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Verbrauchte Zeit 1 Stunde

Punkte 34,33/40,00

Bewertung 85,83 von 100,00

Frage 1

Vollständig

Nicht bewertet

By selecting "I confirm", I hereby declare under oath that I will work on this examination on my own without any help or any third-party assistance.

By selecting "I confirm", I understand that noncompliance results in invalidation of the assessment, whereby the invalidated examination will be added to the total number of retakes and noncompliance may result in further legal action.

- ☒ a. I confirm
- ☐ b. I do not confirm

Die richtige Antwort ist: I confirm

Frage 2

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about word embeddings?

- a. Embeddings are useful for large dictionary/vocabulary sizes.
- b. Embeddings can potentially capture additional information compared to a one-hot encoded representation.
- c. Pre-learned embeddings exist.
- d. A word vector of an embedding has the same size as the word vector of a one-hot encoded representation, given a fixed-sized dictionary/vocabulary.

Die richtigen Antworten sind: Pre-learned embeddings exist., Embeddings are useful for large dictionary/vocabulary sizes., Embeddings can potentially capture additional information compared to a one-hot encoded representation.

Frage 3

Richtig

Erreichte Punkte 1,00 von 1,00

k-means ...

- a. ... is a clustering method.
- b. ... is a dimensionality reduction method.
- ☒ c. ... does not need a fixed number of cluster centers as input.
- d. ... needs a fixed number of cluster centers as input.

Die richtigen Antworten sind: ... is a clustering method., ... needs a fixed number of cluster centers as input.

Frage 4

Richtig

Erreichte Punkte 1,00 von 1,00

Given an input of size 15x15 and a kernel size of 5x5 with a stride of 1, what is the output size after the convolution operation?

- a. 10x10
- b. 11x11
- c. 13x13
- d. 14x14

Die richtige Antwort ist: 11x11

Frage 5

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about an 8-bit grayscale image?

- a. Can be converted into an RGB image without additional information.
- b. The channel information size is 8 bits, which means that 8 values can be stored.
- c. It has only a single channel (brightness).
- d. Every pixel is represented by 8 channels.

Die richtige Antwort ist: It has only a single channel (brightness).

Frage 6

Teilweise richtig

Erreichte Punkte 0,67 von 1,00

Which of the following statements is/are true about the term "hyperparameters"?

- ☐ a. Hyperparameters can strongly influence the final model performance.
- ☐ b. Hyperparameters are those model parameters that are adjusted during training.
- ☐ c. There are models without any hyperparameters.
- ☐ d. Hyperparameters are user-specifiable settings that control the model complexity or the training procedure.

Die richtigen Antworten sind: Hyperparameters are user-specifiable settings that control the model complexity or the training procedure., There are models without any hyperparameters., Hyperparameters can strongly influence the final model performance.

Frage 7

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Which of the following statements is/are true about loss functions?

- ☐ a. Loss functions can have an impact on the training process.
- ☐ b. Loss functions are used to obtain the final model prediction.
- ☐ c. Loss functions are used to measure the difference between a model prediction and the true target.
- ☐ d. The output of loss functions is in the range [0, 1].

Die richtigen Antworten sind: Loss functions are used to measure the difference between a model prediction and the true target., Loss functions can have an impact on the training process.

Frage 8

Falsch

Erreichte Punkte 0,00 von 1,00

Which of the following is/are useful loss functions for regression problems?

- ☐ a. Sigmoid
- ☐ b. Softmax
- ☐ c. Mean-squared error
- ☐ d. Cross entropy

Die richtige Antwort ist: Mean-squared error

Frage 9

Richtig

Erreichte Punkte 1,00 von 1,00

Standard gradient descent performs an update step based on some step size/learning rate η . Which of the following statements is/are true?

- a. If η is too small, the update progress can be very slow.
- b. If η is negative, we would go into the opposite direction (gradient ascent).
- c. If η is 0, no update is performed at all.
- d. If η is too large, the algorithm might not properly converge to some minimum.

Die richtigen Antworten sind: If η is too small, the update progress can be very slow., If η is too large, the algorithm might not properly converge to some minimum., If η is 0, no update is performed at all., If η is negative, we would go into the opposite direction (gradient ascent).

Frage 10

Teilweise richtig

Erreichte Punkte 0,67 von 1,00

Which of the following is/are typically used activation functions?

- a. ReLU
- b. Cross entropy
- c. Sigmoid
- d. Tanh

Die richtigen Antworten sind: Tanh, ReLU, Sigmoid

Frage 11

Richtig

Erreichte Punkte 1,00 von 1,00

Logistic regression ...

- a. ... is a regression model.
- b. ... has an output in the range [0, 1].
- c. ... is a classification model.
- d. ... is never a good model choice.

Die richtigen Antworten sind: ... is a regression model., ... has an output in the range [0, 1].

Frage 12

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about pretrained models?

- a. Pretrained models might be biased.
- b. Using pretrained models might improve the prediction performance.
- c. Pretrained models can be directly used for every task without having to adjust their architecture.
- d. Using pretrained models always improves the prediction performance.

Die richtigen Antworten sind: Using pretrained models might improve the prediction performance., Pretrained models might be biased.

Frage 13

Richtig

Erreichte Punkte 1,00 von 1,00

Which aspects have to be taken into consideration when dealing with high-dimensional input data?

- a. More features might lead to longer model training times.
- b. Dimensionality reduction techniques might be useful.
- c. Often difficult to visualize.
- d. More features take up more space in memory.

Die richtigen Antworten sind: Often difficult to visualize., More features might lead to longer model training times., More features take up more space in memory., Dimensionality reduction techniques might be useful.

Frage 14

Richtig

Erreichte Punkte 1,00 von 1,00

Consider the following vocabulary in the fixed order:

cat dog wolf cow

Which of the following one-hot-encodings is the correct one for the word **wolf**?

- a. (0, 0, 1, 0)
- b. (1, 2, 3, 4)
- c. (3)
- d. (1, 1, 0, 1)

Die richtige Antwort ist: (0, 0, 1, 0)

Frage 15

Richtig

Erreichte Punkte 1,00 von 1,00

Assume you have the following input text that you want to encode with one-hot-encoding:

a cat and a dog and a wolf

What is the dictionary/vocabulary size?

- a. 6
- b. 8
- c. 7
- d. 5

Die richtige Antwort ist: 5

Frage 16

Richtig

Erreichte Punkte 1,00 von 1,00

The bias-variance tradeoff ...

- a. ... is about finding the most underfitting and most overfitting model.
- b. ... is about finding the best ratio of training set size vs. test set size.
- c. ... is about finding the best loss functions.
- d. ... is about finding a compromise between model underfitting and overfitting.

Die richtige Antwort ist: ... is about finding a compromise between model underfitting and overfitting.

Frage 17

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about convolutional neural networks (CNNs)?

- a. Weight sharing is an essential part in CNNs.
- b. Because of 2D input data, CNNs cannot be trained using gradient descent.
- c. CNNs are the same as fully-connected neural networks, just for 2D data.
- d. CNNs take advantage of the "local structure" in image data (neighboring pixels are often highly correlated).

Die richtigen Antworten sind: CNNs take advantage of the "local structure" in image data (neighboring pixels are often highly correlated), Weight sharing is an essential part in CNNs.

Frage 18

Richtig

Erreichte Punkte 1,00 von 1,00

In the forward pass of a neural network, the input vector is ...

- a. ... added to bias weights, multiplied by a weight matrix and passed through an element-wise non-linearity.
- b. ... passed through an element-wise non-linearity, multiplied by a weight matrix and added to bias weights.
- c. ... passed through an element-wise non-linearity, added to bias weights and multiplied by a weight matrix.
- d. ... multiplied by a weight matrix, added to bias weights and passed through an element-wise non-linearity.

Die richtige Antwort ist: ... multiplied by a weight matrix, added to bias weights and passed through an element-wise non-linearity.

Frage 19

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about the logistic function (sigmoid)?

- a. It is a common loss function.
- b. It introduces non-linearity.
- c. It is used in linear regression.
- d. It is used in logisitic regression.

Die richtigen Antworten sind: It is used in logisitic regression., It introduces non-linearity.

Frage 20

Richtig

Erreichte Punkte 1,00 von 1,00

Assume a multi-class classification problem with four classes (1, 2, 3, 4). Further assume that you have a model with a softmax function at the end which produced the following output for some input sample (same order as class list):

(0.3, 0.32, 0.35, 0.03)

Which class should be chosen as the final classification prediction?

- a. Class 1
- b. Class 4
- c. Class 2
- d. Class 3

Die richtige Antwort ist: Class 3

Frage 21

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about the softmax function?

- a. It is suitable for multi-class classification problems.
- b. It is a generalization of the sigmoid function.
- c. The sum of all outputs equals 1.
- d. The output is always 1 for the predicted class and 0 for all others.

Die richtigen Antworten sind: It is a generalization of the sigmoid function., It is suitable for multi-class classification problems., The sum of all outputs equals 1.

Frage 22

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Which of the following statements is/are true about padding in convolutional neural networks?

- a. Padding is optional.
- b. Padding can only be applied to the original input data, i.e., before the first network layer.
- c. Padding can be used to keep the input size and output size the same.
- d. Padding of size n is the same as using a kernel that is smaller by n compared to a bigger kernel.

Die richtigen Antworten sind: Padding is optional., Padding can be used to keep the input size and output size the same.

Frage 23

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

In a fully-connected neural network ...

- a. ... all inputs are connected to all nodes of the following layer.
- b. ... each hidden layer can have arbitrary many nodes.
- c. ... activation functions should be used in between layers to avoid that multiple linear transformations collapse into a single one.
- d. ... the output layer is used for the final model prediction.

Die richtigen Antworten sind: ... all inputs are connected to all nodes of the following layer., ... the output layer is used for the final model prediction., ... each hidden layer can have arbitrary many nodes., ... activation functions should be used in between layers to avoid that multiple linear transformations collapse into a single one.

Frage 24

Richtig

Erreichte Punkte 1,00 von 1,00

Batch normalization ...

- a. ... is performed once for the dataset before training the network.
- b. ... is not applicable in convolutional neural networks.
- c. ... is performed for each mini-batch of training samples.
- d. ... is only used in the last network layer.

Die richtige Antwort ist: ... is performed for each mini-batch of training samples.

Frage 25

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Which problems might arise when data augmentation is not done carefully?

- a. The target values might change too much.
- b. The model performance might be worse than without augmentation.
- c. The input data might no longer correlate with/represent the original target values.
- d. There are no problems, data augmentation is always safe.

Die richtigen Antworten sind: The input data might no longer correlate with/represent the original target values., The model performance might be worse than without augmentation.

Frage 26

Richtig

Erreichte Punkte 1,00 von 1,00

What is meant by the term "underfitting"?

- a. A model fits the training data (too) well but not the test data.
- b. A model with too few hyperparameters was selected.
- c. A model neither fits the training nor the test data well.
- d. A model fits the training and the test data (too) well.

Die richtige Antwort ist: A model neither fits the training nor the test data well.

Frage **27**

Richtig

Erreichte Punkte 1,00 von 1,00

Which techniques can be used to potentially improve a neural network model in terms of prediction performance?

- a. Batch normalization
- b. Deep networks
- c. Hyperparameter augmentation
- d. Loss function schedules

Die richtigen Antworten sind: Batch normalization, Deep networks

Frage **28**

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Which of the following statements is/are true regarding the receptive field in convolutional neural networks?

- a. The receptive field always remains constant throughout the depth of the network.
- b. The receptive field is the (part of the) input that is connected to a node/neuron.
- c. The receptive field is closely related to the terms "kernel" or "filter".
- d. The receptive field is often bigger than the original input size.

Die richtigen Antworten sind: The receptive field is the (part of the) input that is connected to a node/neuron., The receptive field is closely related to the terms "kernel" or "filter".

Frage **29**

Richtig

Erreichte Punkte 1,00 von 1,00

Assume you have grayscale images with `width=20` and `height=20`. What is the dimensionality when you want to train a model with such input data?

- a. 400
- b. 1200
- c. 20
- d. 40

Die richtige Antwort ist: 400

Frage 30

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about empirical risk minimization (ERM)?

- a. ERM is a method of estimating the generalization error/risk.
- b. ERM is a method of hyperparameter optimization.
- c. ERM is typically performed on a dedicated training set.
- d. ERM is typically performed on a dedicated test set.

Die richtigen Antworten sind: ERM is a method of estimating the generalization error/risk., ERM is typically performed on a dedicated training set.

Frage 31

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Considering labeled tabular data, assume you have a feature vector x and a target y for each table entry. Which of the following statements is/are true?

- a. y can be a class label.
- b. x and y together form a sample.
- c. y can be numerical.
- d. The x of one table entry might be identical to another x table entry.

Die richtigen Antworten sind: x and y together form a sample., y can be numerical., y can be a class label., The x of one table entry might be identical to another x table entry.

Frage 32

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

t-distributed stochastic neighbor embedding (t-SNE) ...

- a. ... is a dimensionality reduction method.
- b. ... is a data augmentation method.
- c. ... enables visualization of high-dimensional data.
- d. ... is a clustering method.

Die richtigen Antworten sind: ... enables visualization of high-dimensional data., ... is a dimensionality reduction method.

Frage 33

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about the result of loss functions (= the loss)?

- a. Different loss functions might have different loss value ranges.
- b. When comparing the loss of two different loss functions, one should choose the function that yielded the lower loss.
- c. Typically, the lower the loss, the better the prediction.
- d. Typically, the higher the loss, the better the prediction.

Die richtigen Antworten sind: Typically, the lower the loss, the better the prediction., Different loss functions might have different loss value ranges.

Frage 34

Richtig

Erreichte Punkte 1,00 von 1,00

Given the following dataset in tabular form, what is the dimensionality of this dataset?

| intensity | color | value | gamma |
|-----------|-------|-------|-------|
| 20 | r | 0.87 | 1 |
| 31 | r | 0.94 | -2 |
| 25 | g | 0.73 | -2 |
| 20 | r | 0.75 | 0 |
| 98 | b | 0.01 | -1 |

- a. 9
- b. 5
- c. 20
- d. 4

Die richtige Antwort ist: 4

Frage 35

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about classification?

- a. In classification, the target values are class labels.
- b. In classification, there should be at least two different classes.
- c. In classification, the target values cannot be numbers.
- d. In classification, the target values are numerical values.

Die richtigen Antworten sind: In classification, the target values are class labels., In classification, there should be at least two different classes.

Frage 36

Richtig

Erreichte Punkte 1,00 von 1,00

Assume you have an n -dimensional input that you want to apply to a logistic regression model. Which of the following statements is/are true?

- a. The weights of the logistic regression model must be n -dimensional as well.
- b. The weights of the logistic regression model are multiplied with the input, a bias is added, and the result is the final model output.
- c. The number of computations is independent of n since it is still only a single layer in the logistic regression model.
- d. The weights of the logistic regression model are multiplied with the input, a bias is added, the logistic function (sigmoid) is applied, and the result is the final model output.

Die richtigen Antworten sind: The weights of the logistic regression model must be n -dimensional as well., The weights of the logistic regression model are multiplied with the input, a bias is added, the logistic function (sigmoid) is applied, and the result is the final model output.

Frage 37

Richtig

Erreichte Punkte 1,00 von 1,00

A Random Forest model ...

- a. ... is a supervised learning model.
- b. ... is composed of multiple decision trees.
- c. ... can be used for classification
- d. ... incorporates randomness to reduce overfitting

Die richtigen Antworten sind: ... is composed of multiple decision trees., ... is a supervised learning model., ... incorporates randomness to reduce overfitting, ... can be used for classification

Frage 38

Teilweise richtig

Erreichte Punkte 0,50 von 1,00

Assume you have a classification task where you want to distinguish between cat and dog images. Which of the following is/are potentially meaningful data augmentations with respect to this data?

- a. Adding images of wolves.
- b. Applying input dropout.
- c. Swapping target labels.
- d. Adding a slight blur.

Die richtigen Antworten sind: Applying input dropout., Adding a slight blur.

Frage 39

Richtig

Erreichte Punkte 1,00 von 1,00

Assume you have the following input of size 4x4:

```
[[8 2 0 7]
 [0 3 3 3]
 [4 6 9 8]
 [5 7 4 1]]
```

What is the output after performing max pooling of size 2x2 with a stride of 2?

- a.

```
[[8 3 7]
 [6 9 9]
 [7 9 9]]
```
- b.

```
[[8]
 [3]
 [9]
 [7]]
```
- c.

```
[9]
```
- d.

```
[[8 7]
 [7 9]]
```

Die richtige Antwort ist:

```
[[8 7]
 [7 9]]
```

Frage 40

Richtig

Erreichte Punkte 1,00 von 1,00

A convex function ...

- a. ... only has one (global) minimum.
- b. ... usually occurs when training neural networks.
- c. ... sometimes has a closed-form solution.
- d. ... always has a closed-form solution.

Die richtigen Antworten sind: ... only has one (global) minimum., ... sometimes has a closed-form solution.

Frage **41**

Richtig

Erreichte Punkte 1,00 von 1,00

Which of the following statements is/are true about regression?

- a. In regression, the target values must be between 0 and 1.
- b. In regression, the target values are class labels.
- c. In regression, the input values are used to predict the corresponding target values.
- d. In regression, the target values are numerical values.

Die richtigen Antworten sind: In regression, the target values are numerical values., In regression, the input values are used to predict the corresponding target values.

[◀ Exam](#)

Direkt zu: