Logistic Regression Questions

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Question 1: What is the difference between regression problems and classification problems?

- a. Regression problems deal with numeric data only. Classification problems deal with any type of data.
- b. Classification problems deal with categorical data only. Regression problems deal with any type of data.
- c. ***Regression Problems predict a numerical value. Classification problems predict a class.***
- d. There is no differences, its a matter of preference only.

Question 2: Which of the following evaluation metrics does not make sense if applied to logistic regression output to compare with target?

- a. Accuracy
- b. Log Loss
- c. ***Mean-Squared-Error***
- d. None

Question 3: What can you say about regularized logistic regression vs. non-regularized logistic regression?

- a. We can expect it to perform better on the training set
- b. ***We can expect it to perform better on the testing set***
- c. It will perform better on the testing set

- d. It will perform better on the training set

Question 4: Assume that $z = w^T X$. If the limit of z approaches positive infinity, what will happen to the sigmoid function, i.e what will happen to the value of $\sigma(z)$?

- ***a. Approach 1***
- b. Approach 0
- c. Exactly 1
- d. Exactly 0

Question 5: Binary cross entropy is the same as negative log loss, and are hence used interchangeably.

- a. ***True***
- b. False

Question 6: Which of the following code snippets accurately updates the weights (general rule that we studied)?

- a. ***`weights = weights - learning_rate * gradient`***
- b. `weights = weights + learning_rate * gradient`
- c. `weights = learning_rate * gradient`
- d. `weights = -learning_rate * gradient`

Question 7: What is the direction of maximum increase and decrease for a function?

- a. Negative Gradient direction -> maximum increase, Positive Gradient direction -> maximum increase.
- b. The direction of increase and decrease can not be determined for a function.
- c. The function is always decreasing and never increasing.
- d. ***Positive Gradient direction -> maximum increase, Negative Gradient direction -> maximum decrease.***

Question 8: What is the difference between stochastic, mini-batch, and vanilla gradient descent?

- a. ***SGD: high fluctuation, Vanilla: low fluctuation, Mini-batch: frequent update + fast computations***
- b. SGD: low fluctuation, Vanilla: high fluctuation, Mini-batch: frequent update + fast computations
- c. ***SGD: might overshoot, Vanilla: might land at optimial minima, Mini-batch: best of SGD + Vanilla***
- d. SGD: might overshoot, Vanilla: high fluctuation, Mini-batch: frequent update + fast computations

Question 9: Why is the Adam optimizer the widely preferred optimizer in machine learning?

- a. Because it is relatively new and has no parameters to tune.
- b. ***Because it combines the best of adagrad and rmsprop optimizers.***
- c. Because it is the only optimizer with adaptive learning rates.
- d. Because it is not robust to hyperparameters choices.

Question 10: Momentum sometimes overshoots the target, and thus does not help in getting to the minimum as fast as vanilla SGD.

- a. True
- b. ***False***

Question 11: The logistic curve is also known as the sigmoid curve.

- a. ***True***
- b. False

Question 12: The values of a logistic function will range from 0 to 1. The values of z will vary from $-\infty$ to $+\infty$.

- a. ***True***
- b. False

Question 13: What is the output of a logistic regression?

- a. Probability that the input belongs to class 0 (negative class)
- b. ***Probability that the input belongs to class 1 (positive class)***
- c. Logits and thus requires `np.argmax` to acquire class value
- d. Logits and thus requires `np.argmax` to acquire class probability

Question 14: Logistic regression classifies input data into two categories based on:

- a. Number of features
- b. Dependencies with target value
- c. ***Threshold***
- d. Loss

Question 15: All of the following are advantages of logistic regression EXCEPT:

- a. Simple
- b. Efficient
- c. Flexible
- d. ***Assumes linearity between the dependent and independent variables***

Question 16: What is the main component of logistic regression that made it differ from linear regression?

- a. Logistic regression follows a normal distribution
- b. ***Logistic regression adds non-linearity to the linear combination of variables***
- c. Logistic regression has a higher interpretability than Linear regression
- d. Logistic regression predicts a continuous outcome

Question 17: Logistic regression is based on the concept of Maximum Likelihood Estimation. According to this estimation, the observed data should be most probable.

- a. ***True***
- b. False

Question 18: In logistic regression, there should not be collinearity between the independent variable.

- a. ***True***
- b. False

Question 19: In logistic regression, we predict the following:

- a. Label
- b. Class
- c. Categorical variable
- d. ***All of the above***

Question 20: Which of the following is a method that helps accelerate the gradient descent in the relevant direction and reducing oscillations?

- a. Rmsprop
- b. Velocity
- c. Adagrad
- d. ***Momentum***