Data Analysis Capabilities in DataAI at http://DataAI.link

This project can be used as a web-based data analysis, reporting, visualization, and AI-assisted insight platform. It is built around connecting to existing databases or imported files, turning data into reports and dashboards, and then applying statistical, charting, mapping, matrix-balancing, and OpenAI-assisted interpretation workflows in ASP.NET Web Forms and VB.NET.

Data Sources That Can Be Analyzed

The project can analyze data from several kinds of sources:

- Existing relational databases through configured connection strings.
- SQL Server, MySQL, PostgreSQL, SQLite, ODBC, and OleDb-style data sources.
- Oracle, InterSystems IRIS, and InterSystems Cache when the proprietary provider code and licensed client libraries are enabled.
- Uploaded local or web files, including CSV, TXT, XML, JSON, XLS, XLSX, MDB, and ACCDB.
- Imported tables that are converted into reportable database tables.

After a connection or import is available, the application can inspect tables and fields, build SQL queries, register reports, and create reusable dashboards and analytical views.

Core Analysis Workflows

1. Data Exploration

Users can browse tables, inspect fields, run SQL-based reports, filter result sets, and export data. The project supports table exploration, custom SQL queries, report views, report designer workflows, and saved report definitions.

Possible analysis:

- Review raw records returned by a report or SQL query.
- Filter records interactively.
- Explore table structures and available fields.
- Build reusable reports from imported or connected data.
- Export results to CSV or Excel for external analysis.

2. Descriptive Statistics

The analytics features calculate statistics for numeric fields and grouped report data.

Possible analysis:

- Count records.
- Calculate sums.
- Calculate minimum and maximum values.
- Calculate averages.
- Calculate standard deviation.
- Compare statistics across categories.
- Produce overall totals and grouped subtotals.
- Generate detail reports with category-level and overall statistics.

This is useful for operational reporting, quality checks, financial summaries, survey results, utilization reports, and any dataset where grouped numeric summaries are important.

3. Grouped, Cross-Tab, and Variance Analytics

The application can summarize values by one or more category fields, create matrices from report data, compare measures between selected groups or periods, and calculate contribution to total.

Possible analysis:

- Group data by category fields.
- Compare aggregated numeric values across categories.
- Build matrix-style reports where one category is rows and another category is columns.
- Analyze sums, averages, minimums, maximums, and standard deviations by group.
- Compare matrix cells and totals.
- Calculate variance between a base value and a comparison value.
- Calculate percentage change from base to comparison.
- Calculate each group contribution to the overall total.

This supports use cases such as regional comparisons, time/category summaries, department-by-service analysis, demographic cross-tabulation, budget-versus-actual review, period-over-period comparison, and category contribution analysis.

4. Correlation Analysis

The project includes a dedicated correlation workflow for numeric report fields.

Possible analysis:

- Identify numeric fields in a report.
- Calculate field-level statistics used for correlation.
- Calculate correlation coefficients between pairs of numeric fields.
- Display correlated field pairs.
- Export correlation results.
- Send correlation data to the AI interpretation workflow.

This is useful for finding relationships between measures, such as cost and usage, volume and wait time, revenue and staffing, or survey metrics.

5. Charts and Dashboards

The project uses Google Charts-style visualizations for reports, analytics, correlations, maps, and matrix outputs.

Supported chart-style analysis includes:

- Pie charts.
- Bar charts.
- Column charts.
- Line charts.
- Area charts.
- Stepped area charts.
- Scatter charts.
- Combo charts.
- Bubble charts.

- Histograms.
- Gauges.
- Sankey charts.
- Matrix charts.
- Dashboard statistics views.

These visualizations can be generated from selected report fields and aggregation functions, making the project suitable for both exploratory analysis and recurring dashboards.

6. Geographic and Map-Based Analysis

The project includes map report and Google Maps / Google Earth style workflows. It supports latitude/longitude fields, placemark fields, descriptions, time fields, color fields, and extruded map values.

Possible analysis:

- Plot records as map points.
- Build GeoChart and MapChart views.
- Create KML-style geographic outputs.
- Use placemark names and descriptions.
- Use longitude and latitude start/end coordinates.
- Represent routes or movements when start and end coordinates exist.
- Color or extrude map features based on selected data fields.

This is useful for location-based reporting, service-area analysis, route/movement analysis, regional performance, and any dataset with geographic coordinates.

7. Matrix Balancing and Multidimensional Balancing

The advanced analytics area focuses heavily on matrix balancing. It can compare a starting matrix with target totals or target matrices and calculate balanced values and balancing coefficients.

Possible analysis:

- Balance a matrix to requested row and column sums.

- Balance one matrix against another target matrix.
- Compare starting, target, and balanced matrices.
- Calculate balancing coefficients.
- Measure maximum differences between balanced and target values.
- Perform partial balancing on selected parts of a matrix.
- Expand balancing by additional fields.
- Perform multidimensional balancing across multiple selected fields.

This is useful for survey weighting, demographic adjustment, allocation models, proportional fitting, reconciliation of row/column totals, and other workflows where a table of values must be adjusted to known control totals.

8. AI-Assisted Interpretation

The project includes OpenAI-powered workflows that send selected data, analytics, maps, correlations, or matrix outputs to an AI chat page for interpretation.

Possible analysis:

- Ask the AI to interpret report data.
- Ask for meaningful analytical observations from a table.
- Interpret chart data.
- Interpret map analytics.
- Interpret correlation results.
- Interpret matrix balancing results.
- Ask follow-up natural-language questions about the current dataset.

The AI layer is best understood as an interpretation and narrative-assistance feature. The statistical and reporting calculations are performed by the application, and the AI can help explain patterns, summarize results, and suggest insights.

Practical Use Cases

This project can support analysis for:

- Business reporting and operational dashboards.

- Imported spreadsheet or CSV analysis.
- Database exploration without writing custom application code.
- Statistical summaries by category.
- Relationship discovery through correlation analysis.
- Geographic and location-based reporting.
- Matrix/cross-tab analysis and balancing.
- Survey, population, or allocation weighting workflows.
- AI-generated explanations of reports and analytical outputs.
- Scheduled or repeatable reporting workflows.

Existing ASP.NET Features

Several analysis and reporting features are already present in the project.

SQLquery.aspx already provides a report SQL query designer with:

- SQL data field selection.
- Join definition.
- Filter definition.
- Sorting.
- Report parameters.
- Query saving.
- Query-based report updates.
- Links into report data, charts, analytics, exports, and matrix balancing.

RDLformat.aspx already provides report formatting and output features with:

- Column order and expressions.
- Friendly names and formatting functions.
- Groups and totals.
- Combined column values.
- Advanced report designer navigation.

- Map definition navigation.
- Data export to Excel, CSV, delimited file, and XML.
- Report export to Excel, Word, and PDF.
- Generic report display.
- Report charts.
- Overall statistics.
- Group statistics.
- Field correlation.
- Matrix balancing.

Analytics.aspx already provides report analytics features with:

- Report data retrieval for analytics.
- Automatic analytics recalculation.
- Category/group field selection.
- Value field selection.
- Count and count-distinct calculations.
- Sum, maximum, minimum, average, standard deviation, and value calculations for numeric fields.
- Generated group analytics records.
- Correlation display for selected fields.
- Matrix graph links.
- Bar, pie, and line graph links.
- Detail reports with category totals and statistics.
- Statistics dashboard links.
- Google chart links.
- Advanced analytics and matrix-balancing navigation.
- AI interpretation link for analytical output.

Pivot.aspx provides pivot-style cross-tab analysis with:

- Row field selection.
- Column field selection.
- Value field selection.
- Aggregation options including count, count distinct, sum, minimum, maximum, average, standard deviation, and value.
- Search filtering across the current report result.
- Row totals, column totals, and grand total.
- CSV and Excel export.
- AI interpretation link for pivot output.

Variance.aspx provides percentage-change, variance, and contribution-to-total analysis with:

- Analysis type selection for variance, percentage change, and contribution to total.
- Group field selection.
- Compare field selection.
- Base value and comparison value selection.
- Value field selection.
- Aggregation options including sum, average, and count.
- Search filtering across the current report result.
- Base value, comparison value, variance, and percent-change output.
- Group contribution-to-total output with total row.
- CSV and Excel export.
- AI interpretation link for variance and contribution output.

Profiling.aspx provides automatic profiling for every field in the current report or imported dataset with:

- Source data type and detected data type.
- Nonblank count and blank count.

- Distinct value count.
- Minimum and maximum values where applicable.
- Average and standard deviation for numeric values.
- Search filtering across the current report result before profiling.
- CSV and Excel export.
- AI interpretation link for profiling output.

DataQuality.aspx provides data quality checks for the current report or imported dataset with:

- Missing value checks for every field.
- Duplicate full-record checks.
- Invalid date checks for date-like text values.
- Out-of-range numeric checks based on configurable standard-deviation limits.
- Inconsistent category checks for case, spacing, or punctuation variants.
- Suspicious text checks for leading/trailing spaces, control characters, very long text, markup-like text, and repeated character patterns.
- Search filtering across the current report result before checking quality.
- CSV and Excel export.
- AI interpretation link for data quality output.

Ranking.aspx provides ranking and top/bottom analysis for categories, customers, products, departments, locations, report groups, or other dimensions with:

- Rank field selection for the item or dimension being ranked.
- Optional within-group field selection for ranking separately inside report groups.
- Value field selection.
- Aggregation options including sum, average, minimum, maximum, count, and count distinct.
- Top, bottom, or average-nearest ranking mode.

- Top Value, Bottom Value, or Average Value output depending on the selected ranking mode.
- Group Top Value, Group Bottom Value, or Group Average Value output when within-group ranking is selected.
- Drill-down links from Records values to Data Explorer for the matching records.
- Configurable number of ranked rows.
- Search filtering across the current report result before ranking.
- CSV and Excel export.
- AI interpretation link for ranking output.

ComparisonReports.aspx provides comparison reports between two periods, two groups, two locations, two queries, or two imported files with:

- Comparison type selection for periods, groups, locations, queries, or imported files.
- Row field selection for grouping the comparison output, with an all-records option.
- Compare field selection for choosing the field that identifies the two values being compared.
- Base value and compare value selection.
- Value field and aggregation options including sum, average, minimum, maximum, count, and count distinct.
- Output columns for comparison type, row/group, base value, compare value, variance, percent change, base records, and compare records.
- Search filtering across the current report result before comparison.
- CSV and Excel export.
- AI interpretation link for comparison output.

When Two Imported Files is selected, the page shows two browse controls: one for the base file and one for the compare file. After the user selects both files and clicks Build, the files are read into memory, marked internally as Base and Compare, and combined into one temporary comparison dataset. The selected row field, value field, and aggregation are then used to calculate base value, compare value, variance, percent change, base records, and compare records. For example, two files with Department and Sales columns can be

compared by department using Sum of Sales. The direct file comparison supports delimited CSV, TSV, and TXT files, and the analytical file data is not stored permanently.

Regression.aspx provides simple linear regression analysis to understand and predict how one numeric column changes when another numeric column changes with:

- Selection of an independent X value field and a dependent Y field to predict.
- Optional group field selection to calculate separate regression lines by category.
- Optional prediction input for estimating Y when X has a selected value.
- Regression output including records, equation, slope, intercept, correlation, R squared, average X, average Y, min X, max X, and predicted Y.
- Search filtering across the current report result before regression.
- CSV and Excel export.
- AI interpretation link for regression output.

The Predict Y when X is value is optional. It does not change the regression calculation itself; slope, intercept, correlation, and R squared are calculated from the report data. When the user enters an X value, the page substitutes that value into the regression equation Y = Intercept + Slope * X and displays the estimated result in the Predicted Y column.

DataAdmin.aspx provides an analytics dashboard overview for the current report with:

- Dashboard tiles for Analytics, Data Overall Statistics, Groups Statistics, Correlation, DataAI, Pivot / Cross Tab, Variance Analysis, Comparison Reports, Data Profiling, Data Quality, Ranking Analysis, Regression Analysis, Map Report, and Matrix Balancing.
- Left-menu navigation under Show Analytics from the existing analytics pages.
- Small live preview grids generated from the current report data in memory.
- Analytics tile preview based on the same analytics groups table used by Analytics.aspx.
- Data Overall Statistics tile preview based on the same statistics table used by the top statistics grid in ShowReport.aspx?srd=8.
- DataAI tile preview showing a five-row by five-column sample from the current report data.

- Variance tile preview showing real base and compare values, variance, percent change, and records from the current report data where grouping fields are available.
- Pivot and Matrix preview grids shaped as compact cross-tab summaries.
- Data Quality, Profiling, Ranking, Regression, Map, Correlation, and Groups preview grids shaped to match the purpose of their corresponding analysis pages.
- Open links from each tile to the full analysis page.

Other existing pages also cover major capabilities:

- Correlation.aspx provides dedicated field-correlation analysis and export.
- AdvancedAnalytics.aspx provides matrix balancing and advanced matrix workflows.
- MultidimentionalBalancing.aspx provides multidimensional balancing workflows.
- MapReport.aspx provides map report definition and geographic output workflows.
- DataImport.aspx provides import workflows for CSV, Excel, XML, JSON, Access, and related report creation.
- ScheduledImports.aspx, ScheduledReports.aspx, and related calendar/run pages provide scheduled imports and scheduled reporting workflows.

ASP.NET Analysis Features That Can Still Be Programmed

The current ASP.NET project can still be extended with additional analysis screens, report actions, and reusable VB.NET helper functions. Practical remaining extensions include:

- Time-based summaries by day, week, month, quarter, or year when date fields exist.
- Moving averages and rolling totals for time-series style reports.
- Outlier flagging based on standard deviation, percentage difference, or configurable business rules.
- Correlation threshold filters and specialized correlation views.
- Chart recommendation helpers based on selected fields.
- Map readiness checks for latitude/longitude and KML-ready data.
- Export packages that include CSV, Excel, report definitions, charts, and analysis notes.

- Additional AI interpretation buttons for any new analysis result pages.
- Reusable analysis templates and configurable default dashboard layouts.

Best Fit

The best fit for this ASP.NET project is practical business data analysis: descriptive statistics, report exploration, dashboards, correlation, data quality checks, geographic analysis, matrix/cross-tab analysis, matrix balancing, scheduled reporting, and AI-assisted explanation.

The quality of analysis depends on the connected data source, the fields selected for a report, the configured database provider, and whether OpenAI credentials and optional map/provider settings are configured.