2014
M.E. (Computer Science and Engineering)
Second Semester
Elective - III
CS-8205: Machine Learning

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

I	a) How does L1 regularization differ from L2 regularization? Discuss in brief.	(02)
	b) What is a kernel function in SVM and what is its importance? Discuss in brief.	(02)
	c) List any four applications of anomaly detection systems.	(02)
	d) What do you understand by Multivariate Gaussian Distribution? Discuss in brief.	(02)
	e) How does ordinal data differ from ratio data? Discuss in brief.	(02)
	PART I	
II	a) What is the normal equation? How is it used to find the optimal parameters for a linear regression model? Discuss.	(05)
	b) What are some of the common metrics used to evaluate the performance of a supervised learning algorithm? Discuss.	(05)
III	a) What is the form of hypothesis and cost function in case of linear regression with multiple variables? How the cost function can be optimized? Discuss.	(05)
	b) How does the kernel trick allow SVMs to handle non-linear decision boundaries? Discuss.	(05)
IV	a) How the concept of logistic regression can be applied to solve multi-class classification problems? Discuss.	(05)
	b) What is the optimization objective of SVMs? How does it help finding the decision boundary? Discuss.	(05)
	PART II	
V	a) How clustering algorithms can be categorized? Briefly discuss the characteristics of each category.	(05)
	b) Briefly discuss the EM algorithm and its applications in machine learning.	(05)
VI	a) How does PCA help in reducing the dimensionality of the data? What is the role of eigenvalues and eigenvectors in this process? Discuss.	(05)
	b) What are the different approaches to building recommender systems? What are their characteristics? Discuss.	(05)
VII	Write notes on the following:	
	a) DBSCAN approach to clustering	(05)
	b) Density Estimation and its applications	(05)

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