Quiz - ML Definition

Total points 32/35

Email *

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✓ Machine learning algorithms can learn from data and make predictions or decisions based on that data *1/1

- (●) True ✓
- ( ) False

✓ Regarding the definition of machine learning, according to Tom Mitchell, "A computer program is said to learn from _____ with respect to some _____ and some performance _____, if its _____, as measured by P, improves with experience E" *1/1

- (●) experience E; task T; measure P; performance on T ✓
- ( ) task T; experience E; performance on T; measure P;
- ( ) measure P; task T; experience E; performance on T;

Select the approach that best describes each one of of the following sentences *

	Rule-based approach	ML approach	Score	
Explicit programming is used to solve problems	◉	○	1/1	✓
Samples are used for training	○	◉	1/1	✓
Rules are manually specified	◉	○	1/1	✓
Rules are automatically learned by machines	○	◉	1/1	✓
Especially useful when decision-making rules are complex	○	◉	1/1	✓

✓ Select only the true statements. * 1/1

Machine Learning is great for:

- [x] Problems for which existing solutions require a lot of hand-tuning or long lists of rules ✓
- [ ] Sorting arrays
- [x] Fluctuating environments, in which the ML system can adapt to new data ✓
- [x] Getting insights about complex problems and large amounts of data ✓

Match the following ML problems to the sentences that best describe their objective *

	Classification problems	Regression problems	Clustering problems	Score	
The goal is to predict to which category a given input sample belongs.	◉	○	○	1/1	✓
The goal is to group samples of a dataset based on their similarity	○	○	◉	1/1	✓
The goal is to predict a continuous output value. It is used when the target variable is numerical.	○	◉	○	1/1	✓

✓ If you wanted to use an ML model to predict the cost of a coach ticket, would you use 1/1

- ○ Classification
- ◉ Regression ✓

Feedback

Correct. A regression model's output is a continuous numeric value.

✓ If you wanted to use an ML model to predict energy usage for commercial buildings, what type of model would you use? *1/1

- ○ Classification
- ◉ Regression ✓

Feedback

Correct. A regression model's output is a numeric value.

✓ The label predicted by regression algorithms is * 1/1

- ○ Self-deformation
- ○ Discrete
- ○ Strain type
- ◉ Continuous ✓

Match the ML type with their respective description *

	Supervised learning	Unsupervised learning	Semi-supervised learning	Reinforcement learning	Score	
there is no dataset and the model system learns from errors. The learning system (called agent) can observe the environment, select and perform actions, and get rewards (or penalties). Based on the reward/penalty values, the system adjust the policy (learning) to get most of the reward over time	○	○	○	◉	1/1	✓
the data is unlabeled and the system has to learn without a teacher.	○	◉	○	○	1/1	✓
only a subset of the dataset used to train the model is labeled with the desired/expected solution	○	○	◉	○	1/1	✓
the data used to train the model is labeled with the desired/expected solution.	◉	○	○	○	1/1	✓

✗ Suppose you want to develop a supervised machine learning model to predict whether a given email is "spam" or "not spam." Which of the following statements are true? *0/1

- (●) Words in the subject header will make good labels. ✗
- ( ) We'll use unlabeled examples to train the model.
- ( ) Emails not marked as "spam" or "not spam" are unlabeled examples

Correct answer

- (●) Emails not marked as "spam" or "not spam" are unlabeled examples

Feedback

a) Incorrect. Words in the subject header might make excellent features, but they won't make good labels.
b) Incorrect. We'll use labeled examples to train the model. We can then run the trained model against unlabeled examples to infer whether the unlabeled email messages are spam or not spam.

✓ Select the True alternatives * 1/1

- [x] Supervised learning can be used to solve classification tasks ✓
- [x] Supervised learning can be used to solve regression tasks ✓
- [x] Supervised learning requires data to be labeled with the desired/expected solution ✓
- [ ] Supervised learning does not require labeled data
- [ ] Predicting the price of a car is an example of a classification task

✓ Select the algorithms that can be used to perform the supervised learning task *1/1

- [x] k-Nearest Neighbors ✓
- [ ] k-means
- [x] Linear Regression ✓
- [ ] DBSCAN
- [ ] t-distributed Stochastic Neighbor Embedding (t.SNE)
- [x] Neural Networks ✓

✓ Classification and Regression are two common supervised learning tasks *1/1

- (•) True ✓
- ( ) False

✓ Unsupervised learning is used when the data is labeled, and the goal is to learn the underlying patterns in the data *1/1

- ( ) True
- (•) False ✓

Feedback

Indeed, unsupervised learning does not require the data to be labeled.

✓ Principal Component Analysis (PCA) is a technique used for dimensionality reduction *1/1

- (●) True ✓
- ( ) False

✓ The k-means algorithm is an example of unsupervised learning used for clustering *1/1

- (●) True ✓
- ( ) False

✓ Clustering is a type of unsupervised learning used to group similar data points together *1/1

- (●) True ✓
- ( ) False

✓ K-Means and Hierarchical clustering are common clustering algorithms * 1/1

- (●) True ✓
- ( ) False

✓ Which of the following is true about unsupervised learning? * 1/1

- [x] Unsupervised algorithm only processes "features" and does not require labels ✓
- [ ] Dimensionality reduction algorithms are not classified as unsupervised learning
- [ ] K-means algorithm and SVM algorithm belong lo unsupervised learning

✗ Which algorithms/methods do not belong in supervised learning? * 0/1

- [ ] Logistic regression
- [ ] Support Vector Machines
- [x] Decision tree ✗
- [x] Principal component analysis ✓

Correct answer

- [x] Principal component analysis

✓ Which of the following is the type of labels in classification tasks? * 1/1

- [x] Discrete type ✓
- [ ] Continuous type
- [ ] Self-deformable type
- [ ] Strain type

✓ Reinforcement learning is a type of machine learning used for decision-making tasks *1/1

- (●) True ✓
- ( ) False

✓ What type of Machine Learning algorithm is more indicated to allow a robot to learn to walk in various **unknown** terrains? *1/1

- ( ) Supervised
- ( ) Unsupervised
- ( ) Semi-supervised
- (●) Reinforcement learning ✓

✓ Reinforcement learning can be used to implement self-driving cars and game playing robot *1/1

- (●) True ✓
- ( ) False

✗ Select the true alternatives * 0/1

- [x] Online learning is when the system can be trained incrementally, one sample at a time or by small groups called mini-batches. ✓
- [x] Batch learning, also known as offline learning, involves training a model on a static dataset that is fixed and not updated over time ✓
- [x] In Batch learning, the model is trained once, and then used to make predictions without further updates. ✓
- [ ] Online learning involves training the model incrementally on a continuous stream of data, updating the model after each data point is processed.
- [ ] In summary, the main difference between batch learning and online learning is the way they process data and update the model. Batch learning processes data in bulk and updates the model once, while online learning processes data incrementally and updates the model after each data point is processed.

Correct answer

- [x] Online learning is when the system can be trained incrementally, one sample at a time or by small groups called mini-batches.
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- [x] In summary, the main difference between batch learning and online learning is the way they process data and update the model. Batch learning processes data in bulk and updates the model once, while online learning processes data incrementally and updates the model after each data point is processed.

✓ What type of learning algorithm relies on a similarity measure (i.e., comparing new data points to known data points) to make predictions? *1/1

- (●) Instance-based ✓
- ( ) Model-based