

## MODULE 5 – EVALUATING HYPOTHESIS, INSTANCE BASED LEARNING, REINFORCEMENT LEARNING

1. Explain the two key difficulties that arise while estimating the Accuracy of Hypothesis.
2. Define the following terms
  - a. Sample error b. True error c. Random Variable
  - d. Expected value e. Variance f. standard Deviation
3. Explain Binomial Distribution with an example.
4. Explain Normal or Gaussian distribution with an example.
5. Suppose hypothesis  $h$  commits  $r = 10$  errors over a sample of  $n = 65$  independently drawn examples.
  - What is the variance and standard deviation for number of true error rate  $\text{error}_D(h)$ ?
  - What is the 90% confidence interval (two-sided) for the true error rate?
  - What is the 95% one-sided interval (i.e., what is the upper bound  $U$  such that  $\text{error}_D(h) \leq U$  with 95% confidence)?
  - What is the 90% one-sided interval?

$\alpha$	0.100	0.050	0.025	0.001
$1 - \alpha$	0.900	0.950	0.975	0.999
$z_{1-\alpha}$	1.28	1.64	1.96	3.09

6. What are instance based learning? Explain key features and disadvantages of these methods.
7. Explain the K – nearest neighbour algorithm for approximating a **discrete – valued** function  $f : \mathcal{R}^n \rightarrow V$ , with pseudo code
8. Describe K-nearest Neighbour learning Algorithm for **continues (real) valued** target function.
9. Discuss the major drawbacks of K-nearest Neighbour learning Algorithm and how it can be corrected

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10. Define the following terms with respect to K - Nearest Neighbour Learning :  
i) Regression ii) Residual iii) Kernel Function.
  11. Explain Locally Weighted Linear Regression.
  12. Explain radial basis function
  13. Explain CADET System using Case based reasoning.
  14. What is Reinforcement Learning and explain Reinforcement learning problem with neat diagram.
  15. Write Reinforcement learning problem characteristics.
  16. Explain the Q function and Q Learning Algorithm assuming deterministic rewards and actions with example.