means
A Hybrid of a human and one
or more associated, attached or
embedded artefacts

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Aug 2021 – <https://futurism.com/the-byte/nasas-mars-rover-took-selfie-beautiful>

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Does Intelligence also require Second-Order Intellect / Insight?

- Values-Driven Formulation of Goals
- Common-Sense Understanding of Context
- Detection of Changes of Relevance
- Ongoing Re-Evaluation of Values
- Ongoing Adaptation of Goals

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Dreyfus H.L. (1972)
Weizenbaum J. (1976)

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AI Sceptics are in Good Company



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Degrees of Autonomy

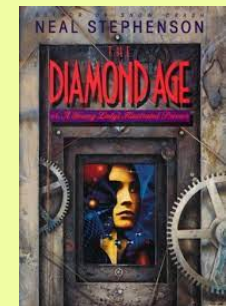
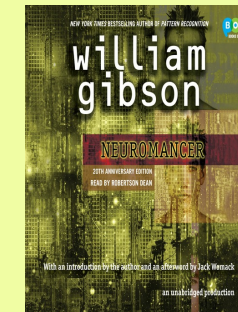
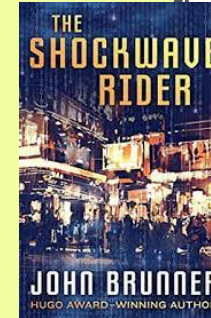
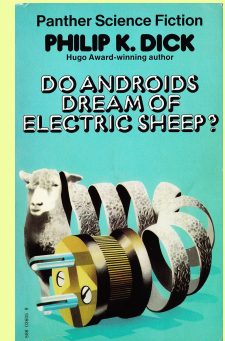
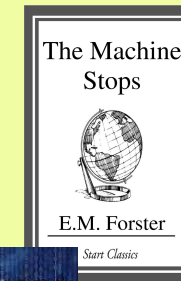
		Function of the Artefact	Function of the Human
	0	NIL	Analyse, Decide, Act
Decision Support System	1	Analyse Options	Analyse, Decide, Act
	2	Advise re Options	Analyse, Decide, Act
	3	Recommend Act	Analyse, Approve/Reject Act
Decision System	4	Notify Impending Act	Override/Veto Impending Act
	5	Act and Inform	Interrupt/Suspend/Cancel an Act
	6	Act	NIL

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Sci-Fi Foresight



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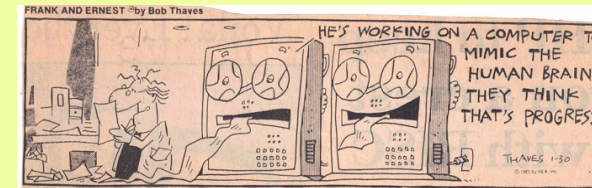
Social Impacts and Implications

- **People-Replacement**
Effect on Income Distribution
- **De Facto Delegation**
'The computer says no'
- **Unexplainability**
Accountability Undermined
- **Unfair Decisions, Actions**
Discriminatory Behaviour
- **Economic, Social Scoring**
Non-Conformist Victimisation
- **Undefendable Accusations**
Power, Information Asymmetry
- **Denial of Services, Movement and Identity**
Resentment, Violence
- **'Predestination'**
Predictive Policing

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Artefact Intelligence

Attributes We Need

- Do things well that humans do poorly, or cannot do at all:
 - Dull, Dirty, Dangerous
 - Precise, Fast, ...
- Perform functions within systems that include both humans and artefacts
- Interface effectively, efficiently, adaptably with humans, other artefacts

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Human Intelligence & Artefact 'Intelligence' → Augmented Intelligence
 AI New #1 AI New #2

Effectors & Actuators → Capability



Human Intelligence & Artefact 'Intelligence' → Augmented Intelligence
 & & &
 Effectors & Actuators → Capability
 ↓ ↓ ↓
 Human Capability & Artefact Capability → Augmented Capability

My Challenge to You

*Compare smart technology
 not against old AI, but against new AI and AC*

- What is the nature of its Artefact Intelligence?
- Is the Artefact Intelligence scientific or empirical?
- Can the artefact explain its rationale?
- Does it replace or augment Human Intelligence?
- Does it include any actuators?
- Does it replace or augment Human Capability?