Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 2 Digital Technologies 2024

91898 Demonstrate understanding of a computer science concept

EXEMPLAR

Achievement

TOTAL 03

INSTRUCTIONS

There are three questions in this assessment, on the topics of:

- computer security (page 3)
- error control (page 9)
- artificial intelligence (page 15).

Choose only ONE question to answer. Note that parts (c), (d), and (e) of each question include options for you to choose from.

Read all parts of your chosen question before you begin. Do not repeat your response in different parts of the question.

Candidates must complete their assessments individually under teacher supervision, in accordance with the NCEA Assessment and Examination Rules and Procedures. The material submitted for assessment must be the candidate's own work.

Candidates are not permitted to access any resources (either in hard copy or online) other than those supplied in the assessment itself.

Schools, teachers, and candidates are not permitted to share or discuss the assessment or their assessment responses with any other schools, teachers, or candidates until after the final date for submission (30 October 2024).

The use of chatbots, generative AI, paraphrasing tools, or other tools that can automatically generate content is not permitted and material generated by these tools should not be submitted as part of the candidate's work.

(Assessment Specifications, NZQA 2024)

OR: **QUESTION THREE: Artificial intelligence (AI)**

(a) (i) How could shops use AI in self-checkouts?

Shops could implement Artificial Intelligence (AI) by adding facial recognition and hearing recognition into their self-checkouts.

Facial recognition

Shops could implement facial recognition into their self-checkouts, for the purpose of helping customer's, as the AI will be able to detect who among the customers, is distressed and not interacting with the machine through body language, to alert staff they need assistance. Another way facial recognition could be implemented into shops is by alerting staff if a customer has not payed for their products and/or and has left the store by keeping an image of the customer and matching it with the customers leaving by car through their security cameras, so they are able to view their liscense plate and inform the customer of their mistake or in serious situations, alert the authorities.

Hearing recognition

Another way shops could implement AI is hearing recognition in the form of a chat service, similar to apple's 'siri', in the self checkout, specifically for disabled people who find it difficult to interact with the machine. Customers would be able to converse with the AI to add, remove items, etc, which would support all audiences but more so those who are disabled.

(ii) Explain at least TWO advantages or challenges of shops using AI in self-checkouts.

Two challenges to the preformentioned Artificial Intellegince (AI), are the following; discrimination and volume.

Cons of Facial recognition

Using the predormentioned scenario regarding a person who doesn't pay for whatever reason will be able to match the persons face to the security cameras within the parking lot to then charge them for stolen goods. The cons with this AI is discrimination, the AI would have to match certain characteristics to those in and/or outside the shop. The AI would match characteristics such as skin color, hair texture/style, accessories, etc, to another customer, in which successful would be a great asset, though if the AI matches it to another person entirely, could be viewed as racism, etc. Which would then cause upset and disturbance among customers, giving the shop a bad rep, therefore reducing sales, and so on.

Cons of hearing recognition

The chat service relies heavily on the volume of the area, if the volume is too loud, it could cause difficulty for the Artificial intelligence (AI) in being able to understand you which could cause the AI to mishear you or completely ignore you, in which case, it would be much better use the self-checkout manually, which defeats the purpose of the AI. This also cause an increase in complaints and disturbance among the customers.

Refer to the image below of the One NZ chatbot. When answering part (b), your answers must be based only on what you see in the screenshots.

(b) (i) How effective is this chatbot in helping customers?

The intended use of the chatbot, 'Hana', is to help customers, mainly to provide information regarding services One NZ has to offer.

In the initial questions "What is prepay?", Hana responds with a brief and relevant answer, yet in the following question "What plans are there?", (which Hana should be expected to know) Hana responds as if they do not fully comprehened the question and provides a link to a page in their One NZ website where their question seems most relevant. Hana continues to repeat this process of responding to the questions by redirecting the customer to the One NZ website, though the following questions that were asked were a lot less relevant to Hana's intended use. The questions: "How do I set up my wifi?" and "I need a power cable." is not neccesariliy relevant as Hana's purpose is to help customers, though specifically around services within One NZ.

With the information given, the chatbot, 'Hana', does not seem very effective at helping customers, specifically in how it provides information. Hana was able to inform customers about the meanings of terms yet does not seem able to go beyond that. When Hana is faced with a question that they are expected to know, they provide a link to a roughly relevant page in the One NZ website. This defeats the purpose of using the chatbot as a customer would be able to get more

information just by contacting an in-store employee or reading specific information from the website.

(ii) Is this an example of weak AI or strong AI? Explain why.

With the given information, the chatbot 'Hana' is an example of a weak AI, due to their limited capablilty of answering questions and redirecting the customer when faced with a 'difficult question'.

Questions such as "What plans are there?" are exactly the type of questions the chatbot should be capable of answering, yet when Hana was faced with the question, they redirected the user to the companies website. Redirecting users to their company's website is a response, generally all chatbots have if they are unable to answer or don't understand, yet in Hana's case, they redirected the user to a question, Hana should have been fully capable of answering as its relevant to her purpose and information they should have access to.

In conclusion, Hana is a weak AI due to her inability to answer relevant questions, though if provided with more screenshots of varied questions the answer could change as only four screenshots were provided with several of the questions not being very relevant to Hana's intended use.

(c) Choose ONE of the following to answer:

- Explain how the Turing test is used to evaluate chatbots.
  How relevant is the Turing test with the current generation of AI?

  OR

- Explain the common methods of evaluating an AI product.

Choice (copy and paste below):

- Explain how the Turing test is used to evaluate chatbots.

How relevant is the Turing test with the current generation of AI?

Response:

The Turing test is a method of evaluating how chatbots converse and provide information to people.

The Turing test is a method that requires a group of two who are each given different roles, with the choices being judge and human/AI, they are then to separate themselves so they are unable to see eachother's screen or body language, the judge therefore asks a series of questions for two rounds via a form of communication such as, gmail, to the human/AI in which the human/AI either copy and pastes the Judges question into a chatbot and uses the chatbot's response for a round or answer as normal. After the rounds are over they come together and discuss which round the judge thought was the AI or human, the human/AI then reveals the answer and they then discuss the flaws and pros of the AI and then fixes or improves them accordingly.

The Turing test is used to discern the pros and cons of a chatbot in order to fine tune it, by reviewing over the conversation.The Turing test is relevant in the current generation of AI as it is currently being used in present day, this is due to the effectiveness of the Turing test in how it discerns the pros and cons of the chatbot, particularly in how it converses and informs humans.

(d) Choose ONE of the following to answer:

- How can AI be future-proofed to ensure its successful adoption?

  OR

- Explain, giving examples, known ethical issues that have occurred in the recent development of large language models, such as ChatGPT and Google Bard.

Choice (copy and paste below):

- Explain, giving examples, known ethical issues that have occurred in the recent development of large language models, such as ChatGPT and Google Bard.

Response:

A widely known ethical issue is the misuse of ChatGPT.

In particular the miuse of ChatGPT by students, as a great percentage of students use ChatGPT to cheat on assessments, exams, etc, which is a major issue, as, if students continue to cheat, they'll be able to meet job requirements without possessing the knowledge to support them in that field.

for example if a student was studying to become a doctor yet used ChatGPT or the like to cheat on their exams they would end up becoming a doctor, yet they would pose a threat to the well being of patients as they would not possess the required knowledge to perform well. This applies to many jobs such as, doctors, tradies, etc.

If you do not posses the required information to execute an action and proceed to execute that action, you will pose a threat to your customers, peers and potentially yourself.

(e) Choose ONE of the following to answer:

- What are 'AI hallucinations' and why do they occur? Using examples, discuss the issues these could cause.

  OR

- Explain 'supervised learning' and 'unsupervised learning' when training AI.
  Discuss, with examples, problems or issues that could result from incorrectly choosing 'unsupervised learning'.

In your response, ensure that you demonstrate clear links to computer science concepts.

Choice (copy and paste below):

- Explain 'supervised learning' and 'unsupervised learning' when training AI.

Discuss, with examples, problems or issues that could result from incorrectly choosing 'unsupervised learning'.

Response:

Supervised learning is actively fixing the AI's flaws in the way it converses to humans, the relevancy of the information it provides,how it delivers that information, etc. Unsupervised learning is allowing the AI to act on it's own and improve itself. The flaws of unsupervised learning is that people will not know the accuracy, relevancy or reliability of the information it provides, and the way it converses with humans could be very flawed and potentially viewed as demeaning to others.

Achievement

Subject: Digital Technologies

Standard: 91898

Total score: 03

Q	Grade score	Marker commentary
Artificial intelligence (AI)	A3	The candidate provided more than one suitable use for AI in self-checkouts, explaining the advantages retailers would have in loss reduction and a benefit to the user. The candidate chose to give two suitable challenges to AI. The candidate went through the responses of the chatbot and described what occurred, and then provided a suitable summary giving a basic justification of why this is a weak AI. The candidate gave a reasonable explanation of the Turing test and a justification for why they believed it was still suitable. The question asked for examples (plural). The candidate gave one suitable ethical issue, so this response did not meet the requirement for a higher grade. Overall, the candidate produced good answers to the questions. To gain a higher grade, they would have needed to read the questions carefully and answer them in greater detail, and with the required responses.