variables resulting from the application for function chains to queries and to concatenate such features into input files for subsequent application of feature selection and classification algorithms are also contemplated. Feature selection algorithms, such as linear correlation coefficients and information entropy, and classification algorithms, such as artificial neural networks, decision trees, and support vector machines, are integrated into the system for sophisticated data mining.

The system emphasizes performance, modularity, flexibility, and third-party software integration. In the Query component **212**, the system can assess "provide the subjects/data for which there are at least 5 minutes of uninterrupted EKG data within 20 minutes of the incident." Another salient query feature is cross-study query. In the scope of the Function **226** and Analysis **220** components, the functions can be added directly by the user without the need for an engineer to manually add third-party algorithms. That allows the system to satisfy the research needs of a sophisticated and diverse user population. Also, more interactive visualization tools are contemplated to allow graphical exploration of time-series data in time and frequency domain.

Turning now to FIG. **3**, shown therein is a process flow diagram illustrating the method of using the present invention in more of a simplified overview. The system requires that clients have Internet access and a Web-browser; all data storage, access, analysis, and graphics functions reside on a server as noted previously. Besides Query and Analysis functions **212**, **220** (see FIG. **2**), the client/user can visualize the attributes and time-series data, output results in reports, export the results or raw data as files, and share data and analytic routines amongst other users.

The basic steps involved in using the invention include, as shown in step **302**, first receiving, over a communications network, a set of electronic data records. Those records may be in any format initially, and may be time-series data or non time-series data. It is anticipated that most of the data files will be bundled and formatted for transfer over a conventional packet-switched network, such as the Internet, using a conventional transfer protocol (i.e., Internet Protocol). The data records may also be downloaded using a direct link to a monitoring device or that device's data logger as discussed previously (see FIG. **2**).

In step **304**, the electronic data records are stored in at least one database that is associated with a host server. Multiple databases may be used. The server may be a single server or multiple, networked servers in different locations.

In step **306**, the server receives a first request from a first client computer and in step **308** parses the first request to extract the query tools, analysis tool (from a library of analysis tools available), and other information needed to execute operations in the Query **212**, Function **226**, and Analysis **220** component routines and to return information to the client computers **224** (as best seen in FIG. **2**).

In step **310**, an analysis module stored on the first server is selected based on the content of the first request, and in step **312** and analysis function from a library of functions is selected. Each function can be sequentially executed as a function chain. The chain accomplishes two objectives: 1) the selection (i.e., query), based on client supplied constraints applied to attribute and/or time-series data, of a subset of subjects from the database, and 2) the mathematical analysis of time-series data associated with each of the selected subjects. The function chain architecture, because of its inherent modularity, allows substantial flexibility in performing query and analysis of attribute and time-series data. The client/user can perform standard database queries on attribute data, but also can directly query a) the original time-series data, or b) the results after application of analytical procedures to the time-series data.

Some of the library of functions include functions that are applied exclusively to attribute data and always select subjects that meet user supplied constraints (i.e., they produce a reduced set of subjects while the variable remains unchanged). Examples of such functions are ones that select subjects based on gender, or that select patients based on whether they received more than 1 unit of blood in a hospital.

Other available functions include those that always mathematically manipulate scalar or time-series data to generate new time-series data or a scalar result. These functions only change the data; the set of subjects remains the same. An example of such a function is one that extracts a specified range of data from time series files. In this case, a new time series that is smaller than the original is generated for each subject.

Still, other functions include those that always mathematically manipulate scalar or time-series data to generate new time-series data or a scalar result as described above; in addition, if the user applies constraint criteria to the output of the function, the function also selects a subset of subjects. This type of function changes both the data and the set of subjects. For example, this kind of function can calculate the length of all time-series data files for each subject in a set of subjects, in which case only the output data, but not the number of subjects, is changed. However, if the user specifies a length constraint, then the output from this step will be the time-series file lengths only for the subjects that meet the length constraint (i.e., both the data and the set of subjects are changed).

In step **314**, the function is applied to the data records in the database to produce a useful result. In step **316**, the system formats a response to the initial query using at least the result from the analysis function from step **314**. In step **318**, the system delivers (i.e., pushes the information down to the client) or provides (i.e., makes the information available to be pulled by the client) the result to the first client computer. The information is made available via the client computer browser, which makes it easy to select and view all time series data in the database, including original and new time-series data calculated by the individual and chain functions. The primary output page displayed on the client computer results from the execution of the function chain and is similar to a spreadsheet in which each subject is a row, and variables are columns. The results include the selected subset of subject ID's, the subjects' attribute or scalar data, and links to associated time-series data. Three other pages can be opened from the report page to provide additional, specialized views of the results.

Although certain presently preferred embodiments of the disclosed invention have been specifically described herein, it will be apparent to those skilled in the art to which the invention pertains that variations and modifications of the various embodiments shown and described herein may be made without departing from the spirit and scope of the invention. Accordingly, it is intended that the invention be limited only to the extent required by the appended claims and the applicable rules of law.

We claim:

1. A computer network including a computer-implemented data evaluation tool for evaluating electronic data sets and capable of displaying an output of the evaluation on a display medium, comprising:

a communications network;