PRANVEER SINGH INSTITUTE OF TECHNOLOGY, KANPUR

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Even Semester 2023-24

B. Tech.- Third Year

Semester- VI

Lab File

Machine Learning Lab

(KAI651)

Submitted To :	**Submitted By :**
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Designation :Assistant Professor	**Roll No.** :_____
	Section :_____

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Department Vision Statement

To be a recognized Department of Computer Science & Engineering that produces versatile computer engineers, capable of adapting to the changing needs of computer and related industry.

Department Mission Statements

The mission of the Department of Computer Science and Engineering is:

i. To provide broad based quality education with knowledge and attitude to succeed in Computer Science & Engineering careers.

ii. To prepare students for emerging trends in computer and related industry.

iii. To develop competence in students by providing them skills and aptitude to foster culture of continuous and lifelong learning.

iv. To develop practicing engineers who investigate research, design, and find workable solutions to complex engineering problems with awareness & concern for society as well as environment.

Program Educational Objectives (PEOs)

i. The graduates will be efficient leading professionals with knowledge of computer science & engineering discipline that enables them to pursue higher education and/or successful careers in various domains.

ii. Graduates will possess capability of designing successful innovative solutions to real life problems that are technically sound, economically viable and socially acceptable.

iii. Graduates will be competent team leaders, effective communicators and capable of working in multidisciplinary teams following ethical values.

iv. The graduates will be capable of adapting to new technologies/tools and constantly upgrading their knowledge and skills with an attitude for lifelong learning

Department Program Outcomes (POs)

The students of Computer Science and Engineering Department will be able:

1. Engineering knowledge: Apply the knowledge of mathematics, science, Computer Science & Engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and Computer Science & Engineering sciences.

3. Design/development of solutions: Design solutions for complex Computer Science & Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Investigation: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex Computer Science & Engineering activities with an understanding of the limitations.

6. The Engineering and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice in the field of Computer Science and Engineering.

7. Environment and sustainability: Understand the impact of the professional Computer Science & Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Computer Science & Engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex Computer Science & Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the Computer Science & Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Department Program Specific Outcomes (PSOs)

The students will be able to:

1. Use algorithms, data structures/management, software design, concepts of programming languages and computer organization and architecture.

2. Understand the processes that support the delivery and management of information systems within a specific application environment.

Course Outcomes

*Level of Bloom's Taxonomy	Level to be met	*Level of Bloom's Taxonomy	Level to be Met
L1: Remember	1	L2: Understand	2
L3: Apply	3	L4: Analyze	4
L5: Evaluate	5	L6: Create	6

CO Number	Course Outcomes
KAI-651.1	Remember the mathematical and statistical prospective of machine learning algorithms through python programming.
KAI-651.2	Understand machine learning algorithms to solve real world problems.
KAI-651.3	Apply appropriate data sets to the machine learning algorithms and predict unknown target data class or form clusters.
KAI-651.4	Design Java/Python programs for various learning algorithms and analyze various performance metrics result by cross validation testing method.

List of Experiments

Lab No.	Lab Experiment	Corresponding CO
1	Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.	1
2	For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate- Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.	2
3	Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.	2
4	Build an Artificial Neural Network by implementing the Backpropagation algorithm and test the same using appropriate data sets.	4
5	Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.	2
6	Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.	3
7	Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.	4
8	Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.	3
9	Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.	2
10	Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.	3

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