

Visual Analytics for Financial Institutions

Tatiana Tekušová

Introduction

The success of financial institutions in highly developed market environments is predominantly based on the rapid availability of the precise and well-founded analysis of economic and financial market developments. Internally available and externally provided datasets stand at the center of the process. Due to the abundance, heterogeneity and continuous updating of the data, the analysis process has become increasingly time-consuming and complicated. In order to cope with this increasing analytical burden, the input data have to be presented in new formats that enable their efficient analysis.

For the financial sector, the area of visual analytics offers tools for obtaining reliable, well-founded and easily presentable assessments from data inputs in real time. This derived information may contribute to higher quality, timely and effective business decisions, leading to an improved profitability of business processes. Using new presentation technologies, the analysts as well as the management will be able to get a quicker and broader view of the results through interactive presentations. Instead of convoluted reports with many data tables, endless sets of charts and extensive explanatory text, they can

be provided with intelligent tools for interactive data search and analysis as well as a presentation of results.

Fields of Application

Visual analytics applications add value to various areas of the financial business. For instance, for financial market analysis, visual analytics may be used to combine and dynamically present data from several sources. In the field of risk management, the new technology can support risk identification and the building of different risk scenarios in an interactive manner.

Private clients of banks and insurance companies are, in general, not financial experts, but are often confronted with complicated financial products. They will prefer an interactive presentation of features that allow them to understand the risks and return, and then make better investment decisions.

At the same time, customer management in a multi-channel distribution environment may be improved by new interactive customer monitoring and relationship management software, which can show various dimensions, such as profitability, risk exposure or the history of the customer relation.

Visual analytics solutions can be applied in additional areas of economic and financial business, for example in risk analysis for IT processes, payment systems and credit exposures, macro-economic analysis, data management, marketing, strategic management and business process management.

The Technology

Visual analytics systems use new methods of interactive data presentation and data processing which incorporate technologies from various other fields of science to create better analysis and decision-making tools.

German Abstract

Der wirtschaftliche Erfolg von Finanzinstituten basiert auf präzisen und fundierten Analysen. Visual Analytics für den Finanzsektor bietet neue Methoden für eine interaktive Datenpräsentation und -bearbeitung, die Technologien aus anderen wissenschaftlichen Gebieten benutzt, um verbesserte Analysewerkzeuge zu erstellen. Außerdem wird hiermit eine effiziente Umwandlung von verfügbaren Daten in nützliche Informationen unterstützt. Visual Analytics-Ansätze können in verschiedenen Bereichen von Finanzunternehmen genutzt werden (z.B. Finanzmarktanalyse, Risikomanagement). Das Fraunhofer IGD entwickelt auf diesem Gebiet das System FinMotion, welches die Analyse dynamischer Finanzmarktindikatoren unterstützt. Das Programm KVMMap hilft bei der Analyse komplexer Datenmengen. Weiterhin bietet die Integration mit weiteren neuartigen Technologien, wie die interaktive Übertragung auf mobile Geräte und Präsentation auf großen Leinwänden, zusätzliche Analysemöglichkeiten.

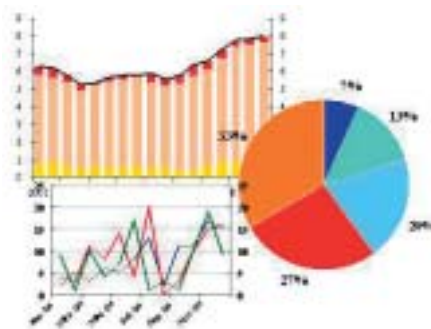


Figure 1: Visualisation examples

For an interactive data exploration, recent trends in knowledge management, semantics and database technologies are implemented. Moreover, the findings from statistical analysis and decision-making theory contribute to the development of appropriate methods for further visual data processing.

Visual analytics offer powerful tools for model-making, hypothesis-making and model validation. The tools create useful visual representations of the hypotheses allowing the examination and comparison of different models.

The Solutions

In the field of visual analytics, Fraunhofer IGD is currently developing systems for the analysis and the presentation of financial data. Moreover, with the help of the new display and network technologies, the data can be

shown on high-resolution large scale displays (like the HEyeWall® system) or transferred in real time to mobile devices (like Smartphones and PDAs).

The project FinMotion supports the analysis of the correlations of market indicators in a dynamic environment (see figure 2). The system uses the animation of data points in a scatterplot to better present the development of market variables. Special features for the scatterplot's glyphs are used to encode more dimensions of the data in a single view. Moreover, the analysis is facilitated by showing detailed information on demand and by additional functions like zooming, selecting and highlighting.

Another project called KVMap shows the possibilities of an analysis of complex data sets supported by new visualization techniques (see figure 3). Statistical correlations between



Figure 4: Mobile applications

the data are processed and presented in a way that allows the analysts to recognize possible data relationships as patterns. This provides a chance to draw conclusions from hidden correlations in the data gathered from very heterogeneous sources without any prior knowledge. These correlations can be a valuable source for a more detailed analysis and hypothesis creation process.

In the current market situation, the employees (such as managers, customer service representatives and traders) need to access, store and analyze their data at every time and everywhere. For this reason, a mobile connection to their tools is of extreme importance. We are currently developing tools for a financial and economic analysis on mobile clients (see figure 4).

The display of complex data on high-resolution large displays (like the HEyeWall® system) opens space for collaborative and interactive work with large amounts of data. The simultaneous presentation of the data from various perspectives allows users to discover new relationships in the data and to keep track of more information than could be shown on a common desktop.

Point of Contact

Dr.-Ing. Jörn Kohlhammer
 Fraunhofer IGD, Darmstadt, Germany
 E-mail:
 joern.kohlhammer@igd.fraunhofer.de



Figure 2: The application FinMotion – analysis of dynamic data

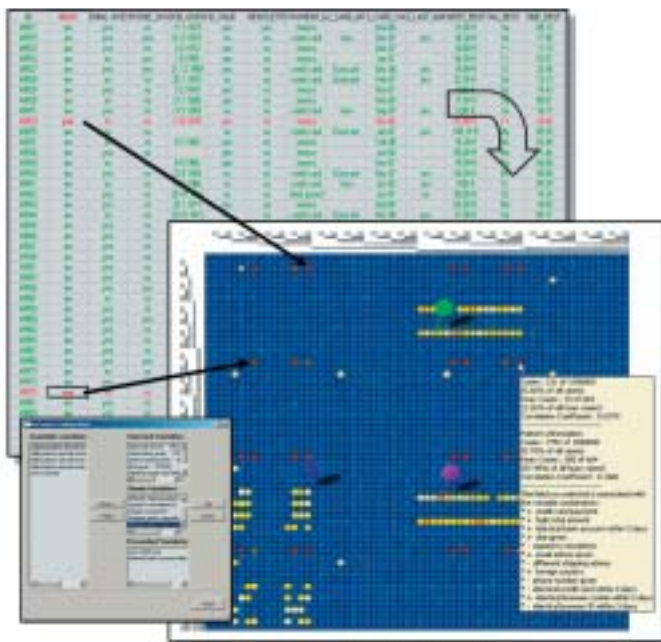


Figure 3: The application KV Map: analysis of correlations