SRMIST, RAMAPURAM

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**Course Code & Course Name:**

**Faculty Name:**

***NPTEL VIDEOS link***

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| **Syllabus Topics** | **NPTEL Videos** | **NPTEL Topics** |
| **Unit I**  Statistical terminology for model building and validation-Machine Learning, Major differences between statistical modeling and machine learning- Steps in machine learning model development and deployment- Statistical fundamentals and terminology for model building and validation- Bias versus variance trade-off, Train and test data- Linear regression versus gradient descent Machine learning losses- When to stop tuning machine learning models- Train, validation, and test data Cross-validation- Grid Search- Machine learning model overview. | [Statistical Modelling (youtube.com)](https://www.youtube.com/watch?v=eRgeKID7Er8)  [Machine Learning (NPTEL) Chaitanya Tejaswi (youtube.com)](https://www.youtube.com/watch?v=BRMS3T11Cdw&list=PL3pGy4HtqwD2a57wl7Cl7tmfxfk7JWJ9Y) | **Statistical Modelling**  **Introduction to Machine Learning** |
| **Unit II**  Comparison between regression and machine learning models-Compensating factors in machine learning models- Assumptions of linear regression Steps applied in linear regression modeling- Example of simple linear regression from first principles- Machine learning models - ridge and lasso regression-Example of ridge regression machine learning, Example of lasso regression machine learning model- Logistic Regression Versus Random Forest-Maximum likelihood estimation- Terminology involved in logistic regression-Applying steps in logistic regression modeling - Random forest-Example of random forest using German credit data -Grid search on random forest - Variable importance plot- Comparison of logistic regression with random forest. | [Simple Linear Regression(Part A) (youtube.com)](https://www.youtube.com/watch?v=OQV8WmUdeIo)  [Logistic Regression (youtube.com)](https://www.youtube.com/watch?v=z9XAXXGwUzM) | **Linear Regression Modelling**  **Logistic Regression** |
| **Unit III**  K-nearest neighbors KNN voter example, Curse of dimensionality-Curse of dimensionality with 1D, 2D, and 3D example , Curse of dimensionality with 3D example, KNN classifier with breast cancer Wisconsin data example.Naive Bayes, Probability fundamentals - Joint probability, Understanding Bayes theorem with conditional probability,Naive Bayes classification.Laplace estimator, Naive Bayes SMS spam classification example | [NPTEL-NOC IITM (youtube.com)](https://www.youtube.com/channel/UCYa1WtI-vb_bx-anHdmpNfA)  [Naïve Bayes (youtube.com)](https://www.youtube.com/watch?v=uQSn3oLVu-8) | K-nearest neighbors  Naïve Bayes classification |
| **Unit IV**  Support Vector Machines -Support vector machines working principles- Maximum margin classifier - Support vector classifier- Support vector machines  -Kernel functions, Artificial Neural Networks- Forward propagation and back propagation -Optimization of neural networks -Stochastic gradient descent – SGD. Introduction to deep learning- Solving methodology-Deep learning software | [Mod-01 Lec-29 Support Vector Machine (youtube.com)](https://www.youtube.com/watch?v=SRVswRH5Q7E)  [Deep Learning NPTEL-NOC IITM (youtube.com)](https://www.youtube.com/watch?v=aPfkYu_qiF4&list=PLyqSpQzTE6M9gCgajvQbc68Hk_JKGBAYT) | **Support Vector Machine**  **Deep Learning** |
| **Unit V**  K-means Clustering -Introduction to K-means Clustering- K-means working methodology from first principles -Optimal number of clusters and cluster evaluation  - The elbow method-K-means clustering with the iris data example. Principal Component Analysis(PCA) -Introduction to PCA -PCA working methodology from first principles  -PCA applied on handwritten digits using scikit-learn. Singular Value Decomposition (SVD) -Introduction to SVD -SVD applied on handwritten digits using scikit-learn | [Mod-03 Lec-26 K-Means Algorithm and Hierarchical Clustering.. (youtube.com)](https://www.youtube.com/watch?v=pBAbMbgaBAk)  [Mod-01 Lec-30 Principal Component Analysis (PCA) (youtube.com)](https://www.youtube.com/watch?v=hkCT-6KJAK0) | **K-means clustering**  **Principal Component Analysis** |

**Course Faculty Course Coordinator HOD/CSE**