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BCS AIF Exam Syllabus Topics:

TopicDetailsTopic 1- Applying the benefits of AI - challenges and risks- Describe the challenges of Artificial IntelligenceTopic 2- Describe a ?learning from experience' Agile approach to projects- Describe the type of team members needed for an Agile projectTopic 3- Describe the three fundamental areas of sustainability and the United Nation's seventeen sustainability goals- General examples of the limitations of AI systems compared to human systemsTopic 4- Recall which typical, narrow AI capability is useful in ML and AI agents' functionality- The Management, Roles and Responsibilities of humans and machinesTopic 5- Understand that ML is a significant contribution to the growth of Artificial Intelligence- Describe how AI is part of ?Universal Design,' and ?The Fourth Industrial RevolutionTopic 6- Demonstrate understanding of the risks of AI project- Ethical and Sustainable Human and Artificial IntelligenceTopic 7- Recall that the Human Centric Ethical Purpose Trustworthy AI is continually assessed and monitored- Describe the difference between waterfall and agile projectsTopic 8- Describe agents in terms of performance measure, environment, actuators and sensors- Recall the general definition of Human and Artificial Intelligence (AI)Topic 9- List common open source machine learning functionality, software and

hardware- Relate intelligent robotics to intelligent agentsTopic 10- Describe four types of agent: reflex, model-based reflex, goal-based and utility-based- Explain the benefits of Artificial IntelligenceTopic 11- Recall that Ethical Purpose AI is delivered using Trustworthy AI that is technically robust- Recall the general definition of EthicsTopic 12- List future directions of humans and machines working together- Describe what are Ethics and Trustworthy AI, in particular

QUESTION 18

The EU and United Nations have made designing for all individuals a core principle. What is this type of

design called?
* Core design
* Universal design.
* Biophilic design.
* Utopic design.

Explanation

https://universaldesign.ie/What-is-Universal-Design/

QUESTION 19

The EU’s Ethical Guidelines use what to demonstrate trustworthy Al?
* A quality assurance plan.
* UN’s sustainability goals.
* Customer feedback.
* A human-centric value system.

QUESTION 20

How could machine learning make a robot autonomous?
* Use OCR, optical character recognition, to read documents
* Use NLP (Natural Language Processing) to listen
* Use actuators to modify its environment
* Learn from sensor data and plan to carry out a task.

https://arxiv.org/pdf/1803.10813

QUESTION 21

Who was the pioneer of computer programming?
* Dame Wendy Hall.
* Karen Spark Jones.
* Ada Lovelace.
* Sophie Wilson

Explanation

https://www.techopedia.com/2/31564/watercooler/ada-lovelace-enchantress-of-numbers

QUESTION 22

What is one of the MAIN contributions of Al to the rapid development of The Fourth Industrial Revolution?
* Enhanced design.
* Automation
* Big Data
* Al personal assistants.

Explanation

https://research.com/careers/what-is-the-fourth-industrial-revolution

QUESTION 23

In an Al project the domain expert is the person…
* with technical and managerial oversight of the business plan
* whomanages the agile project and writes the technical terms of reference
* who measures the trustworthiness of the Al system
* with special knowledge or skills in the area of endeavour and defines what is fit for purpose’

QUESTION 24

What is defined as a philosophy, or set of assumptions and/or techniques, which characterise an approach to a class of problems?
* An approach.
* A set
* A paradigm.
* An algorithm.

QUESTION 25

In an Al project the domain expert is the person…
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QUESTION 26

Human-centric trustworthy Al must be…
* quality assurance certified.
* continually assessed and monitored.
* financially sustainable.
* tested by humans.

QUESTION 27

Narrow or weak Al can be useful to robots.

Which of the following is an example of narrow Al?
* Conscioussimul-ation.
* Artificial General Al.
* Conscious integration.
* NLP – Natural Language Processing.

QUESTION 28

With a large dataset, limited computational resources or frequent new data to learn from, we can adopt what

type of machine learning?
* Batch learning.
* Big Data learning.
* Patchwork learning.
* Online learning.

QUESTION 29

What does Prof David Chalmers describe the hard consciousness problem to be as comples as?
* Psychology.
* Turbulence.
* Quantum mechanics.
* The universe.

QUESTION 30

Para View allows large data sets to be visualised on a parallel computer.

Which of the following is one of the techniques used?
* Norm calculation.
* Dashboard.
* Contour plot
* Eigen function analysis.

QUESTION 31

What technique can be adopted when a weak learners hypothesis accuracy is only slightly better than 50%?
* Over-fitting
* Activation.
* Iteration.
* Boosting.

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 multi-class 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/

QUESTION 32

Ensemble learning methods do what with the hypothesis space?
* Select a combination of hypothesis to combine their predictions
* Use stochastic gradient descent to optimise a network.
* Extract ergodic solutions.
* Test multiple hypotheses simultaneously.

Explanation

https://link.springer.com/referenceworkentry/10.1007/978-0-387-73003-5_293#:~:text=Definition,and%20comb

QUESTION 33

Tensor flow is a typical open source what?
* Cloud based AI application.
* Intelligent robot paradigm.
* Machine learning library.
* Agent based modelling application

TensorFlow is an end-to-end open source platform for machine learning. It has a comprehensive, flexible ecosystem of tools, libraries and community resources that lets researchers push the state-of-the-art in ML and developers easily build and deploy ML powered applications.

https://www.tensorflow.org/#:~:text=TensorFlow%20is%20an%20end%2Dto,and%20deploy%20ML%20powered%20applications.

QUESTION 34

What function is used in a Neural Network?
* Linear.
* Activation.
* Statistical.
* Trigonometric.

Explanation

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-deep-learning/#:~:text=An%20activation

QUESTION 35

Professor David Chalmers described consciousness as having two questions. What were these?
* An easy one and a hard one.
* What is the sub conscious and what is the conscious?
* Can we integrate our knowledge to form consciousness and can we simulate consciousness?
* Are only humans conscious and are machines always unconscious?

QUESTION 36

Which of the following is an advantage of a machine based system?
* Able to judge ambiguous and unknown situations.
* Capable of sympathising with humans.
* Undertakes monotonous tasks reliably and accurately.
* Can explain the output of an Al system

QUESTION 37

What is defined as a philosophy, or set of assumptions and/or techniques, which characterise an approach to a

class of problems?
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