Business Analytics

- *Analytics* = science of analysis – analysis of data: methods and software tools.

- *Business analytics* = applications and techniques for gathering, storing, analyzing and providing access to data to help users make better and strategic decisions (is also known as *analytical processing*, *business intelligence tools* or *business intelligence applications*).

- **Categories of analytic tools and techniques**:

  1. Information and knowledge discovery,
  2. Decision support and Intelligent systems,
  3. Visualization.

Decision Support and Business Intelligence Systems
Efraim Turban, Jay E. Aronson, Ting-Peng Liang, Ramesh Sharda
Pearson Pretince Hall, New Jersey, 2007

Business Analytics

Information and knowledge discovery

- OLAP
- Ad hoc queries and reports
- Data mining
- Text mining
- Web mining
- Search engines

Decision support and Intelligent systems

- DSS
- Group DSS and virtual groups
- Executive and enterprise support
- Automated decision support
- Web analytics

- Management science and statistical analysis
- Data mining and predictive analysis
- Applied artificial intelligence
- Metrics, performance management (BPM)

Visualization

- Visual analysis
- Scorecards
- Dshboards
- 3D virtual reality

- <u>MicroStrategy's</u> **Classification of Business Analytic tools**

  (styles of Business Intelligence**):**

  1. ***Enterprise reporting products*** – generate highly formatted static reports,
  2. ***Cube analysis*** – provide ***Online Analytical Processing*** (***OLAP***) multi-dimensional *slice-and-dice* analytical capabilities,
  3. ***Ad hoc querying and analysis*** – relational OLAB tools are used to allow power users to query a database for any answer, slice-and-dice the entire database, and drill down to the lowest level of transactional information,
  4. ***Statistical analysis and data mining*** – perform predictive analysis and discover the cause-and-effect correlation between two metrics,
  5. ***Report delivery and alerting*** – send full reports or alerts to large user populations, based on subscriptions, schedules or threshold events in the database.

MicroStrategy

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Enterprise:

Business Intelligence, Mobile Intelligence, Cloud Intelligence, Social Intelligence, Free Software, Consumer

Predictive Analytics Software (for better decisions):

Discover the risks that could threaten the survival of the business, Don't waste money collecting data - use it to make better decisions, Predictive analytics without having to hire Stanford graduates:

- **Sophisticated Data Analysis**

The data modeling process begins with analysis. Segmenting your data, understanding what fields are important, what fields are not, selecting the right demographic profile that you know will have the greatest impact is often the most demanding task.

- **Drag-and-drop Simplicity**

It begins with a user interface that is 100% drag-and-drop enabled. Selecting your fields to analyze is as simple as a drag-and-drop operation. Or double click your fields in rapid sequence to add as many as you need to your data analysis process.

- **Instant Analysis**

The baseline statistical analysis is performed in seconds. Once your baseline analysis is done, simply drag and drop the fields you wish to analyze further onto the charting areas. Insight! instantly renders the perfect pie or bar charts for you, giving you the ability to quickly understand relationships, identify outliers and narrow your list of demographic fields down to the few that count.

- **Compare anything**

Comparing multiple fields is just as simple. Drop two or more fields into the chart areas and see how the two fields compare - giving you instant feedback and the ability to understand how two data elements can work together quickly and intuitively.

- **Dynamic Filtering**

Dynamic filtering methods let you further reduce your data sets to only the records you need - once again giving you the power and flexibility to identify the data that makes sense and that will have the greatest impact in seconds.

- **Share Your Analysis**

Getting to the bottom of your analysis often means collaborating with others. With Insight! not only can you share your results with other Insight! users, you can also send your data to other users as Excel files - complete with data and charts - to give them an opportunity to further review and comment on your analysis - whether they have Insight! or not.

- **Data Modeling for the Rest of Us**

Understanding the key drivers for your business ultimately comes down to understanding your data. Your data stores months and years of information on what went right, and what went wrong, modeling that data reveals the reasons why.

- **An Easier Way**

Data mining and predictive analytics software has been available for years. But unfortunately you typically need a PhD just to be able to get started. With Insight! nothing could be further from the truth. That's because we have made it simpler. Simpler by using two of the most intuitive - and accurate - modeling algorithms available (decision tree analysis and rule induction), and simpler because you use them without even knowing it.

- **Wizard Driven**

It starts with the wizard driven interface that simply walks you through a series of questions about the data you are using. Set a few settings, check a few boxes and your data models will begin to appear before your eyes. Yes, it's really that simple.

- **Set the Boundaries**

Getting the most out of any data model, however, is about getting it "just" right. That's why in Insight! you can set the key drivers that build your model to suit your desires, giving you the ability to modify your models as you see fit.

- **Try, Test, Repeat**

The process of building and using data models is, by its very nature, a repetitive one. With Insight! changing your models around to account for new options, new scenarios and new assumptions is as simple as clicking on the appropriate pane, changing the fields you wish to analyze and repeating the process. Because of the speed with which Insight! executes the analysis, you can work through any number of analyses until you arrive at the models that best suit your needs.

- **Share your Results**

Sharing your results with others is equally simple and intuitive with Insight!. Simply share the project file with other users and they will be able to take full advantage of your model in what-if analysis and target analysis regardless of whether they have access to the original data source or not. Sharing with non-Insight! users is just as simple; export your results in a formatted report or an Excel file and share your results with anyone.

- **Deploying Your Data Model**

The entire point of data mining is to be able to create business models that help you drive decision making to reduce risk and augment your ability to benefit from opportunities that present themselves to your business. Taking that step with traditional data mining software, however, can be daunting, expensive and work intensive.

- **An Easier Way**

Insight! makes the process of deploying your lessons quick and easy through a built-in "target analysis" engine. Simply load a data set you wish to use your business model on, use the built-in matching wizard to match up your model with your data and click go - Insight! will automatically show you all the records in your data sample that match the business rules you created.

Using built-in matching is an invaluable method of deploying data mining in the real world. For example, let's say you have created a set of models that describe customers who are at highest risk for defaulting on their outstanding debt. Using the built-in target analysis you can load a list of your current prospects, select the business model you wish to use for analysis and in seconds Insight! will show you which prospects from within your list of hundreds or thousands of prospective customers are at highest risk for defaulting. How useful would that information be before you close the deal with your prospect?

- **What-if Scenario Analysis**

With Insight! testing your data models is simple and intuitive with a built-in What-if scenario analyzer that quickly lets you identify the statistical or algorithmic probability of your "what if" scenario according to the model you created.

- **Automated Matching**

Insight! lets you quickly apply your data models to every day business scenarios with a built-in what-if engine that lets you input sample data and automatically identifies statistical and algorithmic probabilities. Learn in seconds what element in your model a sample customer might fit, change a few parameters and watch the models realign automatically - all in just seconds.

- **Graphical Representation**

Understanding your data is always best done in graphical format. With Insight! that's exactly what you can do because it automatically shows you the matching data in a graphical representation, giving you the ability to quickly see how your data models are being used.

Classification of Strategic enterprise Management: *Operational, Managerial and Strategic*

1. *Operational* – ERP mainly support transaction processing on the operational level;
2. *Managerial* – access reports, arranged by functional areas – can make queries and drill down;
3. *Strategic* – SAP-SEM (Strategic Enterprise Management (includes BA).

BI activities evolved from two tools:

1. *Executive information systems* – EIS = a computer-based system – serves the information needs of the top executives: *exception reporting* and *drill-down*;
2. *Executive support systems* – ESS = comprehensive support system that goes beyond EIS to include analysis support, communications, office automation and intelligence support;

Online Analytical Processing (*OLAP*):

- refs to a variety of activities usually performed by end users in online systems;
- usually includes such activities as generating and answering queries, requesting ad hoc reports and executing them, conducting traditional or modern statistical analyses and building visual presentations;
- multidimensional analysis and presentations, EIS/ESS and data mining;
- provide modeling, analysis and visualisation capabilities to large data sets, either to database management systems (DBMS), data warehouse systems, and a multidimensional conceptual view of the data.

Characteristics of OLAP tools:

- *Categorical analysis* – static analysis based on historical data;
- *Exegetical analysis* – base on historical data and drill-down analysis (query further into data to determine the detail data that were used to determine a derived value);
- *Contemplative analysis* – allows a user to determine a derived value;
- *Formulaic analysis* – permits changes to multiple variables;

Types of *OLAP*:

- *Multidimensional* (*MOLAP*) – cub structure the user can rotate – queries are fast;

- *Relational* (*ROLAP*) – create multidimensional views *on-the-fly*; a large number of attributes – it can be easily placed in a cube structure;

- *Database* and *Web* (*DOLAP* and *WOLAP*) – refers to a relational database management system (RDBMS) - is designed to host OLAP structures and perform OLAP calculations; Web OLAP refers o OLAP data that is accessible from a Web browser.

- *Desktop* OLAP involves low-priced, simple OLAP tools that perform local multidimensional analysis and presentation of data downloaded to client machines from relational or multidimensional database; can move desktop processing to an intermediate server which increases the scalability.

Reports and queries:

- The activities of **OLAP** and **BI** are using reports and queries. OLAP reporting must be uniform, flexible and adjustable.
- Types of reports:
    1. **Rutine Reports** – are generated automatically and distributed periodically to subscribers on mailing lists;
    2. **Ad Hoc** (**On-Demand**) **Reports** – are created for a specific user whenever needed.

Software examples:

- **Business Objects' Crystal Reports** – tool kit that helps in creating flexible, feature-rich reports and integrates them into Web and Windows applications;
- **Micro Strategy** – provides monitoring and report creation tools for production and operational reports;
- **Cognos & Business Intelligence** – includes a complete list of serf-serve report types, adaptable to any data source;
- **Hyperion** – provides a full spectrum of management reporting capabilities that combine both operational and financial information;
- **Microsoft** – has included **Report Builder** – a user-friendly feature that allows report creation or modification.

Multidimensionality (for analysis and presentation):

- **Factors for Multidimensional presentation**:
  Dimensions, *Measures* and *Time*.

- **Data cube**: represent data along some measure of interest – each dimension represents some attribute in the database (the cells represent measure of interest); Cube analysis lets people perform queries by flipping through a series of report views.
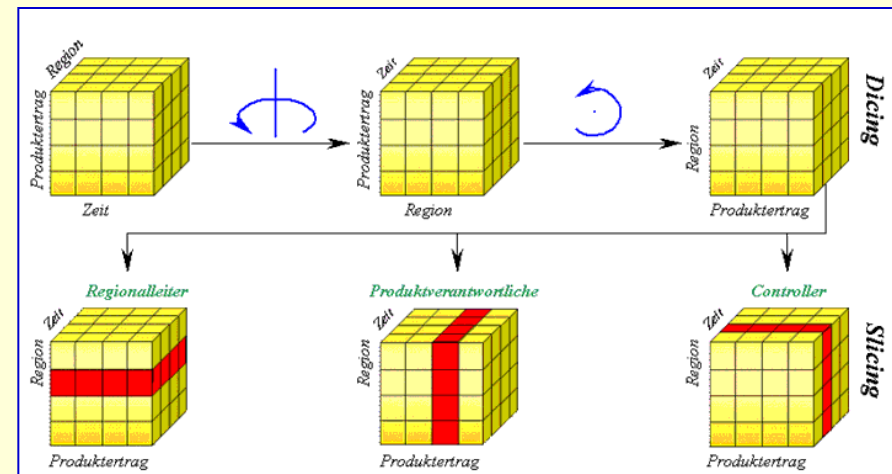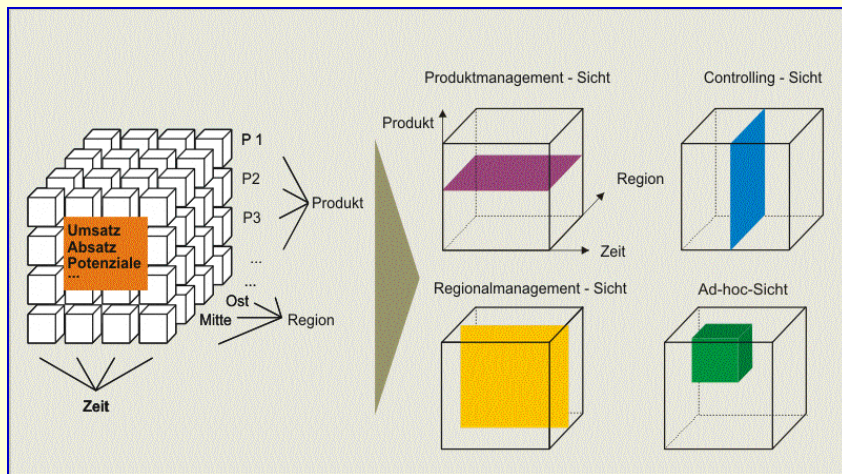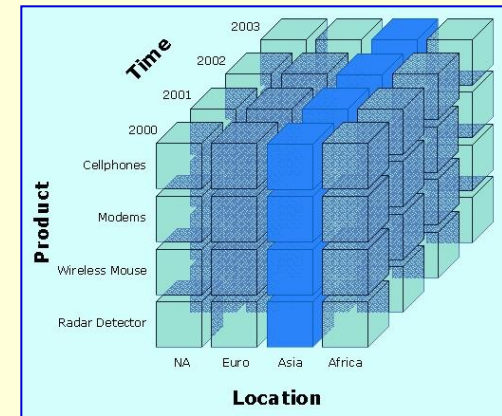
Advanced Business Analytics

- *Data mining* and *Predictive Analysis* (multiple regression analysis, special forecasting and prediction methods)
    - *Data mining* tools extract hidden, predictive information from database and search for the patterns in large transaction database;
    - *Predictive Analysis* tools determine the probable future outcome for an event or the likelihood of the situation occurring, and identify relationships and patterns.

Tools for Advanced Analytics

- *MicroStrategy -* more than 400 statistical, mathematical and financial function for creating reports and analyzing their results.
- *Hyperion's System* – includes the *Essbase Analytics* module for quickly performing sophisticates analyses to interpret complex data;
- *Cognos & Business Intelligence* analytics – includes customizable time-series analysis & trends, deep competitive analysis, drill-down, forecasting and optimization;
- *Microsoft* – offers advanced analytics in its *Microsoft Dynamics*;
- *Fair Isaac* – offers intelligent tools for conducting risk analysis, fraud detection, profitability analysis and intelligent querying;
- *ILOG* – offer optimisation (maximize resource utilization, cost-benefit analysis).

Data Visualization

Visual technologies make decision support application more attractive and understandable to users.

Data visualization refers to technologies that support visualization and interpretation of data and information. It includes digital images, GIS, Graphical user interface, graphs, virtual reality, dimensional presentations, videos and animation. Visual tools can help idenftify relationships such as trends.
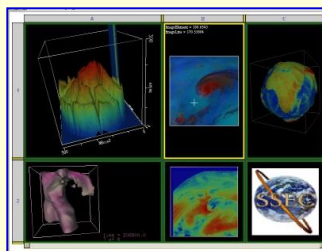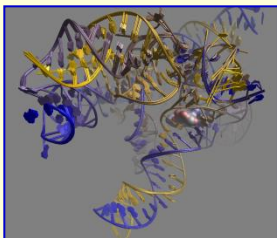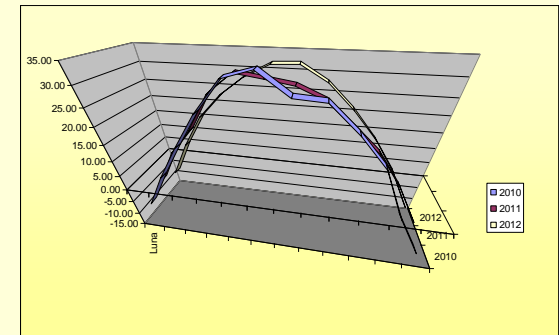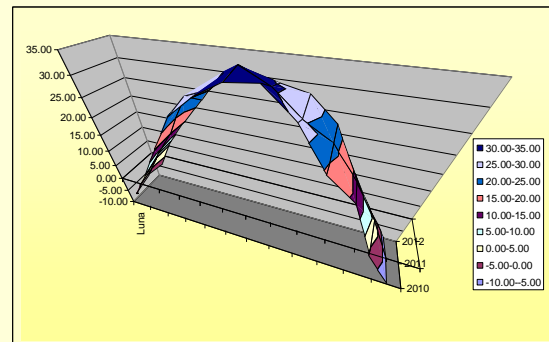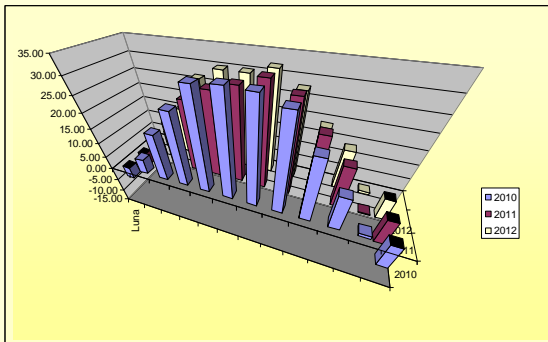
Lumina
DECISION SYSTEMS
Bringing clarity to difficult decisions

Graphic interface design for DSS

Chiunsin Lin; Chijuin Chang; , Inst. of Manage. Sci., Nat. Chiao Tung Univ., Taipei, *Graphic interface design for DSS dialog management: a composite graphics approach,*

ABSTRACT

Text mode has been widely used for the dialog management of conventional decision support systems. It can be predicted, however, that a graphics mode will replace text mode. The paper creates a new computer graphics model, the composite graphics model, which can be widely accepted by DSS builders. It also develops a graphic display generator system based on a composite graphics model and shows the way to integrate composite graphics with a DSS tool

DESIGN OF A GRAPHICAL USER INTERFACE DSS

S.R. Burckhard, M. Narayanan, V.R. Schaefer, P.A. Kulakow, and B.A. Leven, *DESIGN OF A GRAPHICAL USER INTERFACE DECISION SUPPORT SYSTEM FOR A VEGETATED TREATMENT SYSTEM*, Department of Civil and Environmental Engineering, South Dakota State University, Brookings, SD 57007; Department of Computing and Information Sciences, Kansas State University, Manhattan, KS 66506.

ABSTRACT

The use of vegetation in remediating contaminated soils and sediments has been researched for a number of years. Positive laboratory results have lead to the use of vegetation at field sites. The design process involved with field sites and the associated decision processes are being developed. As part of this development, a computer-based graphical user interface decision support system was designed for use by practicing environmental professionals. The steps involved in designing the graphical user interface, incorporation of the contaminant degradation model, and development of the decision support system are presented.

Welcome to Free & Open Source Software (FOSS) at CES, IISc, Bangalore, India

GRDSS (Geographic Resources Decision Support System) is an open source GIS based on GRASS (Geographic Resources Analysis Support System) that has functionalities such as raster, topological vector, image processing, graphics production, etc. It operates through a GUI developed in Tcl/Tk under LINUX. GRDSS include options such as Import / Export (of different data formats) including extraction of individual bands from the IRS (Indian Remote Sensing Satellites) data, display, digital image processing, map editing, raster analysis, vector analysis, point analysis, spatial query, geo-visualisation tools etc.

http://wgbis.ces.iisc.ernet.in/foss/index.php?option=com_content&task=view&id=17&Itemid=40

http://www.ces.iisc.ernet.in/energy/paper/grdss/index.htm

Style Intelligence - Business Intelligence Software
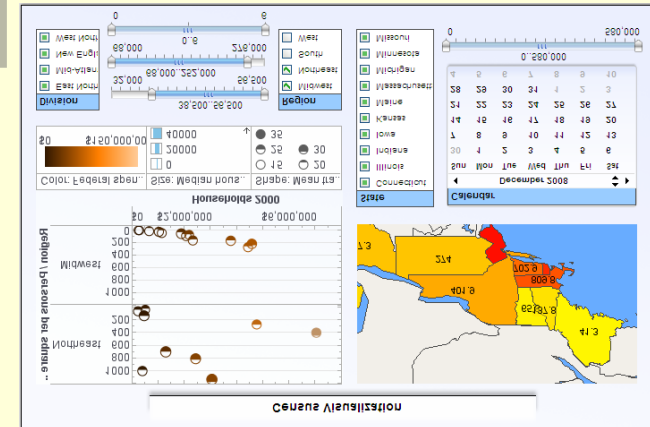
BUSINESS ANALYTICS

data mining - predictive modeling - business analytics
guidance and results for those who are data-rich, yet information-poor