SEVENOAKS SCHOOL

YEAR 9 (13+) SCHOLARSHIP

May 2023
for entry in September 2023

GENERAL PAPER

Your Name: _____

Your School: _____

Time allowed: 1 hour

Equipment needed: Pen, pencil, lined paper, eraser.

Information for candidates:

1. Write your name and school on this page.
2. Write your answers on the **separate paper** provided. Please put your name on all the sheets of paper you use.
3. There are two sections, section A and section B. Answer **all** the questions in section A and choose **one** question from section B.
4. The paper will be marked out of 30. Section A and Section B are worth 15 marks each.

SECTION A [15 Marks]

Is advanced Artificial Intelligence (AI) actually smart? 'No, it's using the same system as a pigeon', study finds

Adapted from an article on Sky News, Tuesday 7 February 2023 16:00, UK

How intelligent is Artificial Intelligence (AI)? Will we one day get to a situation where AI can outsmart humans? These questions are frequently debated by scientists, philosophers, politicians and science-fiction writers.

In a paper published last year, titled, "When Will AI Exceed Human Performance? Evidence from AI Experts," AI researchers predicted that there is a 50% chance that within 45 years "human level machine intelligence" (HLMI) will occur.

However, new research suggests that whilst there may still be differences between AI and human intelligence, there are currently many similarities between AI and pigeon intelligence. Having undertaken a deep study into the inner workings of the bird's brain, researchers from the University of Iowa found that the "brute force" techniques they use to learn share similarities with AI.

Much like AI is taught to identify patterns and objects recognised by humans, the team at the University of Iowa discovered pigeons rely on a repetitive, trial-and-error approach. They tested this by showing pigeons a range of stimuli, each with a different pattern. The pigeons then had to categorise the stimuli by pecking one of two buttons. They had to do so based on characteristics like line width, line angle, and how the patterns were arranged. A correct answer yielded a tasty pellet, but an incorrect response yielded nothing. Eventually, the pigeons memorised enough of them to score almost 70%.

"You hear all the time about the wonders of AI, all the amazing things that it can do," said Professor Ed Wasserman, from the university's psychology and brain sciences department. "It can beat the pants off people playing chess, or at any video game, for that matter. How does it do it? Is it smart? No, it's using the same system or an equivalent system to what the pigeon is using here."

This way of learning through recognition is known as associative learning, whereas humans usually rely on something called declarative learning.
For example, most of us don't need to touch a hot stove to know that it will hurt - whereas something that relies on associative learning would.

Pigeons are 'AI masters'

Hailing pigeons as "like AI masters", Prof Wasserman said: "People are wowed by AI doing amazing things using a learning algorithm, much like the pigeon. When people talk about associative learning in humans and animals, it is discounted as rigid and unsophisticated."

Of course, where computers can go beyond pigeons is in their enormous memory and storage capabilities, allowing them to store and process far more information than a pigeon brain could.

But at their core, the way they learn is much the same.

"They're using a biological algorithm, the one that nature has given them," added Prof Wasserman. "Whereas the computer is using an artificial algorithm that humans gave them." The peer-reviewed study has been published in the journal *Current Biology*.

Questions

1. Explain what the differences are between associative and declarative learning and give an example of each.

[2 marks]

2. Professor Ed Wasserman concludes that we should see AI as less 'smart' than we think as it uses the same system of learning as pigeons. To what extent do you agree with his conclusion?

[5 marks]

3. As a result of reading this article what do you think about:

   a) The similarities or differences between AI and humans?
   b) The similarities or differences between AI and animals?
   c) The similarities or differences between humans and animals?

[8 marks]

Continued…

SECTION B [15 marks]

Choose **one** of the following questions to respond to. You should look at arguments on both sides and refer to real life or hypothetical examples to demonstrate why your points are both true and important.

1. To what extent do you think that we should boycott the work of artists who have been convicted of crimes?

2. To what extent do you think that we can ever be certain about anything?

3. To what extent do you think that human beings are naturally selfish?

4. To what extent do you think that some things are universally right and universally wrong?