

Machine Learning & Deep Learning

Session 1: Introduction to Artificial Intelligence

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| ✓ What is Artificial Intelligence? | ✓ Why Artificial Intelligence? |
| ✓ Various AI Techniques, Application of AI | ✓ How AI used in Decision Making |

Session 2: Introduction to Machine Learning and Deep Learning

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| ✓ What is Machine Learning? | ✓ Summer to Winter of Machine Learning |
| ✓ What are the features of Machine Learning | ✓ Difference between Machine Learning and Deep Learning |
| ✓ Application of Machine Learning and Deep Learning | ✓ Examples of Machine Learning and Deep Learning |

Session 3: Tools used in Machine Learning & Deep Learning

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| ✓ Various Tools used in ML and DL | ✓ Introduction of Computer Programming Tools used in ML and DL |
| ✓ Computer Solutions | ✓ Introduction to Python, R, Julia, Matlab etc. |

Session 4: Programming Languages

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| ✓ Basics of Python Programming | ✓ List, Array, Data Structure, Numerical tools |
| ✓ Basics of MATLAB Programming | ✓ Various tool boxes, Simulink and command line instruction |

Session 5: Mathematical Basics 1, 2 and 3

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| ✓ Methods and Codes | ✓ Linear Algebra, Vector Calculus, Vector Space, Matrix |
| ✓ Statistics, Differentiation, Taylors Series | ✓ Probability, Bayes Theorem, Total Probability Theorem, Random Variables |

Session 6: Computational Basics

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| ✓ Numerical Computation and Optimization | ✓ Introduction to Machine Learning Packages |
| ✓ Linear and Logistics Regression | ✓ Bias/Variance, Tradeoff, Regularization |

Session 7: Inductive Learning

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| ✓ MLE, MAP, Applications, Decision Tree | ✓ Random Tree, Random Forest, Conceptual Cluster |
| ✓ Inductive Logic Programming | |

Session 8: Neural Networks

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| ✓ Single and Multilayer Perceptron | ✓ Backpropagation, Applications, RBF and SOM |
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Session 9: Deep Neural Networks

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| ✓ Convolutional Neural Networks | ✓ CNN Operations, CNN Architectures, Training |
| ✓ Transfer Learning, Applications | |

Session 10: Classification Techniques

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| ✓ SVM, Naïve Bayes, Applications | ✓ Classification Techniques, K-Means, GMM |
| ✓ Expectation Maximization | ✓ Applications of Classification Techniques |

Session 11: Unsupervised Learning

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| ✓ kNN, Reinforcement Learning | ✓ Boltzmann Learning |
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Session 12: Project

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| ✓ Working with Machine Learning Projects | |
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