EXERCISE

A. Multiple-choice questions (MCQs):

1. Who is often referred to as the "Father of AI"?
    a. Alan Turing
    b. John McCarthy
    c. Marvin Minsky
    d. Herbert A. Simon
2. In which year was the term "Artificial Intelligence" first used by John McCarthy?
    a. 1930
    b. 1955
    c. 1970
    d. 2000
3. What does the term "Data is the new oil" imply?
    a. Data is as valuable as oil.
    b. Data is used as fuel for machines.
    c. Data is a non-renewable resource.
    d. Data and oil are unrelated.
4. Divya was learning neural networks. She understood that there were three layers in a neural network. Help her identify the layer that does processing in the neural network.
    a. Output layer
    b. Hidden layer
    c. Input layer
    d. Data layer
5. Which category of machine learning occurs in the presence of a supervisor or teacher?
    a. Unsupervised Learning
    b. Reinforcement Learning
    c. Supervised Learning
    d. Deep Learning
6. What does Deep Learning primarily rely on to mimic the human brain?
    a. Traditional Programming
    b. Artificial Neural Networks
    c. Machine Learning Algorithms
    d. Random Decision Making
7. What is the role of reinforcement learning in machine learning?
    a. Creating rules automatically
    b. Recognizing patterns in untagged data
    c. Rewarding desired behaviors and/or penalizing undesirable ones
    d. Mimicking human conversation through voice or text

8. Which AI application is responsible for automatically separating emails into "Spam" and "Not Spam" categories?

a. Gmail
b. YouTube
c. Flipkart
d. Watson

B. Fill in the Blanks:

1. To determine if a machine or application is AI-based, consider its ability to perform tasks that typically require _____ intelligence.
2. Artificial intelligence (AI) enables a machine to carry out cognitive tasks typically performed by _____.
3. Supervised, unsupervised, and reinforcement learning are three categories of _____.
4. _____ is a subset of artificial intelligence that is entirely based on artificial neural networks.
5. Machine learning can be used for online fraud detection to make cyberspace a _____ place.

C. True or False:

1. Chatbots like Alexa and Siri are examples of virtual assistants.
2. Supervised learning involves training a computer system without labeled input data.
3. Unstructured data can be easily analyzed using traditional relational database techniques.
4. Deep learning typically requires less time to train compared to machine learning.
5. Machine learning is not used in everyday applications like virtual personal assistants and fraud detection.

D. Short Answer Questions:

1. How is machine learning related to AI?
2. Define Data. List the types of data.
3. Define machine learning.
4. What is deep learning, and how does it differ from traditional machine learning?
5. What do you mean by Reinforcement Learning? Write any two applications of Reinforcement Learning at School.
6. How do you understand whether a machine/application is AI based or not? Explain with the help of an example.

E. Case-study/Application Oriented Questions:

1. A hospital implemented an AI system to assist doctors in diagnosing diseases based on medical images such as X-rays and MRI scans. However, some patients expressed concerns about the accuracy and reliability of the AI diagnoses. How can the hospital address these concerns?

ANSWERS

A. Multiple-choice questions (MCQs):

1. b. John McCarthy 2. b. 1955 3. a. Data is as valuable as oil
4. b. Hidden layer 5. c. Supervised Learning 6. b. Artificial Neural Networks
7. c. Rewarding desired behaviors and/or penalizing undesirable ones
8. a. Gmail

B. Fill in the Blanks:

1. human-like 2. Humans 3. Machine Learning 4. Deep Learning 5. Secure

C. True or False:

1. True 2. False 3. False 4. False 5. False

D. Short Answer Questions:

1. How is machine learning related to AI?

Ans. Machine learning enables machines to learn, forecast, and improve on their own, contributing to the broader field of AI.

2. Define Data. List the types of data.

Ans. Data is a representation of information that can be processed or transmitted by humans or machines. The two types of data mentioned are structured data (e.g., name, age, address) and unstructured data (e.g., text, video, audio).

3. Define machine learning.

Ans. Machine learning is defined as the science of getting computers to act without being explicitly programmed, and its primary categories include supervised, unsupervised, and reinforcement learning.

4. What is deep learning, and how does it differ from traditional machine learning?

Ans. Deep learning is a subset of machine learning entirely based on artificial neural networks, distinguished by its ability to solve end-to-end problems and its heavy reliance on high-end machines for computation.

5. What do you mean by Reinforcement Learning? Write any two applications of Reinforcement Learning at School.

Ans. Reinforcement learning is a type of machine learning where an agent learns to make decisions by interacting with an environment and receiving feedback in the form of rewards or penalties. Two applications in schools include adaptive learning systems that personalize content and educational games/simulations that engage students in interactive learning experiences.

6. How do you understand whether a machine/application is AI based or not? Explain with the help of an example.

Ans. To understand whether a machine/application is AI based or not, we need to check if it learns with data and whether it's able to decide/predict.

E. Case-study/Application Oriented Questions:

1. A hospital implemented an AI system to assist doctors in diagnosing diseases based on medical images such as X-rays and MRI scans. However, some patients expressed concerns about the accuracy and reliability of the AI diagnoses. How can the hospital address these concerns?

Ans. The hospital can address these concerns by conducting thorough validation studies to assess the accuracy and reliability of the AI system compared to human diagnoses. They can also ensure transparency by providing detailed information about how the AI system works and how it complements the expertise of human doctors.

F. Competency Based Questions

1.Rahul is an architect. He has designed and built a beautiful home for his client in Pune. He has installed these systems/appliances/gadgets at the newly constructed home. Identify which of these are AI systems and which of these are not AI systems.

Solar water heater, Smart TV, Security cameras, rainwater harvesting system, cleaning robots, smart lighting, automatic door, Siri, automatic washing machine.

After separating the AI systems, mention some parameters on which you choose these appliances/systems as AI systems.

Ans: The AI systems are: Smart TV, cleaning robots, smart lighting, Siri.

The systems which are not AI systems are: Solar water heater, security cameras, rainwater harvesting systems, automatic door, automatic washing machine.

The parameters are: ability to make decisions, problem-solving, recommendations, adapt to new situations, and learn from past experiences. (any other AI feature can be included).

2.If you were designing a robot to sort recyclable items like glass, plastic, and paper, which type of learning would be used to help the robot.

Ans: Supervised learning

3.Can you think of a scenario where you have a bunch of different fruits mixed together and you want the computer to organize them into groups based on similarities?

Ans: Unsupervised learning

4.Mr. Shankar owns a company that deals with services to customers related to financial investments. Lately, he has been using AI technology in his company due to which his employees are facing less job responsibility, customers are feeling insecure about their data. What is this scenario known as?

Ans: Potential impact of AI on society

5.Jatin is a student who has just enrolled in a course in AI. He attended a few introductory classes and learned that systems can learn from the data using algorithms to perform a task without explicitly programming it. In some situations, the system mimics the human brain's learning process. Identify the concepts in this scenario.

Ans: Machine learning and Deep learning

REFERENCES

Videos to watch

- Understand about AI : https://youtu.be/ad79nYk2keg?feature=shared
- History of AI : https://www.youtube.com/watch?v=L-9ZqkeNNJE
- Introduction to Data Science: https://youtu.be/X3paOmcrTjQ?feature=shared
- Natural Language Processing: https://www.youtube.com/watch?v=CMrHM8a3hqw
- Introduction to Computer Vision: https://www.youtube.com/watch?v=puB-4LuRNys
- Cognitive Computing : https://www.youtube.com/watch?v=Zsl7ttA9Kcg