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QUESTION 1

A human manipulates what using their intelligence?

- A. Environment
- B. Space
- C. Objective
- D. Mission
- Correct Answer: A

Humans use their intelligence to manipulate their environment in order to achieve their objectives and complete their mission. This can involve a wide range of activities, such as building tools, constructing shelters, and creating strategies to

solve problems.

References: BCS Foundation Certificate In Artificial Intelligence Study Guide, https://bcs.org/ai/certificate/ and APMG International, https://www.apmg- international.com/qualifications/artificial-intelligence-foundation-certificate.

QUESTION 2

An intelligent robot uses AI to do what?

- A. Sense, plan and act
- B. Plan, act and speak.
- C. Perceive, plan and act.
- D. Sense, plan and move.

Correct Answer: C

An intelligent robot uses Artificial Intelligence (AI) to perceive its environment, plan its actions and then act on them. This is sometimes referred to as the "sense, plan, act" cycle, and is at the heart of what makes a robot intelligent. By using

Al, robots can sense their environment, plan their actions accordingly and then act on them in order to complete their tasks.

For more information, please refer to the BCS Foundation Certificate in Artificial Intelligence Study Guide: https://www.bcs.org/category/18076/bcs-foundation-certificate-in-artificial-intelligence-study-guide.

QUESTION 3

What is an intelligent robot?



- A. A robot that has consciousness
- B. A robot that acts like a human.
- C. A robot that uses AI techniques.
- D. A robot that takes the place of a human.

Correct Answer: C

An intelligent robot is one that uses AI techniques, such as machine learning and natural language processing, to perceive, plan and act on its environment. Intelligent robots are able to process large amounts of data quickly and accurately, allowing them to make decisions and carry out tasks autonomously. Intelligent robots can be used in a variety of applications, from industrial automation to healthcare.

QUESTION 4

What technique can be adopted when a weak learners hypothesis accuracy is only slightly better than 50%?

A. Over-fitting

- B. Activation.
- C. Iteration.
- D. Boosting.
- Correct Answer: D

Weak Learner: Colloquially, a model that performs slightly better than a naive model.

More formally, the notion has been generalized to multi-class classification and has a different meaning beyond better than 50 percent accuracy. For binary classification, it is well known that the exact requirement for weak learners is to be

better than random guess. [...] Notice that requiring base learners to be better than random guess is too weak for multiclass problems, yet requiring better than 50% accuracy is too stringent.

-Page 46, Ensemble Methods, 2012.

It is based on formal computational learning theory that proposes a class of learning methods that possess weakly learnability, meaning that they perform better than random guessing. Weak learnability is proposed as a simplification of the

more desirable strong learnability, where a learnable achieved arbitrary good classification accuracy. A weaker model of learnability, called weak learnability, drops the requirement that the learner be able to achieve arbitrarily high accuracy; a

weak learning algorithm needs only output an hypothesis that performs slightly better (by an inverse polynomial) than random guessing.

-The Strength of Weak Learnability, 1990.

It is a useful concept as it is often used to describe the capabilities of contributing members of ensemble learning algorithms. For example, sometimes members of a bootstrap aggregation are referred to as weak learners as opposed to

strong, at least in the colloquial meaning of the term.

More specifically, weak learners are the basis for the boosting class of ensemble learning algorithms.

The term boosting refers to a family of algorithms that are able to convert weak learners to strong learners.

https://machinelearningmastery.com/strong-learners-vs-weak-learners-for-ensemble- learning/

The best technique to adopt when a weak learner\\'s hypothesis accuracy is only slightly better than 50% is boosting. Boosting is an ensemble learning technique that combines multiple weak learners (i.e., models with a low accuracy) to create

a more powerful model. Boosting works by iteratively learning a series of weak learners, each of which is slightly better than random guessing. The output of each weak learner is then combined to form a more accurate model. Boosting is a

powerful technique that has been proven to improve the accuracy of a wide range of machine learning tasks. For more information, please see the BCS Foundation Certificate In Artificial Intelligence Study Guide or the resources listed above.

QUESTION 5

In Machine learning what are a brain\\'s axons called?

- A. Dendrites
- B. Edges
- C. Tetrahedra.
- D. Nodes

Correct Answer: D

In Machine Learning, the brain\\'s axons are referred to as nodes. Nodes are the components of a neural network that are responsible for processing the input data and generating the output. A node is a mathematical function that takes input data, performs a computation on it, and produces an output. Each node is connected to other nodes in the network via edges, which represent the strength of the connection between the respective nodes. The strength of the connection between two nodes is determined by the weights assigned to each edge. The weights are adjusted during the training process to generate the desired results. For more information, please refer to the BCS Foundation Certificate In Artificial Intelligence Study Guide (https://www.bcs.org/upload/pdf/bcs-foundation-certificate-in-artificial-intelligence-study-guide.pdf) or the EXIN Artificial Intelligence Foundation Certification (https://www.exin.com/en/exams/artificial-intelligence-foundation).

QUESTION 6

What function is used in a Neural Network?

- A. Linear.
- B. Activation.
- C. Statistical.



D. Trigonometric.

Correct Answer: B

Activation Functions An activation function in a neural network defines how the weighted sum of the input is transformed into an output from a node or nodes in a layer of the network. https://machinelearningmastery.com/choose-an-activation-function-for-deeplearning/#:~:text=An%20activation%20function%20in%20a,a%20layer%20of%20the%20ne twork. An activation function is a mathematical function used in a neural network to determine the output of a neuron. Activation functions are used to transform the inputs into an output signal and can range from simple linear functions to complex non-linear functions. Activation functions are an important part of neural networks and help the network learn patterns and generalize data. Types of activation functions include sigmoid, ReLU, tanh, and softmax. References: BCS Foundation Certificate In Artificial Intelligence Study Guide, https://bcs.org/certifications/foundation-certificates/artificial-intelligence/

QUESTION 7

If AI undertakes routine and monotonous tasks and takes these away from humans, what will humans do?

- A. Higher value work.
- B. Leisure activities
- C. Change jobs.
- D. Sabotage the Al.

Correct Answer: A

Al is designed to take on routine and monotonous tasks, freeing up humans to take on more complex, higher value work. This can include tasks such as research, problem-solving, and decision-making. This shift in work roles is expected to

increase productivity and efficiency, allowing humans to focus on more creative and innovative tasks. For example, robots can be used to automate mundane manufacturing processes, freeing up human workers to take on jobs that require

more creative thinking and problem- solving.

References:

[1] https://www.bcs.org/upload/pdf/foundation-certificate-ai-syllabus-v1.pdf

[2] https://www.apmg-international.com/en/qualifications-and-certifications/bc-foundation-certificate-in-artificial-intelligence/

[3] https://www.exin.com/en/certifications/bc-foundation-certificate-in-artificial-intelligence/

QUESTION 8

Which of the following is an advantage of a machine based system?

- A. Able to judge ambiguous and unknown situations.
- B. Capable of sympathising with humans.
- C. Undertakes monotonous tasks reliably and accurately.
- D. Can explain the output of an AI system

Correct Answer: C

One of the main advantages of a machine-based system is its ability to reliably and accurately undertake monotonous and repetitive tasks. This is especially useful for tasks that require a high level of accuracy and precision, such as data

entry or analysis. Machine-based systems are also able to process large amounts of data quickly, meaning that they are able to complete tasks more quickly and efficiently than humans. Additionally, machine-based systems can be

programmed to take certain decisions and actions based on the input data, allowing them to automate certain processes without the need for human intervention.

References:

BCS Foundation Certificate In Artificial Intelligence Study Guide (2019), AI Systems, Chapter 8. https://www.apmg-international.com/en/al-adoption/advantages-of-al/

QUESTION 9

Ensemble learning methods do what with the hypothesis space?

- A. Select a combination of hypothesis to combine their predictions
- B. Use stochastic gradient descent to optimise a network.
- C. Extract ergodic solutions.
- D. Test multiple hypotheses simultaneously.

Correct Answer: A

https://link.springer.com/referenceworkentry/10.1007/978-0-387-73003-

5_293#:~:text=Definition,and%20combine%20them%20to%20use. It works by selecting different subsets of the data, or different combinations of the hypothesis, and

combining the results of each prediction in order to create a single, more accurate result. This is useful in situations where different hypothesis may be accurate in different parts of the data, or where a single hypothesis may not be accurate in

all cases. Ensemble learning is used in a variety of applications, from computer vision to natural language processing.

References:

[1] BCS Foundation Certificate In Artificial Intelligence Study Guide, BCS

[2] Apmg-international.com, "What is Ensemble Learning?", APMG International, https://apmg-international.com/en/about-apmg/blog/what-is-ensemble-learning/



[3] Exin.com, "Ensemble Learning", EXIN, https://www.exin.com/en-us/learn/ensemble-learning

QUESTION 10

From the Ell\\'s ethics guidelines for AI, what does \\'The Principle of Autonomy,\\' mean?

A. Robots will have freewill.

- B. Al agents will behave as humans.
- C. Al systems will be human-centric
- D. Al systems will preserve human agency.

Correct Answer: D

The Principle of Autonomy from the ELL\\'s ethics guidelines for AI states that AI systems should be designed in a way that preserves human agency and responsibility. This means that AI systems should be designed in a way that allows humans to remain in control of their decisions, and that the Al system should not be able to act without human input or permission. References: BCS Foundation Certificate In Artificial Intelligence Study Guide, https://bcs.org/ai/certificate/ and APMG International, https://www.apmg-international.com/qualifications/artificial-intelligence-foundation-certificate.

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