MAD Quizz

Exercise 1 Mixture

Questions	Réponses
1. Is a mixture of uniform distributions identifiable ?	☐ yes ■ no
2. The kmeans algorithm assumes that	■ the proportions of the mixture are all equal ☐ the mean vectors of the mixture are equal ■ the covariance matrices of the mixture are equal ■ the covarance matrices are proportional to the identity ■ the components of the mixture are normal
3. The E-step of the EM algorithm computes	■ The expectation of the complete log-likelihood ☐ The probabilities $P(Z_{ik} = 0 \| \boldsymbol{x}_i)$ ☐ The probatilities $P(\boldsymbol{x}_i \| Z_{ik})$
4. The M-step of the EM algorithm maximises	■ the expectation of the log likelihood knowing X: $\log P(X)$ ☐ the expectation of the log likelihood knowing Z: $\log P(Z)$ ☐ something else
5. The EM algoirthm finds a maximum which is	☐ global ■ local
6. A finite mixture is	☐ gaussian ■ a density
7. The Bayesian information criterion	■ is used for model selection ☐ is used for determining the entropy of the mixture

Exercise 2 Principal Component Analysis

Questions	Réponses
1. Principal Component Analysis is used to identify ?	■ new independent variables ☐ clusters
2. The principal components are	☐ vectors spanning a subspace where data is projected ■ a new coordinates system ☐ a gaussian mixture
3. The total variance of the dataset is equal to	☐ the maximum eigenvalue of the empirical covariance matrix ■ the sum of the eigenvalue of the empirical covariance matrix ■ the number of variables if the data is scaled.
4. The principal axis are	■ vectors spanning a subspace where data is projected ■ eigenvectors of the empirical covariance matrix ■ orthogonal vectors.
5. The percentage of projected variance	■ is used for chosing the number of princicpal component ☐ is used for chosing the minimal eigenvalue.
6. Principal Coordinate Analysis aims at	☐ maximizing the total variance ☐ summarizing the principal components ■ finding a representation of the dataset.
7. Principal Component Analysis	■ allows a decomposition of the total variance ■ maximizes the projected variance ■ minimizes the variance in the space orthogonal to the projection space.
8. Principal Component Analysis requires	■ more individuals than variables ■ more variables than individuals.