Matrix derivatives

Quiz, 3 questions

1	
point	

1.

Choose the correct statements about MLP implementation:

A forward pass of a dense layer can be done with matrix product

You can write both passes of a dense layer with NumPy and make it quick even in Python

You shouldn't prefer matrix operations when working with GPU

A backward pass of a dense layer needs a 4-d tensor derivative

1 point

2.

How many dimensions will a derivative of a 3-d tensor by a 4-d tensor have?

7

1 point

3

Let's play around with matrix derivatives!

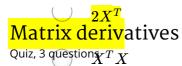
A trace Tr(X) of a matrix X is a sum of its diagonal elements.

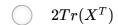
For example: $Tr\begin{pmatrix} 1 & 3 \\ 3 & 1 \end{pmatrix} = 1 + 1 = 2$. Note that trace is a scalar!

Let's find a matrix notation for $\frac{\partial Tr(X^2)}{\partial X}$ for matrix $X = \begin{pmatrix} x_{1,1} & x_{1,2} \\ x_{2,1} & x_{2,2} \end{pmatrix}$, where X^2 is a matrix product $X \cdot X$

Please do this element-wise and figure out a matrix notation for it:

 \bigcirc 2X





 $\bigcap Tr(2X)$



I, **Chinmay kumar Das**, understand that submitting work that isn't my own may result in permanent failure of this course or deactivation of my Coursera account.

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