



UNIT I

Chapter 1 : Introduction to Machine Learning

1-1 to 1-11

Syllabus : Classic and adaptive machines, Machine learning matters, Beyond machine learning-deep learning and bio inspired adaptive systems, Machine learning and Big data. Important Elements of Machine Learning-Data formats, Learnability

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UNIT II

Chapter 2 : Feature Selection

2-1 to 2-34

Syllabus : Scikit-learn Dataset, Creating training and test sets, managing categorical data, Managing missing features, Data scaling and normalization, Feature Selection and Filtering, Principle Component Analysis(PCA) - Non negative matrix factorization, Sparse PCA, Kernel PCA, Atom Extraction and Dictionary Learning.

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UNIT III

Chapter 3 : Regression**3-1 to 3-36**

Syllabus : Linear Regression : Linear Models, A bi-dimensional example, Linear Regression and higher dimensionality, Ridge, Lasso and ElasticNet, Robust regression with random sample consensus, Polynomial regression, Isotonic regression.

Logistic Regression : Linear classification, Logistic regression, Implementation and Optimizations, Stochastic gradient descent algorithms, Finding the optimal hyper-parameters through grid search, Classification metric, ROC Curve.

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UNIT IV

Chapter 4 : Naïve Bayes and Support Vector Machine

4-1 to 4-22

Syllabus : Bayes' Theorem, Naïve Bayes' Classifiers, Naïve Bayes in Scikit-learn - Bernoulli Naïve Bayes, Multinomial Naïve Bayes, and Gaussian Naïve Bayes. Support Vector Machine (SVM) : Linear Support Vector Machines, Scikit-learn implementation- Linear Classification, Kernel based classification, Non-linear Examples. Controlled Support Vector Machines, Support Vector Regression.

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UNIT V

Chapter 5 : Decision Trees and Ensemble Learning

5-1 to 5-30

Syllabus : Decision Trees : Impurity measures, Feature Importance. Decision Tree Classification with Scikit-learn, Ensemble Learning- Random Forest, AdaBoost, Gradient Tree Boosting, Voting Classifier. Clustering Fundamentals:Basics, K-means: Finding optimal number of clusters, DBSCAN, Spectral Clustering. Evaluation methods based on Ground Truth- Homogeneity, Completeness, Adjusted Rand Index. Introduction to Meta Classifier:Concepts of Weak and eager learner, Ensemble methods, Bagging, Boosting, Random Forests.

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UNIT VI

Chapter 6 : Clustering Techniques

6-1 to 6-18

Syllabus : Hierarchical Clustering, Expectation maximization clustering, Agglomerative Clustering - Dendrograms, Agglomerative clustering In Scikit- learn, Connectivity Constraints. Introduction to Recommendation Systems : Naïve User based systems, Content based Systems, Model free collaborative filtering-singular value decomposition, alternating least squares. Fundamentals of Deep Networks : Defining Deep learning, common architectural principles of deep networks, the building blocks of deep networks.

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Tech Knowledge Publications