Logistic Regression Questions

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

- Regression problems deal with numeric data only. Classification problems deal with any type of data.
- Classification problems deal with categorical data only. Regression problems deal with any type of data.
- ***Regression Problems predict a numerical value. Classification problems predict a class.***
- 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?

- Accuracy
- Log Loss
- ***Mean-Squared-Error***
- None

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

- We can expect it to perform better on the training set
- ***We can expect it to perform better on the testing set***
- It will perform better on the testing set
- 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 $\sigma(z)$?

- Approach 1
- Approach 0
- ***Exactly 1***
- Exactly 0

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

- ***True***
- False

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

- ***`weights = weights - learning_rate * gradient`***
- `weights = weights + learning_rate * gradient`
- `weights = learning_rate * gradient`
- `weights = -learning_rate * gradient`

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

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

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

- ***SGD: high fluctuation, Vanilla: low fluctuation, Mini-batch: frequent update + fast computations***
- SGD: low fluctuation, Vanilla: high fluctuation, Mini-batch: frequent update + fast computations

- *SGD: might overshoot, Vanilla: might land at optimial minima, Mini-batch: best of SGD + Vanilla*
- 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?

- Because it is relatively new and has no parameters to tune.
- *Because it combines the best of adagrad and rmsprop optimizers.*
- Because it is the only optimizer with adaptive learning rates.
- 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.

- True
- *False*

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

- *True*
- False

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

- *True*
- False

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

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

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

- Number of features
- Dependencies with target value
- *Threshold*
- Loss

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

- Simple
- Efficient
- Flexible
- *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?

- Logistic regression follows a normal distribution
- *Logistic regression adds non-linearity to the linear combination of variables*
- Logistic regression has a higher interpretability than Linear regression
- 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.

- *True*
- False

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

- *True*
- False

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

- Label
- Class
- Categorical variable
- *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?

- Rmsprop
- Velocity
- Adagrad
- *Momentum*