# What computers can and cannot do in healthcare

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In some ways healthcare is not a natural starting point for the application of AI.

- the complexity of human biology
- the complexity of pathology
- the interconnected nature of hospitals and of healthcare systems more generally
- the importance of human factors in the uptake of new technologies,
- the role of human behaviour in determining human health
- and the presence of significant vested interests in the healthcare system

Mean that the use of AI in healthcare is extremely challenging

In another sense its an obvious starting point.

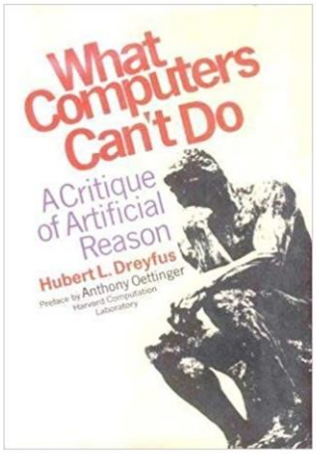
- It's important
- there's lots of data
- there's money to be made.

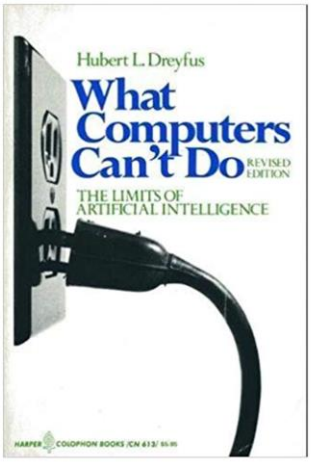
**What can AI do now?**

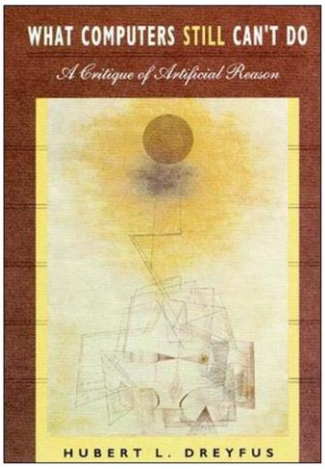
**What will AI be able to do soon?**

**What will AI not be able to do for the foreseeable future?**

It is important to understand what computers can and cannot do in healthcare
One of my take-home messages is going to be that the things they do well but not perfectly are especially problematic



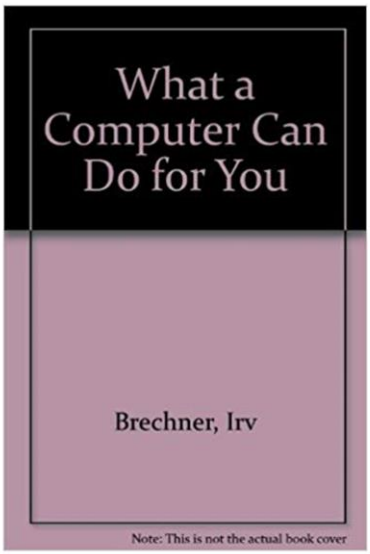

**What computers can't do (intro)**

I want to emphasise that I'm not a Luddite and that I think there is enormous potential for AI to make a valuable contribution to healthcare

I am also conscious that claims about what computers cannot cannot do aren't obviously within the expertise of philosophers. As these book covers show the history of such claims involves extensive backing down from the philosophers. Engineers have a habit of working out ways to make computers do the things that people claim they can't.

Nevertheless, philosophy has something to contribute by way of reflecting upon the role that values play in healthcare and by analysing competing claims made in the engineering and medical literatures

An important caveat for the purposes of this presentation is that I'm only considering realistically available AI. In particular, that means that I'm not going to spend any time talking about what sentient machines might be capable of contributing to healthcare. That's because we really have no idea about how to build sentient machines.



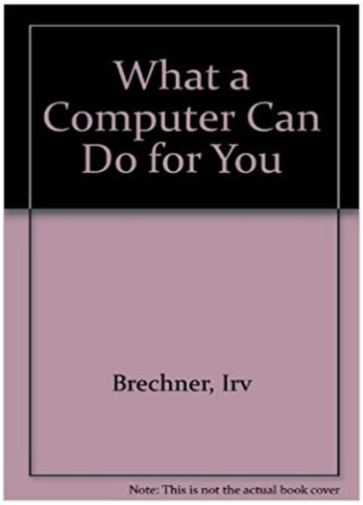


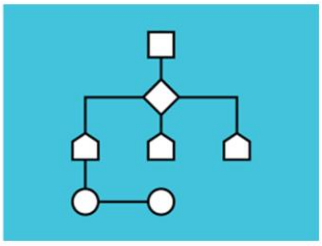
**What computers can do**

**Research**

- Drug design
- Health informatics/Data mining patient outcomes
- Evidence based medicine

They can bring new sources of data to healthcare decisions (for instance social media scraping)

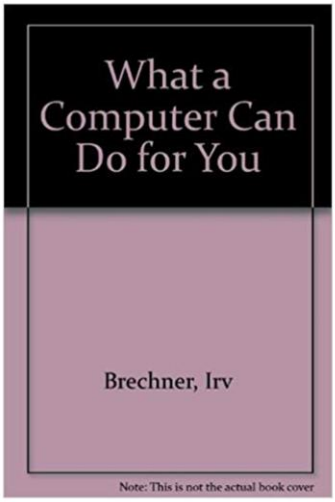


**What computers can do…**

**Some role in diagnosis and treatment choice**
More by way of suggestion for the moment

Important to acknowledge that AI isn't magic here and that findings based upon AI still rely on having good sources of data, a good understanding of data, good understanding of causal relations, and good experimental design. Still lots of role for human error…







**In practice one of the first places that AI is likely to contribute to health care is by having an impact on business practices**

- Insurance
- Managed care
- Billing and debt recovery systems

Not necessarily places where patients are going to be enthusiastic about the applications of AI

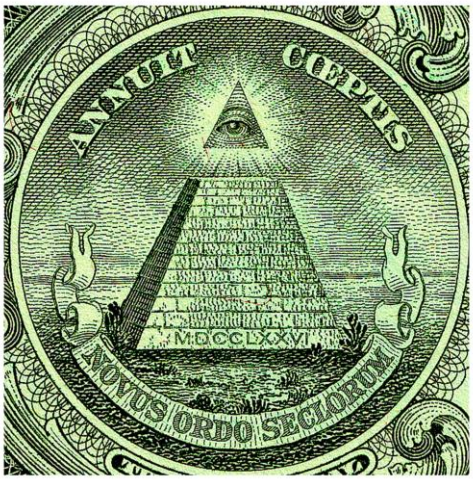
**Some of the dangers**

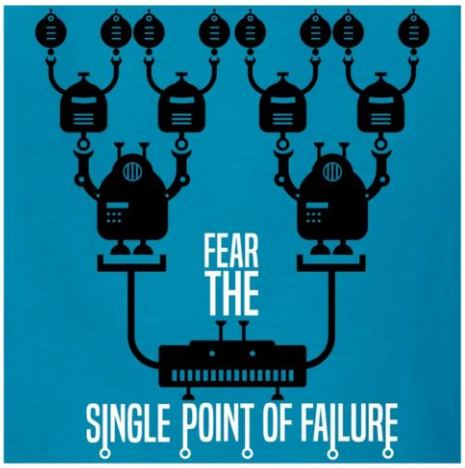
*Threats to quality of care*

- Healthcare practitioners may only pay attention to the lessons of the data which is drawn from population level studies and lose sight of the individual patient
- The dangers of fetishisation of data and measurement
- Damage to the relationship between carer and patient
- Automation bias
- Loss of skills and expertise amongst the medical profession

*The threat to explainable medicine*

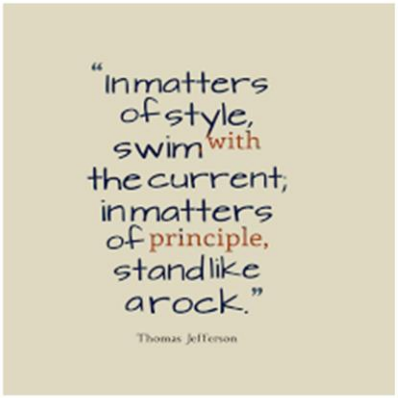
AIs tend to be "black boxes" such that human beings often can't explain precisely why the system has reached the decision that it has. This makes it difficult to trust them even when they are reliable. In some contexts we also owe each others explanations and the role of AI in decision-making may make it difficult to justify treatment decisions to patients.




**More dangers**

- Centralisation of power both within institutions and across the healthcare sector
- Overreliance on particular AI systems may create a single point of failure




**What computers can't do at all**

- Understand patients
- Care for patients

Yet these are absolutely central to good outcomes in important areas of healthcare practice, especially around chronic disease

I don't think computers can make moral decisions, which are more central to medicine than is generally recognised. The moment we have to take account of patients values in advising them in relation to treatment, AI is going to fail

More controversially, I don't think machines can provide moral reasons for action. Would you turn off your father's life support on the advice of Google Assistant? Machines can't stand behind their claims in the way that people can because they don't have the right sorts of relationships to us and because they can't suffer or feel embarrassment or remorse

**What computers can't do well….**

- Deal with human bodies

  Dexterous manipulation in unstructured environments is beyond the capacity of robotic systems and is likely to remain so for a long time. That means that actual medical treatment will often require human beings. It also means that significant parts of diagnosis and examination will still need to be carried out by human beings

  But note the potential of wearables, remote sensors, scans, and online interfaces to gather (some) diagnostic data…

  There is a real danger here that healthcare will gravitate towards data that can be gathered by machines at the expense of more rigourous patient interviews or physical examinations

- Relate to and motivate patients

  Interpersonal relationships and nurse and physician expectations arguably

play an important role in motivating patients to change behaviour in ways necessary to improve their health. I doubt AI can do this effectively

But note enthusiasm for ehealth apps that try to change behaviour and also for chat bots and virtual avatars

Again, there is a significant danger that such innovations might be rolled out at the expense of maintaining opportunities for human contact

**Cyborg medicine!**
"Human plus AI" teams

However note the significant danger in the longer term that AI might displace human beings from large areas of medical practice

- For economic reasons
- Because of deskilling
- Because of a tendency to emphasise that which can be measured at the expense of that which is important

We need to ensure that we defend the caring relationships that are essential to the practice of compassionate medicine….

Sparrow, R. 2016. Robots in aged care: A dystopian future?
*AI and Society* 31(4): 445-454.

Sparrow, R., and Sparrow, L. 2006. In the hands of machines? The future of aged care.
*Minds and Machines* 16: 141-161.

Sparrow, R. 2004. The Turing triage test.
*Ethics and Information Technology* 6(4): 203-213.

Sparrow, R. 2002. The march of the robot dogs.
*Ethics and Information Technology* 4(4): 305-318.

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