**User Manual for the Shiny Machine Learning Dashboard**

**1. Introduction**

Welcome to the **Shiny Machine Learning Dashboard**!  
This manual provides you with step-by-step instructions for:

* Installing the required libraries
* Running the application
* Understanding the features and visualizations available

The application is built in **R Shiny** and offers interactive machine learning tools and visualizations.

**2. Required Libraries**

To run the application successfully, the following libraries must be installed in R:

* shiny
* DT
* ggplot2
* forecast
* rpart
* rpart.plot
* gridExtra
* Metrics
* lubridate

**3. Installing Libraries**

To install all required libraries, open **RStudio** and run the following command:

r

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install.packages(c("shiny", "DT", "ggplot2", "forecast", "rpart", "rpart.plot", "gridExtra", "Metrics", "lubridate"))

**4. Running the Application**

To run the Shiny Machine Learning Dashboard, follow these steps:

1. Open **RStudio**.
2. Set the working directory to the folder containing the app files:

r

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setwd("path/to/your/Shiny\_ML\_Dashboard")

1. Run the following command to launch the app:

r

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shiny::runApp(".")

1. The application will open in a web browser.

**5. Application Features**

The Shiny Machine Learning Dashboard allows users to:

1. **Upload Datasets**:
   * Upload CSV files with a customizable separator (comma, semicolon, or tab).
   * Optionally display the uploaded data.
2. **Regression Analysis**:
   * Perform **linear regression** with dynamic variable selection.
   * Display regression plots and performance metrics:
     + R² (Coefficient of Determination)
     + MSE (Mean Squared Error)
     + MAE (Mean Absolute Error)
3. **Polynomial Regression**:
   * Perform polynomial regression with adjustable degrees.
4. **Additional Graphics**:
   * Generate the following visualizations:
     + Histograms
     + Residual Plots
     + Correlation Matrices
5. **Clustering Analysis**:
   * Implement **K-means clustering** with dynamic selection of X and Y variables and cluster count.
6. **Decision Tree Analysis**:
   * Create **regression trees** and **classification trees**.
   * Visualize decision tree structures and variable importance.
7. **Time Series Analysis (ARIMA)**:
   * Perform ARIMA forecasting for time-series data.
   * Set custom forecast horizons.
8. **Filtered Data**:
   * Dynamically filter uploaded datasets.
9. **Export Options**:
   * Export results and visualizations as **CSV** or **PDF**.

**6. Visualizations Available**

The application generates the following types of visualizations:

* **Linear Regression Plot**: Scatter plot with a regression line.
* **Polynomial Regression Plot**: Polynomial fit for selected degrees.
* **Histograms**: Distribution of selected variables.
* **Residual Plots**: Analyze regression residuals.
* **Correlation Matrices**: Visualize relationships between numeric variables.
* **K-means Clustering Scatter Plots**: Clustering results with cluster separation.
* **Decision Tree Diagrams**: Tree structure visualization.
* **ARIMA Forecast Plots**: Forecast and confidence intervals for time-series data.

**7. Exporting Results**

To export results:

1. Navigate to the desired **tab** (e.g., Regression Output, Clustering, etc.).
2. Click the **Export to CSV** or **Export to PDF** button to save results.

**8. Troubleshooting**

* **Issue**: Missing libraries error.  
  **Solution**: Install missing libraries using install.packages() in R.
* **Issue**: App doesn't load.  
  **Solution**: Ensure the working directory is set correctly and the app files exist.
* **Issue**: Dataset not displaying properly.  
  **Solution**: Check file format (must be CSV) and ensure headers and separators are correct.