KUMARAGURU
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B.E DEGREE EXAMINATIONS: NOV/DEC 2022

(Regulation 2018)

Seventh Semester

COMPUTER SCIENCE AND ENGINEERING

U18CST7002: Machine Learning Techniques

COURSE OUTCOMES

CO1: Differentiate the implementation of mathematical model to various machine learning methods. (K_4)

CO2: Illustrate graphical models and multiple learners. (K4)

CO3: Develop projects using appropriate machine learning approaches for real life problems. (K_5, S3)

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Differentiate between supervised learning and Unsupervised Learning?	CO1	[K_2]
2.	Explain reinforcement learning with examples?	CO1	[K_2]
3.	What is overfitting and Underfitting with examples?	CO1	[K_1]
4.	Given the following data of transactions at a shop, calculate the support and confidence values of milk-bananas,bananas-milk,milk-cholocate and chocolate-milk	CO1	[K_3]

Transaction	Item in basket
1	Milk,bananas,cholocate
2	Milk,cholocate
3	Milk,bananas
4	Cholocate
5	Cholocate
6	Milk,cholocate

5.	Differentiate classification and clustering technique.	CO3	[K_2]
6.	Tell about likelihood-based and discriminant-based classification.	CO3	[K_1]
7.	Write about dendrogram with example.	CO3	[K_2]
8.	Explain the functionality lazy learner and eager learner with one example.	CO3	[K_2]
9.	What are the categories in graphical model?	CO2	[K_2]

| 10. | List out difference between bagging and boosting techniques. | | CO2 | [K_2] |

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

| 11. | a) | Explain classification using Bayes method to compute class probabilities and generalize to make rational selections among many actions to minimize expected risk with discriminant functions? | 10 | CO1 | [K_2] |
| | b) | Illustrate multistage cascading technique with appropriate diagram. | 6 | CO2 | [K_2] |

| 12. | a) | Using a derivative mathematical model, explain the parametric approach of regression | 10 | CO1 | [K_2] |
| | b) | Discuss the following functions involved in parametric classification. | 6 | CO1 | [K_2] |

       i)   Likelihood Function
       ii)   Posteriors with equal priors
       iii)   Expected risks

| 13. | a) | Illustrate the importance of Graphical model in Bayesian networks. Explain three canonical cases with appropriate example. | 10 | CO2 | [K_2] |
| | b) | Discuss condensed nearest neighbor algorithm. | 6 | CO1 | [K_2] |

| 14. | a) | Summarize different types of HMM model and it's working principles. | 10 | CO2 | [K_2] |
| | b) | Illustrate Ripper algorithm for learning rules from the data. | 6 | CO1 | [K_2] |

| 15. | a) | Explain K-means clustering algorithm. Illustrate encoding and decoding techniques implementation using clustering concepts. | 10 | CO3 | [K_2] |
| | b) | Discuss Ada Boost algorithm. Discuss the importance of Ada Boost from other boosting techniques. | 6 | CO2 | [K_2] |

| 16. | a) | Elaborate Expectation-Maximization(EM) algorithm and give the detailed discussion of E-step and M-step computation using Bayes rule and Gaussian model. | 10 | CO1 | [K_2] |
| | b) | Describe how to tune model complexity and model selection approaches for balancing model complexity. | 6 | CO1 | [K_2] |

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