

CHAPTER 4**BIG DATA PROJECTS****1. (C) Volume and velocity.****Explanation**

Big Data may be characterized by its volume (the amount of data available), velocity (the speed at which data are communicated), and variety (degrees of structure in which data exist). "Terabyte" is a measure of volume. "Latency" refers to velocity.

(Module 4.1, LOS 4.a)

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2. (B) recall is the ratio of correctly predicted positive classes to all actual positive classes.**Explanation**

Recall (also called sensitivity) is the ratio of correctly predicted positive classes to all actual positive classes. Precision is the ratio of correctly predicted positive classes to all predicted positive classes. Accuracy is the percentage of correctly predicted classes out of total predictions.

(Module 4.3, LOS 4.c)

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3. (B) 89%.**Explanation**

The model's accuracy is the percentage of correctly predicted classes out of total predictions.

Model accuracy is calculated as:

$$\begin{aligned}\text{Accuracy} &= (TP + TN) / (TP + FP + TN + FN) = (TP + TN) / N \\ &= (307 + 113) / (307 + 31 + 113 + 23) = (307 + 113) / (474). \\ &= 0.8861 = 89\%\end{aligned}$$

(Module 4.3, LOS 4.c)

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4. (C) An analyst adjusts daily stock index data from two countries for their different market holidays.

Explanation

Curation is ensuring the quality of data, for example by adjusting for bad or missing data. Word clouds are a visualization technique. Moving data from a storage medium to where they are needed is referred to as transfer.

(Module 4.1, LOS 4.a)

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5. (C) The model treats true parameters as noise.

Explanation

Underfitting describes a machine learning model that is not complex enough to describe the data it is meant to analyze. An underfit model treats true parameters as noise and fails to identify the actual patterns and relationships. A model that is overfit (too complex) will tend to identify spurious relationships in the data. Labelling of input data is related to the use of supervised or unsupervised machine learning techniques.

(Module 4.3, LOS 4.f)

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6. (C) 91%.

Explanation

Precision, the ratio of correctly predicted positive classes (true positives) to all predicted positive classes, is calculated as:

$$\text{Precision (P)} = \text{TP} / (\text{TP} + \text{FP}) = 307 / (307 + 31) = 0.9083 \text{ (91\%)}$$

In the context of this default classification, high precision would help us avoid the situation where a bond is incorrectly predicted to default when it actually is not going to default.

(Module 4.3, LOS 4.c)

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7. (A) feature design.

Explanation

Data exploration encompasses exploratory data analysis, feature selection, and feature engineering.

(Module 4.2, LOS 4.d)

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8. (C) 93%.

Explanation

$$\begin{aligned}\text{Recall that} &= TP / (TP + FN) \\ &= 307 / (307 + 23) = 0.9303 = 93\%.\end{aligned}$$

Recall is useful when the cost of a false negative is high, such as when we predict that a bond will not default but it actually will. In cases like this, high recall indicates that false negatives will be minimized.

(Module 4.3, LOS 4.c)

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9. (A) tokenization.

Explanation

Text is considered to be a collection of tokens, where a token is equivalent to a word. Tokenization is the process of splitting a given text into separate tokens. Bag-of-words (BOW) is a collection of a distinct set of tokens from all the texts in a sample dataset. Stemming is the process of converting inflected word forms into a base word.

(Module 4.1, LOS 4.g)

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10. (C) 92%.

Explanation

The model's F1 score, which is the harmonic mean of precision and recall, is calculated as:

$$\begin{aligned}\text{F1 score} &= (2 \times P \times R) / (P + R) \\ &= (2 \times 0.9083 \times 0.9303) / (0.9083 + 0.9303) \\ &= 0.9192(92\%)\end{aligned}$$

Like accuracy, F1 is a measure of overall performance measures that gives equal weight to FP and FN.

(Module 4.3, LOS 4.c)

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11. (C) veracity.

Explanation

Big data is defined as data with high volume, velocity, and variety. Big data often suffers from low veracity, because it can contain a high percentage of meaningless data.

(Module 4.1, LOS 4.a)

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