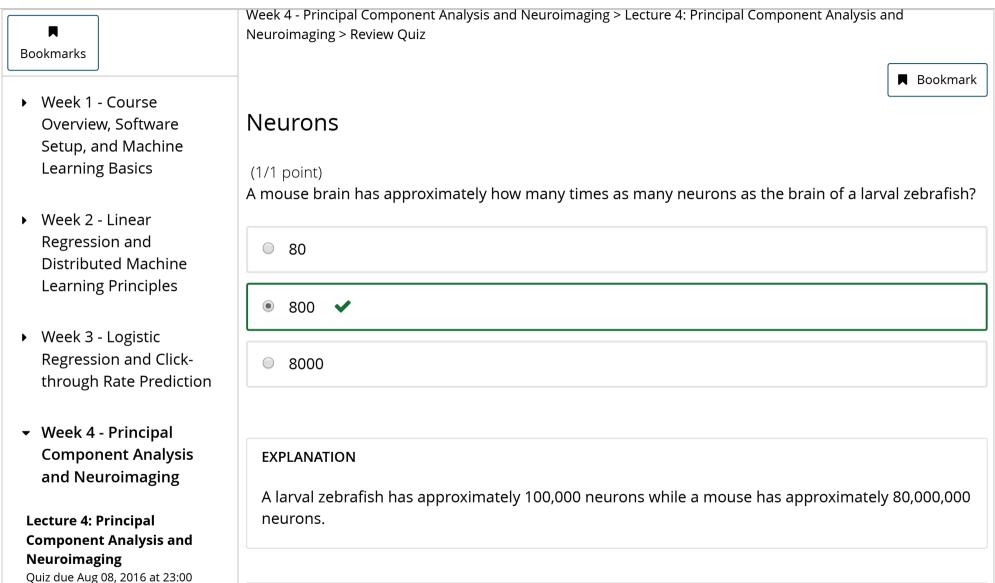


UTC

BerkeleyX: CS120x Distributed Machine Learning with Apache Spark



(A)

fMRI

Lab4 - Neuroimaging Analysis via PCA Lab due Aug 08, 2016 at 23:00	(1/1 point) fMRI scanners provide too low of a resolution to tell, in detail, what is occurring at the neuron level.
Lab4 Quiz	● True ✔
Quiz due Aug 08, 2016 at 23:00 UTC	O False
	EXPLANATION
	fMRI provides a coarse-grained view of neural activity.
	Light-sheet Microscopy
	(1/1 point) Light-sheet microscopy can only be used in transparent animals.
	● True ✔
	O False
	EXPLANATION

Light-sheet microscopy can only be used in transparent animals like the larval zebrafish.

Experiment Data

(1/1 point)

According to the lecture, recording the neuron activity of the entire brain of a larval zebrafish during a typical experiment requires:

- 1 MB of data
- 1 GB of data
- 1 TB of data
- 1 PB of data

EXPLANATION

Recording the neural activity for the larval zebrafish's 100,000 neurons requires approximately 1 TB of data.

Clustering (1/1 point) Clustering is a supervised learning technique. True False 🗸 **EXPLANATION** Clustering does not use labels. It attempts to place similar (according to some measure of similarity) observations into groups based on their features. **PCA Distance Metric** (1/1 point) When working with two dimensional data, if we project data points onto the top principal component (which is a line in 2D space), the distance between the projected points and the original points minimizes which distance? vertical distance

● euclidean distance ✔		
manhattan distance		
horizontal distance		
EXPLANATION		
PCA minimizes the euclidean distance between points and their projections.		
Covariance Matrix Symmetry		
(1/1 point)		
The covariance matrix is asymmetric.		
True		
● False ✔		
EXPLANATION		

The covariance matrix is symmetric. The covariance between vectors u and v is equal to the covariance between v and u, i.e. cov(u, v) == cov(v, u).

Covariance Matrix Diagonal Entries

(1/1 point)

The values along the diagonal of the covariance matrix are variances.

True

False

EXPLANATION

Along the diagonal of the covariance matrix, the values are the covariance of a feature with itself, which is the variance of the feature, i.e. cov(x, x) == var(x).

Principal Components Properties

(1/1 point)

For a set of principal component vectors, the dot product between any two distinct vectors equals:

One One
● Zero ✔
d the number of features
Principal component vectors are orthnormal, which means that they are pair-wise perpendicular. The dot product of perpendicular vectors is zero.
Principal Components
(1/1 point) Principal components equal the eigenvalues of some matrix.
O True
● False ✔
EXPLANATION

Review Quiz | Lecture 4: Principal Component Analysis and Neuroimaging | CS120x Courseware | edX Principal components are eigenvectors of the sample covariance matrix. **Number of Principal Components** (1/1 point) Given a d-dimensional dataset with n observations, the total number of principal components is: n some other number

EXPLANATION

The total number of principal components equals the number of dimensions of the data.

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