Bayesian Data Analysis and Data Governance & Compliance

Unit 1:
1. Define the concept of subjective probability with examples.
2. Calculate conditional probability and explain its significance.
3. Demonstrate the calculation of marginal probability in Bayesian data analysis.
4. Apply Bayes theorem to solve real-world problems.
5. Analyze the applications of Bayes theorem in spam filtering and Bayesian search algorithms.

Unit 2:
1. Interpret prior and posterior distributions in Bayesian analysis.
2. Estimate posterior distributions and determine credible intervals.
3. Identify the highest posterior density regions in a given dataset.
4. Construct hierarchical models and explain the concept of Hierarchical Bayes.
5. Differentiate between Hierarchical Bayes and Empirical Bayes methods in Bayesian data analysis.

Unit 3:
1. Implement acceptance-rejection sampling techniques in Bayesian analysis.
2. Utilize importance sampling for estimating complex probability distributions.
3. Explain the basics of Markov chains and their role in Monte Carlo simulations.
4. Implement Gibbs sampling technique in Bayesian data analysis.
5. Evaluate the Metropolis-Hastings MCMC algorithm and use MCMC diagnostics for model evaluation.

Unit 4:
1. Perform Bayesian linear regression analysis for predicting outcomes.
2. Apply Bayesian logistic regression in classification tasks.
3. Interpret the results of Bayesian linear regression models.
4. Assess the performance of Bayesian logistic regression models.
5. Compare and contrast Bayesian linear regression with traditional regression techniques.

Select Language ∨