PVP20

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)
Kanuru, Vijayawada-520007

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI & ML)

III B. Tech – I Semester CSE (AI&ML)

Machine Learning Lab

Course Code	20AM3551	**Year**	III	**Semester**	I
Course Category	PCC Lab	**Branch**	CSE(AI&ML)	**Course Type**	Practical
Credits	1.5	**L-T-P**	0-0-3	**Prerequisites**	Python Programming
Continuous Internal Evaluation	15	**Semester End Examination**	35	**Total Marks**	50

Course Outcomes		
Upon successful completion of the course, the student will be able to		
CO1	Demonstrate experimental procedures through oral communication and submit comprehensive documentation reports.	**L2**
CO2	Apply supervised and unsupervised machine learning techniques for developing predictive and descriptive models using tools.	**L3**
CO3	Analyze machine learning problems, and critically assess their performance and limitations.	**L4**
CO4	Evaluate the performance of machine learning models using suitable metrics across various datasets.	**L5**
CO5	Design and develop the system that demonstrates intelligence using Machine Learning	**L6**

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:High, 2: Moderate, 1:Low)

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	2									2				
CO2					3							3	3	
CO3		3										3		
CO4				3								3		
CO5												3		3

Syllabus		
Expt No.	**Contents**	**Mapped CO**
1	Explore different Tools: Jupyter Notebook, PyTorch, TensorFlow, Google Colab, Kaggle.	CO1
2	Develop and implement linear and non-linear regression models, and evaluate their performance using a comprehensive set of appropriate metrics across various datasets.	CO1 to CO4
3	Implement logistic regression on different datasets & evaluate using accuracy, precision, recall, AUC-ROC to assess generalizability.	CO1 to CO4
4	Evaluate the performance of KNN on various Datasets using Accuracy as the metric, with a focus on determining the optimal number of neighbors (K).	CO1 to CO4
5	Implement Support Vector Machines (SVM) for classification on various datasets and evaluate their performance using confusion matrices, precision, recall, and F1 scores.	CO1 to CO4
6	Implement a simple perceptron and multi-layer perceptron to classify handwritten digits using the MNIST dataset.	CO1 to CO4
7	Evaluate ANNs for image recognition (e.g., MNIST). Compare with SVMs & KNNs using accuracy, precision, recall, F1. Explore ANN strengths & weaknesses: impact of network architecture & data quality, and interpretability vs. other algorithms.	CO1 to CO4
8	Apply ensemble learning methods (bagging, boosting, and stacking) and evaluate their performance using accuracy, precision, and recall metrics to determine the best ensemble method for a given task.	CO1 to CO4
9	Implement Recurrent Neural Network (RNN) architectures, including Long Short-Term Memory (LSTM) for sequence modeling tasks such as text generation or sentiment analysis.	CO1 to CO4
10	**Capstone Project:** Development of a robust end-to-end machine learning pipeline adhering to the Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology, culminating in a comprehensive research paper that elucidates the chosen machine learning technique, the specific application domain, and the empirical results obtained	CO1 to CO5

Learning Resources
Text Books
1. Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, Aurelien Geron, Third Edition, 2022, O'Reilly 2. Pattern Recognition and Machine Learning, Christopher M. Bishop, First Edition, 2016, Springer
Reference Books
1. Machine Learning, Tom M. Mitchell, First Edition, 2017, McGraw Hill Education

2. Machine Learning: A Probabilistic Perspective, Kevin P. Murphy, 2012, MIT Press

e- Resources & other digital material

1. Practical Machine Learning with TensorFlow: https://nptel.ac.in/courses/106106213
2. https://www.tensorflow.org/tutorials
3. https://pytorch.org/tutorials/