Machine Learning: Assignment #3

June 13, 2018

1. We saw binomial distribution can be applied when the result of an experiment from a set of two outcomes. What is Bernoulli distribution? How is that different from Binomial?
2. Find out practical use cases for Poisson, Gamma & Multinomial Distributions.
3. There are two types of distribution, namely discrete and continuous. Is there a possibility for using continuous distributions when you always deal with discretized data in practical machine learning?
4. Find some examples of asymmetric distributions.
5. What is the significance of kurtosis of a distribution?
6. If you plot a 1-d gaussian with mu=0 and sigma=1, what is the direction of maximum variance?
7. When the covariance matrix is a diagonal matrix, what is the interpretation?
8. Let's assume that you have a 2-d scatter plot of a circle shape (let's say, the scatter plot looks like a circle of radius 'r'). If you run PCA on it, what would be the directions of the principal components and how many such components can be estimated?
9. For the same circle shape with an origin (10,5), what are the possible basis vectors?
10. Write down three 3 dimension vectors that are linearly independent of each other.
11. What is the difference between orthogonal and orthonormal?
12. What is the rank of a matrix? What would be the rank of PCA transformed matrix?
13. When a matrix is non-singular, can we assume that the matrix has full rank and vice-versa?

14. How can you find the inverse of a non-square matrix?