DATA VISUALIZATION FRAMEWORK PATENT

Patent No. 14,382,951

Filing Date: June 15, 2021

Issue Date: September 28, 2022

ABSTRACT

A system and method for dynamic data visualization and analysis comprising an intelligent framework that processes multiple data streams through configurable visualization pipelines. The framework includes automated data ingestion, real-time processing algorithms, and interactive display capabilities optimized for enterprise-scale operational datasets. The system employs machine learning to identify patterns and anomalies while generating customizable visual representations through a modular architecture.

BACKGROUND

Field of Invention

This invention relates to systems and methods for enterprise data visualization, specifically to frameworks that enable real-time processing and display of complex operational datasets through configurable visualization pipelines.

Prior Art

Existing visualization solutions lack the capability to process enterprise-scale datasets while maintaining real-time performance and customizability. Current systems are limited by:

- Static visualization templates
- Limited data processing capabilities
- Poor scalability for large datasets
- Inability to handle multiple concurrent data streams
- Lack of intelligent pattern recognition

DETAILED DESCRIPTION

1. System Architecture

1 The framework comprises:

- Data ingestion layer supporting multiple input formats
- Processing engine with configurable analysis modules
- Visualization pipeline manager
- Interactive display interface
- Machine learning subsystem

2 Key Components:

- Data stream processors
- Pattern recognition algorithms
- Customizable visualization templates
- Real-time analytics engine
- User interaction handlers

2. Data Processing Methods

1 The system implements:

- Automated data cleaning and normalization
- Multi-threaded processing architecture
- Configurable data transformation rules
- Dynamic cache management
- Intelligent data sampling algorithms

2 Processing Pipeline:

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Raw Data  Normalization  Analysis  Pattern Detection  Visualization
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3. Visualization Capabilities

1 The framework supports:

- Interactive 2D/3D visualizations
- Real-time data updates
- Customizable display parameters
- Multiple visualization layers

- Dynamic scaling and zooming

2 Supported Visualization Types:

- Network graphs
- Heat maps
- Time series plots
- Geospatial representations
- Custom visualization modules

CLAIMS

A computer-implemented method for dynamic data visualization comprising:

a) Receiving multiple data streams through configurable input channels

b) Processing said data streams using machine learning algorithms

c) Generating interactive visualizations based on processed data

d) Enabling real-time updates and user interaction

The method of Claim 1, wherein the processing includes:

a) Automated pattern recognition

b) Anomaly detection

c) Trend analysis

d) Predictive modeling

A system for implementing the method of Claim 1, comprising:

a) Data ingestion modules

b) Processing engine

c) Visualization pipeline

d) User interface components

INVENTORS

- Dr. Robert Martinez, Chief Innovation Officer
- Michael Chang, Chief Technology Officer
- James Henderson, Chief Digital Officer

ASSIGNEE

Summit Digital Solutions, Inc.

1234 Innovation Drive

Wilmington, DE 19801

LEGAL REPRESENTATION

Patterson & Moore LLP

Patent Attorneys

Registration No. 58392

GOVERNMENT RIGHTS

The invention was made with government support under contract DE-AC04-94AL85000 awarded by the Department of Energy. The government has certain rights in this invention.

PRIORITY CLAIM

This application claims the benefit of U.S. Provisional Application No. 63/219,847, filed June 15, 2020.

CERTIFICATION

I hereby certify that this patent document and all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

/s/ Dr. Robert Martinez

Chief Innovation Officer

Summit Digital Solutions, Inc.

Date: June 15, 2021