INFOSOFT IT SOLUTIONS

Training | Projects | Placements

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Machine Learning

Introduction to Machine Learning

- Overview of Machine Learning: History, applications, and significance
- Types of Machine Learning: Supervised, Unsupervised, Reinforcement Learning
- Machine Learning Workflow: Data collection, preprocessing, model building, evaluation, deployment

Python Fundamentals for Machine Learning

- Introduction to Python for Data Science: Basics of Python programming
- Essential Libraries: NumPy, Pandas, Matplotlib, Scikit-learn
- Data Visualization: Plotting data for analysis and presentation

Data Preprocessing and Exploration

- Data Cleaning: Handling missing data, outliers, and noise
- Data Transformation: Normalization, scaling, encoding categorical variables
- Exploratory Data Analysis (EDA): Visualizing data distributions, correlations, and patterns

Supervised Learning Algorithms

- Linear Regression: Simple and multiple linear regression
- Logistic Regression: Binary and multiclass classification

- Decision Trees and Random Forests: Ensemble methods for classification and regression
- Support Vector Machines (SVM): Kernel methods for classification and regression

Model Evaluation and Validation

- Model Selection: Training and testing datasets, cross-validation
- Evaluation Metrics: Accuracy, precision, recall, F1-score, ROC curves
- Overfitting and Underfitting: Bias-variance trade-off, regularization techniques

Unsupervised Learning Algorithms

- Clustering Techniques: K-means, hierarchical clustering
- Dimensionality Reduction: Principal Component Analysis (PCA), t-SNE
- Association Rule Learning: Apriori algorithm for market basket analysis

Neural Networks and Deep Learning

- Introduction to Neural Networks: Perceptron, activation functions
- Deep Learning Fundamentals: Feedforward Neural Networks, Backpropagation
- Convolutional Neural Networks (CNNs): Image recognition and classification
- Recurrent Neural Networks (RNNs): Sequence modeling, text generation

Natural Language Processing (NLP)

- Text Preprocessing: Tokenization, stemming, lemmatization
- Bag-of-Words and TF-IDF Models: Representing text data
- Sentiment Analysis: Classifying sentiment from text data
- Named Entity Recognition (NER) and Text Generation

Reinforcement Learning

- Introduction to Reinforcement Learning: Markov Decision Processes (MDPs)
- Q-Learning and Deep Q-Learning: Learning optimal policies
- Applications of Reinforcement Learning: Game playing, robotics

Machine Learning Deployment and Production

- Model Deployment: Exporting models, integrating with web applications
- Containerization and Microservices: Docker, Kubernetes for scalable deployments
- Model Monitoring: Performance tracking, feedback loops, and updates

Advanced Topics in Machine Learning

- Transfer Learning: Using pre-trained models for new tasks
- Generative Adversarial Networks (GANs): Generating synthetic data
- Explainable AI: Interpreting model decisions, fairness in AI

Ethical Considerations in Machine Learning

- Bias and Fairness: Addressing biases in data and models
- Privacy and Security: Protecting sensitive information
- AI Ethics Guidelines and Regulations

Machine Learning Projects and Case Studies

- Real-world Machine Learning Projects: Implementation and evaluation
- Case Studies: Industry-specific applications (e.g., healthcare, finance)
- Presentation and Documentation of Machine Learning Projects