INFOSOFT IT SOLUTIONS

Training | Projects | Placements

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JUPYTER NOTEBOOK TRAINING

1: Introduction to Jupyter Notebook

1: Getting Started

- Introduction to Jupyter Notebook
- Installation and Setup
  - Installing Anaconda
  - Launching Jupyter Notebook
- Understanding the Jupyter Interface
  - Menu bar
  - Toolbar
  - Code cells vs. Markdown cells
- Basic Operations
  - Creating and saving notebooks
  - Running cells
  - Keyboard shortcuts

2: Basic Python Programming

- Variables and Data Types
- Basic Operators
- Conditional Statements
- Loops (for, while)
- Functions and Modules

3: Introduction to Pandas

- Installing Pandas
- Data Structures: Series and DataFrame
- Reading and Writing Data
    - CSV
    - Excel
    - SQL
- Data Frame Operations
    - Indexing and selecting data
    - Filtering
    - Sorting

4: Data Cleaning and Preparation

- Handling Missing Data
- Data Transformation
- String Operations
- Aggregating and Grouping Data

3: Data Visualization

5: Introduction to Matplotlib and Seaborn

- Installing Matplotlib and Seaborn
- Basic Plotting with Matplotlib
    - Line Plots
    - Bar Plots
    - Histograms

- Customizing Plots
    - Titles and Labels
    - Legends
    - Colors and Styles
    -

6: Advanced Visualization

- Plotting with Seaborn
    - Distribution Plots
    - Categorical Plots
    - Matrix Plots
- Interactive Visualizations with Plotly
    - Installing Plotly
    - Basic Interactive Plots
    - Customizing Interactive Plots

4: Advanced Jupyter Features

7: Interactive Widgets

- Installing ipy widgets
- Basic Widgets
    - Slider
    - Dropdown
    - Text
- Linking Widgets and Functions

8: Advanced Notebook Features

- Magic Commands
    - Line and cell magics
    - Timeit
    - Debugging
- Exporting Notebooks
    - HTML
    - PDF
    - LaTeX
- Collaboration
    - JupyterHub
    - Nbviewer

5 : Machine Learning with Scikit-Learn

9: Introduction to Machine Learning

- Overview of Machine Learning
- Installing Scikit-Learn
- Supervised Learning
    - Regression
    - Classification
- Unsupervised Learning
    - Clustering
    - Dimensionality Reduction

ADVANCE TRAINING ;-

1: Advanced Jupyter Notebook Features

1: Advanced Notebook Features

- Advanced Markdown
    - LaTeX for Mathematical Notation
    - Embedded HTML and CSS
- Magic Commands
    - Advanced Line and Cell Magics
    - Custom Magic Functions
- Extensions and Customizations
    - Installing and Managing Jupyter Extensions
    - Using Jupyter Themes
    - Creating Custom Jupyter Widgets

2: JupyterLab

- Introduction to JupyterLab
- JupyterLab Interface and Features
    - Workspaces
    - Code Consoles
    - File and Data Management
- Extensions and Customizations in Jupyter Lab
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2: Advanced Data Manipulation with Pandas

3: Data Manipulation Techniques

- Advanced Indexing and Selection
- MultiIndex and Hierarchical Indexing
- Advanced Grouping Operations
    - GroupBy with Multiple Keys
    - Applying Multiple Functions
- Reshaping and Pivoting Data

4: Performance Optimization

- Efficient Data Handling
    - Working with Large Datasets
    - Memory Optimization
- Vectorization and Performance Tuning
- Parallel Processing with Dask

3: Advanced Data Visualization

5: Advanced Matplotlib and Seaborn

- Customizing Complex Plots
    - Subplots and Multiple Axes
    - 3D Plotting with Matplotlib
- Advanced Seaborn Techniques
    - Complex Statistical Plots
    - Custom Theming and Styling

6: Interactive and Real-time Visualization

- Advanced Plotly for Interactive Visualizations
    - 3D Scatter and Surface Plots
    - Interactive Dashboards
- Real-time Data Visualization
    - Using Bokeh
    - Streaming Data with Plotly and Bokeh
    -

4: Interactive Widgets and Applications

7: Building Interactive Applications

- Advanced ipywidgets
    - Interactive Forms and Dynamic Controls
    - Custom Widget Creation
- Jupyter Dashboards
    - Creating Interactive Dashboards
    - Deploying Dashboards

8: Voila and Binder

- Converting Notebooks to Web Applications with Voila
- Deploying Notebooks using Binder
- Integrating Jupyter with Web Technologies (HTML, CSS, JavaScript)

5: Machine Learning and Deep Learning

9: Advanced Machine Learning Techniques

- Advanced Data Preprocessing
    - Feature Engineering
    - Pipelines and Transformations
- Ensemble Methods
    - Bagging, Boosting, and Stacking
- Model Evaluation and Hyperparameter Tuning
    - Cross-Validation Techniques
    - Grid Search and Random Search

10: Deep Learning with TensorFlow and Keras

- Introduction to Deep Learning
  - Neural Networks Basics
  - TensorFlow and Keras Overview
- Building and Training Deep Learning Models
  - Convolutional Neural Networks (CNNs)
  - Recurrent Neural Networks (RNNs)
- Advanced Topics in Deep Learning
  - Transfer Learning
  - Generative Adversarial Networks (GANs)

6: Big Data and Cloud Integration

11: Big Data Integration

- Working with Apache Spark
  - PySpark Basics
  - Data Processing with PySpark
- Integrating Jupyter with Hadoop

12: Cloud Integration and Deployment

- Using Jupyter on Cloud Platforms
  - AWS SageMaker
  - Google Colab
  - Microsoft Azure Notebooks
- Deploying Jupyter Notebooks as Services
  - Dockerizing Jupyter Notebooks
  - CI/CD for Jupyter Notebooks

7: Collaboration and Version Control

13: Collaborative Workflows

- Using JupyterHub for Multi-user Environments
- Real-time Collaboration with JupyterLab
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14: Version Control and Reproducibility

- Using Git with Jupyter Notebooks
    - Version Control Best Practices
    - Collaboration via GitHub

ADVANCE TOPICS ;-

1: Advanced Notebook Features;-

- **Advanced Markdown and LaTeX**:
    - Creating complex documents using advanced Markdown.
    - Embedding LaTeX for mathematical notation.
- **Magic Commands**:
    - Utilizing advanced line and cell magics.
    - Creating custom magic functions.
- **Extensions and Customizations**:
    - Installing and managing Jupyter extensions.
    - Customizing the notebook interface.
    - Creating custom Jupyter widgets.

2: Jupyter Lab

- **Introduction to Jupyter Lab**:
    - Overview and benefits of JupyterLab.
- **Interface and Features**:
    - Workspaces, code consoles, and managing files and data.
- **Extensions and Customizations**:
    - Installing and using Jupyter Lab extensions.
    - Customizing the Jupyter Lab interface.

2: Advanced Data Manipulation with Pandas

3: Advanced Data Manipulation

- **Advanced Indexing and Selection**:
  - MultiIndex and hierarchical indexing.
  - Advanced selection techniques.
- **Grouping Operations**:
  - Grouping by multiple keys.
  - Applying multiple functions.
  - Custom aggregations.

4: Performance Optimization

- **Efficient Data Handling**:
  - Working with large datasets.
  - Memory optimization techniques.
- **Vectorization and Performance Tuning**:
  - Using vectorized operations.
  - Optimizing performance.
- **Parallel Processing with Dask**:
  - Introduction to Dask.
  - Parallel processing with Dask and Pandas.

3: Advanced Data Visualization

5: Advanced Matplotlib and Seaborn

- **Complex Plot Customization**:
  - Creating subplots.
  - Multiple axes.
  - Advanced plotting techniques.
- **3D Plotting with Matplotlib**:
  - Creating and customizing 3D plots.
- **Advanced Seaborn Techniques**:
  - Creating complex statistical plots.
  - Custom theming and styling.

6: Interactive and Real-time Visualization

- **Advanced Plotly Techniques**:
  - Creating 3D scatter and surface plots.
  - Building interactive dashboards.
- **Real-time Data Visualization**:
  - Using Bokeh for streaming data.
  - Integrating Plotly and Bokeh for real-time visualization.

4: Interactive Widgets and Applications

7: Building Interactive Applications

- **Advanced ipywidgets**:
  - Creating interactive forms.
  - Dynamic controls.
  - Custom widgets.
- **Jupyter Dashboards**:
  - Creating and deploying interactive dashboards.

8: Voila and Binder

- **Voila**:
  - Converting notebooks into standalone web applications.
- **Binder**:
  - Deploying notebooks online using Binder.
  - Integrating Jupyter notebooks with web technologies (HTML, CSS, JavaScript).

5: Machine Learning and Deep Learning

9: Advanced Machine Learning Techniques

- **Data Preprocessing**:
  - Advanced feature engineering.
  - Using pipelines and transformations.
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- **Ensemble Methods**:
  - Implementing bagging, boosting, and stacking techniques.
- **Model Evaluation and Hyperparameter Tuning**:
  - Advanced cross-validation techniques.
  - Hyperparameter tuning with grid search and random search.

10: Deep Learning with TensorFlow and Keras

- **Introduction to Deep Learning**:
  - Basics of neural networks.
  - Overview of TensorFlow and Keras.
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- **Building Deep Learning Models**:
  - Creating and training CNNs, RNNs.
- **Advanced Deep Learning Topics**:
  - Transfer learning.
  - Generative Adversarial Networks (GANs).

6: Big Data and Cloud Integration

11: Big Data Integration

- **Working with Apache Spark**:
  - Introduction to PySpark.
  - Data processing with PySpark.
- **Integrating Jupyter with Hadoop**:
  - Using Hadoop with Jupyter notebooks.

12: Cloud Integration and Deployment

- **Using Jupyter on Cloud Platforms**:
  - Overview of AWS SageMaker, Google Colab, Microsoft Azure Notebooks.
- **Deploying Jupyter Notebooks as Services**:
  - Dockerizing Jupyter notebooks.
  - Setting up CI/CD for Jupyter notebooks.

7: **Collaboration and Version Control**

13: Collaborative Workflows

- **Using JupyterHub**:
  - Setting up and using JupyterHub for multi-user environments.
- **Real-time Collaboration**:
  - Collaborative editing with JupyterLab.
  - Using nbgrader for education.

14: Version Control and Reproducibility

- **Using Git with Jupyter Notebooks**:
  - Best practices for version control.
  - Collaborating via GitHub.
- **Reproducible Research**:
  - Creating reproducible documents with nbconvert.
  - Managing reproducible environments with Conda.