CSE140: Introduction to Intelligent Systems (Winter 2023)
Quiz - 2

Date of Examination: 10.04.2023 Duration: 30 mins Total Marks: 15 marks

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Instructions –

- Attempt all questions.
- MCQs have a single correct option.
- State any assumptions you have made clearly.
- Standard institute plagiarism policy holds.
- No evaluation without suitable justification.

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1. Which of the following is an example of visual data used in medical imaging? **[1 mark]**

    1. A video sequence of a surgical procedure.
    2. A depth image of a patient's body.
    3. A CT scan of a patient's brain.
    4. Views from multiple cameras of a patient's body.

    3. A CT scan of a patient's brain

2. What is the purpose of the backward pass in a neural network? **[1 mark]**

    1. To update the weights of the neural network.
    2. To propagate the input data through the network and generate an output.
    3. To calculate the error between the output and the ground truth.
    4. None of the above.

    1. To update the weights of the neural network.

3. What is a major barrier for many organizations and researchers in accessing and utilizing Large Language Models (LLMs)? **[1 mark]**

    1. Lack of understanding of the technology behind LLMs.
    2. Limited availability of LLMs in the market.
    3. Incompatibility of LLMs with existing computational infrastructure.
    4. High cost of computational resources and large datasets required for LLM training.

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4. Give an example of a scenario where you will prefer to use an unsupervised machine learning technique. **[2 marks]**

    Marks to be given if the scenario given by the student is feasible to apply unsupervised learning techniques to solve the problem.

5. What is the main difference between supervised and unsupervised learning in machine learning? Provide examples of each type of learning? **[2 mark]**

   1 mark for What is the main difference between supervised and unsupervised learning in machine learning and 1 mark for examples of each type of learning

6. Given some facts and clauses written in prolog language:

   Facts

   faster(horse, hare).
   faster(hare, dog).
   faster(dog, cat).
   faster(rat, cat).
   faster(cat, donkey).
   faster(hare, turtle).
   faster(dog, donkey).

   A.) Answer the following queries (either Yes/No) along with their reasons: **[3×2=6 marks]**

   - ?- faster(hare, donkey).
   - ?- faster(rat, cat).
   - ?- faster(cat, dog).

   B.) After addition of the following clause in the program, answer the given query in Yes or No along with its reason: **[2 mark]**
   Clause: is_faster(X,Y) :- faster(X,Y).
   is_faster(X,Y) :- faster(X,Z), is_faster(Z,Y).
   X, Y, Z are variables and constants start with lowercase letters.
   Query: ?- is_faster(horse, donkey).

   1 mark for correct answer (yes or no) 1 mark for correct reason.
   Answer: A.) I. No (query fails to find relevant fact)
   II. Yes
   III. No (query fails to find relevant fact)
   B.) Yes.
   Following facts are observed to be True or Yes using backtracking:
   faster(dog, donkey). → faster(hare, dog). → faster(horse, hare).
   OR
   faster(cat, donkey). → faster(dog,cat). → faster(hare, dog). → faster(horse, hare).