Docket #: S10-149

Data management, storage and analysis technologies

Researchers in Dr. Leonore Herzenberg's lab at Stanford University have developed a portfolio of data management, storage, and analysis technologies that may be used for large data sets. This portfolio of technologies has been used for FACS (fluorescence activated cell sorting) experiments but it is also beneficial for a variety of other scientific applications. In addition, the portfolio has implications for retail data as the data analysis tools offer an automated way to see clusters in the data. These tools provide a means for automated processing of market data to identify target consumers to allow more customized marketing efforts. When used together this portfolio offers data management and analysis tools that may advance the way scientists store, evaluate and communicate data, while also providing businesses new insight into market data for more customized marketing approaches.

The portfolio of inventions includes:

Data management and storage technologies:

Stanford Docket S99-147: This patented technology is an internet-accessible federated directory service system for managing scientific data.

Stanford Docket S03-347: This patented invention is an internet-based laboratory data management system that can be used to create protocols, collect and organize data, archive long-term records, and facilitate scientific collaboration among researchers.

Stanford Docket S05-123: This patented technology is a computer program and method for secure, version-controlled coordination of ontologies in a knowledge base.

Stanford Docket S08-098: This patented system stores, indexes, serves and archives large data sets over long periods of time.

Data analysis tools:

Stanford Docket S98-109: This patented technology provides methods for analyzing multiple complex multiparameter data sets.

Stanford Docket S02-215: This patented, automated data analytics tool sorts and analyzes large data sets by identifying and creating clusters of data.

Stanford Docket S10-149: This invention is a software tool for analyzing data with multivariate distributions.

Stanford Docket S10-149- Quantitative analysis of flow cytometry and other multivariate distributions

Abstract

This invention is a software tool for analyzing data with multivariate distributions. The method uses a true distance metric algorithm to measure differences between two multivariate sample distributions. It can be applied to FACS to enable a novel form of high-dimensional, high-throughput flow cytometry analysis with greatly reduced need for expert supervision. Compared to current bin-to-bin comparisons, this new tool is less sensitive to small systematic shifts between samples and thus small biologically significant movements in cell populations can be quantified in research and clinical applications. In addition, the method has much broader application as it can be used to analyze any large distribution of multivariate data. As such it could be used for analysis of data ranging from census data to shopping patterns.

Applications

- High-throughput flow cytometry analysis in clinical or research settings to:
  - Identify biological responses (e.g. stimulation, activation)
  - Measure phosphorylation levels
  - Provide quality control for instrument stability
  - Prioritize large numbers of samples for additional analysis and detect outliers

- Other multivariate data analysis
    - Census data
    - Shopping patterns

Advantages

- Sensitive - can discriminate small, biologically significant movements in cell populations
- Robust - less sensitive to small systematic shifts between samples
- True, quantitative metric:
    - True distance metric, as opposed to a statistical test
    - Enables ranking and sorting compared to controls
- Automated and scalable for high-dimensional, high-throughput applications

Patents

- Published Application: 20120173199
- Issued: 10,452,746 (USA)

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