AN APP A DAY KEEPS THE DOCTOR AWAY…

AIs that diagnose diseases are starting to assist and replace doctors

Digital doctors are already in use, but there are big questions about how they work. Are we ready for the rise of AI healthcare? - *New Scientist*.

ARTIFICIALLY intelligent doctors are here. Thousands of people in the US and Europe have already been screened by an AI system for detecting diabetes-related blindness without the involvement of a human doctor. The system was approved last year after it **outperformed** trained professionals in a **trial**.

More AI tests will **kick off** in the next few years. They look set to improve the diagnosis of many conditions, from breast and lung cancer to broken wrists and glaucoma. Any hospital that can afford the necessary equipment will soon be able to offer the same standard of diagnosis.

This is the vision, at least. Yet if we rush to adopt such systems prematurely, they could prove **harmful**. "I'm **bullish** about the ability of AI to do good," says Amol Navathe at the University of Pennsylvania. "But it's harder than people think."

Take IBM Watson, the AI system famous for winning the *Jeopardy* TV quiz. It was supposed to revolutionise healthcare by using its natural language processing skills to analyse vast amounts of medical literature to provide more accurate diagnoses and recommend better treatments.

But it has been claimed that the cancer system, IBM Watson for Oncology, sometimes made incorrect and unsafe recommendations – which weren't followed – and that some doctors are abandoning the system after it didn't live up to expectations. "In my view, it's a failure," says cardiologist Eric Topol, author of *Deep Medicine*, a book on AI in healthcare.

IBM has **disputed** these claims. "Can Watson help oncologists make better decisions for their patients? Repeatedly, the answer has proven to be a resounding 'yes'," wrote IBM executive John Kelly in a blog post.

But Navathe says he and others have found that you can't just feed a whole lot of data to an AI and expect it to produce brilliant **insights**, because of inherent biases in data sets. "The data that they are seeing is filtered through the eyes and judgement of humans," he says.

For instance, an AI fed hospital test data might seem good at predicting what disorder a patient has long before the results come back. But because doctors order tests based on what they suspect is wrong with a person, what the system might really be doing is using its knowledge of which tests have been ordered to work out what doctors suspect the problem might be, which isn't helpful.

Some of the **pitfalls** are even more subtle. Navathe has worked on AI systems for spotting sepsis, a sometimes deadly immune response to infection. The aim is to predict early who might die to give more time to save lives.

The trouble is, those who die often have little chance of survival because of other health issues. So even if an AI can identify these people, if doctors follow its advice, they might end up aggressively treating people who should instead be getting palliative care to ease their final days.

Perhaps the biggest issue is ensuring that people really do benefit. While we tend to assume that the more tests done the better, this isn't the case.

When it comes to breast cancer screening, for instance, a 2013 study concluded that for every life saved, 10 women had unnecessary treatment and 200 suffered years of needless stress. Such findings have led some to argue that mass mammogram screening should be abandoned. "We need to be careful about overdiagnosis," says Lehman.

Doctors spend so much time looking at data that it eats into their time with patients

Similar problems might come from personal tech. Take Apple's latest watch, with an ECG function that can identify abnormal heart rhythms with the help of an AI algorithm. Many people have irregular heart rhythms without symptoms. These people might be put on unnecessary drugs or even have needless surgery.

Navathe thinks regulators should demand evidence that such tests really benefit people. Earlier this year, he and his colleagues called for algorithms to be **assessed** on the basis of criteria such as extending people's lives. Where systems involve adaptive algorithms that learn on the go, there need to be regular audits.

He is concerned that regulators are applying lower standards to algorithms than to drugs or devices. "Because they are not invasive, they seem lower risk." But, he says, if doctors are basing treatments on AIs, the same standards need to be applied.

Even those pointing out the problems with AI, like Navathe, are optimistic about the long-term prospects, though (see "medical monitors" below). AI really does look set to make medicine better, more equal and maybe even more human.

Topol thinks AI could free doctors from being glorified "data clerks", enabling them to spend more time with the people who need their help. Many studies show that outcomes are better when patients have a relationship with their doctors, he says.

But it will only happen if doctors stand up against the managers and pen-pushers, he says. "It's going to take unprecedented action."

Medical monitors

The AI-based medical systems being rolled out are essentially ways of diagnosing diseases faster and more accurately. As such, they fit neatly into the existing model of healthcare.

But some people think AIs will end up transforming the nature of healthcare. Instead of going to see a doctor only when we are sick, our health will be constantly assessed by AIs, based on data from devices such as smart watches along with your genome sequence. These AIs will alert us to potential problems before we are aware of them ourselves.

At least this is the vision of companies like Babylon Health, maker of an app for connecting people to doctors via an AI triage system. "The system will become part and parcel of your life, constantly monitoring your health," says Saurabh Johri, the firm's chief science officer. And with millions of people using systems, disease outbreaks could also be detected and tracked in real time, he says.

But this vision is far from becoming reality. Babylon's AI is essentially a chatbot designed to help assess people's symptoms, and so far it isn't clear that it outperforms people. In fact, not everyone is convinced these sorts of systems can even be described as AI. "I would view them as productivity tools," says Amol Navathe at the University of Pennsylvania.

AIs that diagnose diseases are starting to assist and replace doctors
Reading Comprehension

A. Answer in your own words. Do not copy from the text.

1. Sum up the benefits and limits of the rise of AI doctors.

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2. According to which major criterion should AI doctors be regulated? To what purpose?

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3. "But it will only happen if doctors stand up against the managers and pen-pushers, he says. "It's going to take unprecedented action." How do you understand the journalist's last statement? Do you agree with him?

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B. RIGHT or WRONG? Circle the good answer. Justify by quoting from the article 'specific words/phrases + line number(s))

1. There is no danger whatsoever in considering AIs as reliable and infallible systems, providing accurate and better medical diagnoses.
   RIGHT/WRONG

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1. Doctors and entrepreneurs concur in defending AIs as the future of healthcare.
   RIGHT/WRONG

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2. Mass screening programmes proved to provide positive outcomes.
   RIGHT/WRONG

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C. Choose the closest equivalent. Circle the right answer.

1. ll. 25-26: "(…) what the system might be really doing is using its knowledge of which tests have been ordered to work out what doctors suspect the problem might be (…).

a. It is very likely that the system might be using former tests to analyse what the doctors' problem might be.
b. Based on what it knows of the type of tests which have been previously ordered by doctors, the system figures out what the problem might be.
c. Perhaps, the system is using what doctors know about the tests to deduce what the problem is.

2. ll. 48-49: "He is concerned that regulators are applying lower standards to algorithms than to drugs or devices."

a. He is concerned that higher controlling standards are required for algorithms and drugs or devices as well.
b. The same regulatory strategy is indiscriminately being applied to algorithms and drugs or devices, which is quite worrying for him.
c. He is worried that algorithms are not being controlled as strictly as drugs or devices by regulators.

D. Rephrase the underlined parts of the sentence in your own words.

1. l. 15: "(…) – and that some doctors are abandoning the system after <u>it didn't live up to their expectations</u>."

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2. ll. 57-58: "But it will only happen if doctors <u>stand up against the managers and pen-pushers.</u>"

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3. l. 18: "Repeatedly, the answer <u>has proven to be a resounding 'yes'</u>."

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E. Match each word (in bold letters in the text) with a synonym

1. outperform	a. destructive, hurtful
2. trial	b. observation, idea
3. kick off	c. do better than
4. harmful	d. evaluate, rate
5. bullish	e. trap, hazard
6. dispute	f. test, test-run
7. insight	g. contest, deny
8. pitfall	i. optimistic
9. assess	j. start

1	2	3	4	5	6	7	8	9

F. **Essay: Choose one of the subjects and discuss** (250-300 words):

1. What are the ethical issues raised by AI?

2. Is AI fair?

Could AI do your job?
Listening Comprehension

1. **Fill in the blanks:**

"Do you think there are people today who believe they are too _____ _____ to be replaced by AI, so, _____, doctors, lawyers, me… _____, journalists?"

2. Why does Daniel Susskind – the interviewee - think that this is a mistake?

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3. **Fill in the blanks:**

"'But we're always gonna need people to have _____ _____ that only a human can _____ surely. So, with the doctors, it's all about their _____ _____ as much as it is for me as a journalist, it's about the contacts so I _____ the relationships I have with people and build with people.'
'Hmmm… I think it's one of the _____ that is hardest to _____.'"

4. Name the field of computer science dedicated to design systems that can both detect and respond to human emotions and affects:

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5. **Fill in the blanks:**

"I think - and this is in no way to sort of to _____ or _____ the importance of _____ and the value of _____ _____ - but I think there is an extent to which and particularly _____ -_____ professionals _____ the importance of these things in their work.'

6. What three arguments does the 'boisterous tax accountant' put forwards to contradict/ gainsay Daniel Susskind?

A. ……

B. ……

C. ……

7. **TRUE or FALSE? – Quote words or phrases to justify your answer.**

According to Daniel Susskind:

People come to see their tax accountant to avoid paying late filing penalties.
☐ TRUE ☐ FALSE

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The tax accountant helps people make sure they comply with tax laws in filing their tax return in the most efficient way.
☐ TRUE ☐ FALSE

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People would sooner see their tax accountant in person rather than file their tax return online.
☐ TRUE ☐ FALSE

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8. In which areas, can interpersonal interactions be considered as essential and beneficial? (Two answers).

A. ……

B. ……

9. Journalists are now being challenged by automated systems that more effectively generate various types of reports. Name the four types of reports mentioned:

   A. ……

   B. ……

   C. ……

   D. ……

10. According to Daniel Susskind, these automated systems are now somehow compatible with journalism. Explain why.

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11. How is it now possible for teachers in China to detect whether their students in class are bored?

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12. Fill in the blanks:

"It goes to this point that there are now systems that can detect human emotions and can read human expressions more _____ that we are able to."

13. TRUE or FALSE? – Quote words or phrases to justify your answer.

These new systems detecting human emotions outperform leading lawyers in courtrooms.
□ TRUE □ FALSE

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14. How do people feel regarding the introduction of this new technology in a classroom? Name the technology in your answer.

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15. Why is automation going to gain more and more control over our jobs?

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16. What kind of systems are used in the US in the criminal justice system?

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17. Fill in the blanks:

“But in how we’d feel about a system being used to _____ life sentences even if it can _____ more _____ and _____ based on the law than a human _____. I think many people would feel really uncomfortable.”