Quiz 2

About COVID-19: This is a highly contagious disease. The person with the disease must quarantine to control its spreading.

Suppose you have issued a tender for the COVID-19 testing kit, and four vendors participated in this tender. These vendors have their metric of testing kit performance. You have an urgency to give the contract to one of these vendors.

Their kit performance is as follows:

- The vendor A's kit has 99.99% accuracy,
- The vendor B's kit has 99% precession,
- The vendor C's kit has 97% precession and 97% recall, and
- The vendor D's kit has 92% precession and 98% recall.

Using this information, answer the question given below.

Question 1

0.0/1.0 point (graded)

With respect to the information provided above, which vendor suits best for the contract?
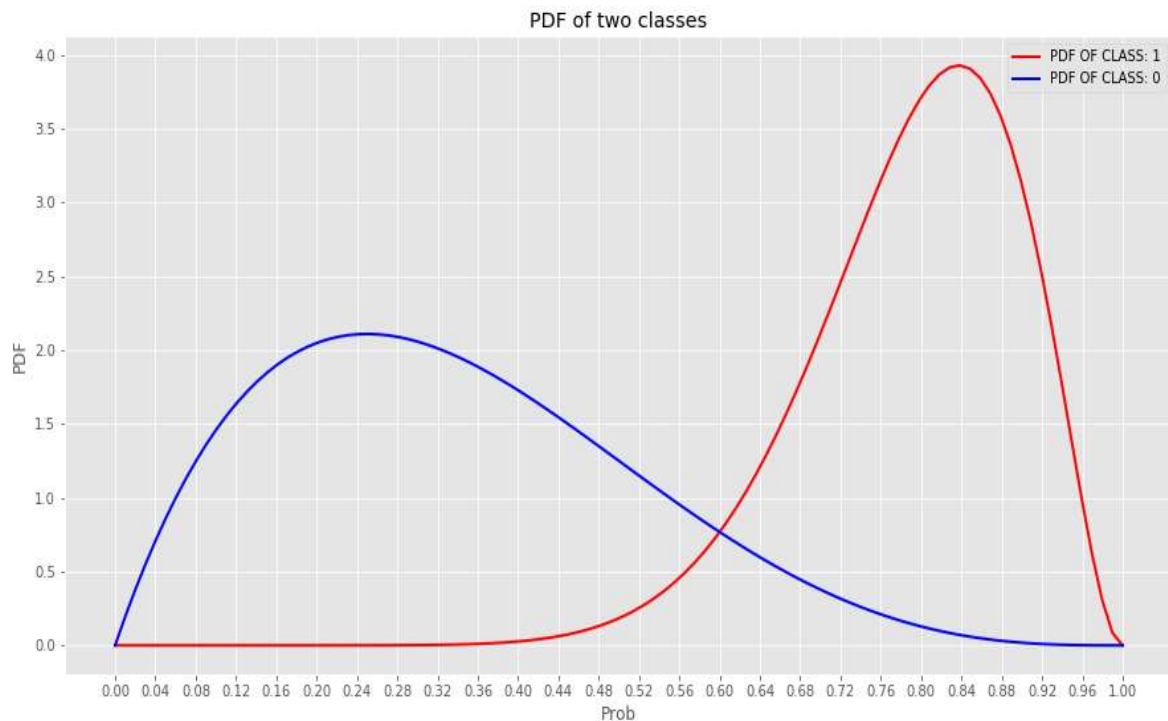
> A

> B

> C ✖

> D

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Mr. Sidharth has solved a two-class classification problem using logistic regression (getting a probability map using sigmoid). Both classes have the same number of training and validation example. He is not interested in training the network anymore but wants to make the best use of the existing model. He is interested in the accuracy metric. So he plotted the probability distribution function for both classes to find the optimal probability thresholding for the classes.

Question 2

1.0/1.0 point (graded)
By observing the above plot, which of the following is the best threshold probability? Note that, greater than threshold means class 1 else class 0.

Hints: Area under each curve is one. For probability 0.64 to 0.68, the area under class 0 curve is around 0.02, and for class 1 curve is around 0.056. This means that 2% of example in class 0 and 5.6% of example in class 1 has a prediction between 0.64 to 0.68 like this.

0.6

0.62 ✔

0.5

0.52

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Question 3

1.0/1.0 point (graded)

Skip connections in the residual network (ResNet) solves the following problem:

Overfitting

Underfittings

Vanishing gradients ✔

None of the above

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Gradient descent:

$$W_t = W_{t-1} - \alpha g_{t-1}$$

Gradient descent with momentum:

$$v_t = \beta v_{t-1} + (1-\beta)g_{t-1} \quad (1)$$
$$(2)$$
$$W_t = W_{t-1} - \alpha v_t \quad (3)$$

RMSProp:

$$s_t = \beta s_{t-1} + (1-\beta)g_{t-1}^2 \quad (1)$$
$$(2)$$
$$W_t = W_{t-1} - \alpha \frac{g_{t-1}}{\sqrt{s_t} + \epsilon} \quad (3)$$

Adam:

$$v_t = \beta_1 v_{t-1} + (1-\beta_1)g_{t-1} \quad (1)$$
$$(2)$$
$$s_t = \beta_2 s_{t-1} + (1-\beta_2)g_{t-1}^2 \quad (3)$$
$$(4)$$
$$W_t = W_{t-1} - \alpha \frac{v_t}{\sqrt{s_t} + \epsilon} \quad (5)$$

Question 4

1.0/1.0 point (graded)

Suppose you are training a model with batch size one. You have already trained for thousand of batches. The next batch data is an

outlier in the dataset. Which of the following optimizer will worst hit the model parameters because of the outlier?

> Gradient descent with momentum

> RMSProp ✔

> Adam

> Optimizers are not meant for dealing with outliers

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Question 5

1.0/1.0 point (graded)

Suppose you have a dataset with multiple features and have to train a linear regression model. Your gut feeling is, a lot of features are not useful, and removing features may lead to losing a few important features. So you have decided to use the regularization technique. Which of the following regularization technique is the most useful in this scenario?

> L1 ✔

> L2

> Dropout

> None of the above

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Question 6

1.0/1.0 point (graded)

What can you do when you do not have much data to train your network on?

> We can use data augmentation to increase training samples artificially.

> We can use fine-tuning or transfer learning

> Neural networks require a lot of data, so we can't proceed without collecting more data.

> Option a and b. ✔

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Please consider the following data for Question 7 – Question 9

Model	Train Set Error	Validation Set Error
Model 1	10%	20%
Model 2	0%	20%

Question 7

1.0/1.0 point (graded)

Which of the following statement is correct about the model 1 in the above table?

> The model has high bias and high variance. ✔

> The model has low bias and high variance.

> The model has low bias and low variance.

> The model has high bias and low variance.

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Question 8

1.0/1.0 point (graded)

What should be the first step to improve model 1?

> Get more data.

> Add more convolution layers or increase the number of filters or both. ✔

> Decrease the number of convolution layers or the number of filters or both.

Use dropout.

Submit   You have used 2 of 2 attempts

Question 9

1.0/1.0 point (graded)

Which of the following will be useful in improving model 2?

Get more data.

Add more convolution layers or increase the number of filters or both.

Use data augmentation.

Use dropout.

✔

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Question 10

0.5/1.0 point (graded)

Which of the following techniques help in regularization?

Data augmentation

Batch normalization

Dropout

L2-regularization

✱

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