

# Artificial Intelligence

09/04/2002

# Introduction

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- Many people will leave the cinema after seeing Spielberg's film AI and think all they saw is just round the corner....of course it isn't.
- But what is AI and how far has it got?
- The AI film was based on a short story by Brian Aldiss 'Supertoys last all summer long' written in 1969.

Recently, he wrote: **'Brains are far more than mere computers ... Intelligence cannot exist without consciousness. Artificial consciousness: that sounds like a taller order, and indeed it is. ... So what I believed in 1969 is what I do not believe in 2001'**.

New Scientist 09/15/01

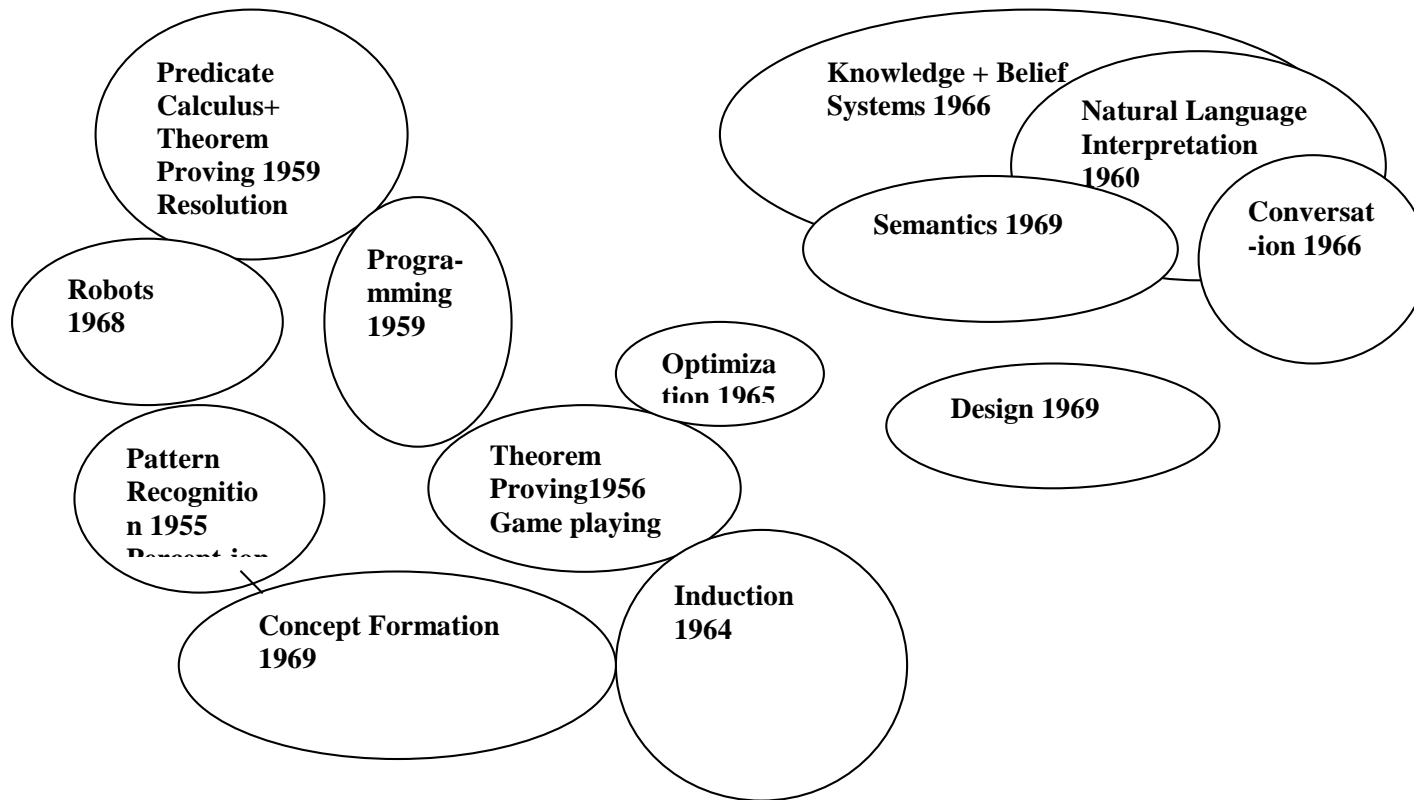
# AI is nearly as old as computing

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- 1941 Konrad Zuse, Germany, general purpose computer
- 1943 Britain (Turing and others) Collossus, for decoding
- 1945 ENIAC, US. John von Neumann a consultant
- 1946 The Logic Theorist on JOHNNIAC--Newell, Shaw and Simon
- 1956 Dartmouth Conference organised by John McCarthy (inventor of LISP)
- The term Artificial Intelligence coined at Dartmouth---intended as a two month, ten man study!

# Newell's geography of AI 1969

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# Has AI achieved anything in thirty/forty years?

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- Robots make cars in all advanced countries
- Reasonable machine translation is available for a large range of foreign web pages
- Systems land 200 ton jumbo jets unaided every few minutes
- Search systems like Google are not perfect but very effective information retrieval
- Robots cut slots for hip joints better than surgeons.
- Computer games and auto-generated cartoons are advancing at an astonishing rate and have huge markets
- Deep blue beat Kasparov in 1997 and the world Go champion is a computer.
- Medical expert systems can outperform doctors in many areas of diagnosis (but we aren't allowed to find out easily!)

# And yet the major philosopher of Cognitive Science wrote recently

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“..the failure of artificial intelligence to produce successful simulation of routine commonsense cognitive competences is notorious, not to say scandalous. We still don't have the fabled machine that can make breakfast without burning down the house; or the one that can translate everyday English into everyday Italian, or the one that can summarize texts..” (Jerry Fodor, *The mind doesn't work that way*, 2000 p.37).

You can only understand such vehement critics of AI if you realize how much it was oversold

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“It is not my aim to surprise or shock you----but the simplest way I can summarize is to say that there are now in the world machines that think, that learn and that create. Moreover, their ability to these things is going to increase rapidly until ...” (Herb Simon 1957)

But not so.....

# So what is AI, then? Do definitions help?

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- The use of computer programs and programming techniques to cast light on the principles of intelligence in general and human thought in particular (Boden)
- The study of intelligence independent of its embodiment in humans, animals or machines (McCarthy)
- Getting computers to believe something or mean something
- The pursuit of metaphysics by other means (Longuet-Higgins)
- AI is the study of how to do things which at the moment people do better (Rich & Knight)
- AI is the science of making machines do things that would require intelligence if done by men. (Minsky)
- Automating commonsense activities everyone can do.

# First AI slogan: The human-superhuman fallacy (Papert)

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- We should not in AI be implementing functions that machines can do much better than humans--- AI is not superhuman functioning (e.g. very fast arithmetic on a watch!).
- But could a machine, say, understand language better than us?
- Does that very idea make any sense?

Consider this:

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NO BRAIN INJURY IS TOO TRIVIAL TO  
BE IGNORED

What does this mean ... is it

- A\* treat all brain injuries
- or
- B\* ignore all brain injuries

- But a computer would have no problem with the Brain sentence ... why?

One of major divisions in AI (and you can see it in those definitions above) is between

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- Those who think AI is the only serious way of finding out how WE work (since opening heads doesnt yet tell you much)  
and
- Those who want computers to do very smart things, independently of how WE work.

### **Cognitive scientists vs. Engineers.**

- Think about a reading computer that read English (very well) from Right to Left!
- What follows, if anything, from its success?

There is another group separate from the Cognitive Scientists and Engineers we just distinguished: it is those who are interested in attributing mental capacities to machines ... and this group could overlap with either of the first two.

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- Their interest is the mentality of machines, not the machine-likeness of humans. Here is Dennett, the major US philosopher concerned with AI:
  - In a recent conversation with the designer of a chess-playing program I heard the following criticism of a rival program: It thinks it should get its queen out early. This ascribes a propositional attitude to the program in a very useful and predictive way, for the designer went on to say one can usually count on chasing that queen around a board. But for all the many levels of explicit representation to be found in that program, nowhere is there anything roughly synonymous with ‘I should get my queen out early.’ explicitly tokened.

For Dennett machines and people are in roughly the same position: we have a language for talking about how they work and why, which he calls FOLK PSYCHOLOGY---i.e. the propositional attitudes BELIEVE, INTEND etc.

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- But he says that in neither case should we assume those correspond to anything real inside, in the brain or the program.