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Visualization challenge

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Introduction

The eResearch Australasia conference is proud to introduce the annual eResearch Visualization Challenge. The challenge invites researchers, students, practitioners, and educators from diverse disciplines to submit visualizations on a given theme. Entries will be displayed at the conference, and a prize of A\$5,000 will be awarded for the winning entry. This year's challenge is sponsored by [Sirca](#).

Visualization is one of the most important communication and analysis tools available. It enables humans to process large amounts of data rapidly, to gain insights and to understand linkages and trends. As we continue to amass and link an unprecedented wealth of data in widely disparate fields, the ability to interpret this data visually to bring meaning out of complexity is essential.

The eResearch Visualization Challenge aims to harvest the best examples of meaningful (as opposed to purely artistic) visualizations around an annual theme, to raise the bar for the documentation and communication of the process applied to generate those visualizations, and to sensitize people to the importance of visualization for formal and informal education and the communication of information.

Theme for this Year: Financial Markets

With the Global Financial Crisis (GFC) upon us, the financial markets theme for the first eResearch Australasia Visualization Challenge is highly relevant. Financial markets also provide an illustration of this year's conference theme: No Boundaries. The GFC has raised awareness that markets and economies are knit together in global interdependency; consequences do not stop at borders but can affect everyone on the planet.

Financial markets can be seen as a complex system that generates large volumes of electronic “event” data. The “follow-the-sun” nature of markets means that trading occurs around the clock with peak activity regularly reaching around 450,000 records per second. The dominant theory of market behaviour asserts that this complex system is driven by the random arrival of information, commonly described as news, but also including price signals from previous trading behaviour. The response from market participants to information arrival leads to complex interactions within and between the observed characteristics of markets and companies.

Financial markets are places where people buy and sell financial assets; the most widely known financial assets are shares in a company. Buying a share makes you a part owner of the company; as a part owner you are entitled to a part share of the profits of the company. How much you would be willing to pay to become a part owner (shareholder) will depend on your view of the profits that the company will make in the future. Investors who believe that profits will increase in the future will be willing to pay a higher price for shares in the company than those who believe that profits will be lower in the future. The prices that shares trade for in the market summarises the beliefs of investors about the level of future profits of the current and potential shareholders of a company.

To buy the stock of a company you would submit a buy order, this order tells the market how many shares you want to buy and the price you are willing to pay per share. The price you are willing to pay is known as a bid price. To sell stock you would submit a sell order, indicating the number of shares you want to sell and the price you would like to receive. The price you want to receive is known as the ask price. When the bid and ask prices match a trade occurs.

The operators of financial markets collect and disseminate details of orders that are received and trades that result from these orders. The details that are disseminated are; the time that the order was received or a trade occurred, the price and number of shares associated with the order or trade.

The competition will invite researchers, students, practitioners, and educators from diverse disciplines to submit the best-of visualizations of evolving activity patterns in the financial markets data set provided. Competition applications will comprise large resolution static images or video footage together with a detailed explanation of the analysis or modelling techniques applied, and visualization design. Applicants will also be asked to list and explain major insights gained and to discuss the value the visualization might have

for educational purposes.

Data Description

The data for the challenge is taken from the New York Stock Exchange and NASDAQ and provided by Thomson Reuters. Order and trade records for the 30 stocks that make up the Dow Jones Industrial Average, and the computed value of the Dow Industrial Average are provided. The file also includes the headlines of Reuters news stories that refer to the Dow stocks. The data covers the week beginning on the 28th of September 2008; the week when the full extent of the GFC became apparent.

The data file is organised by company, each of the companies having a unique identifier. Each line of the file contains the details of an order or trade. The first column contains the code that identifies the company. The identifiers are listed in Table 1.

Table 1 - Unique Company Identifiers

Identifier	Name
AA.N	ALCOA INC
AXP.N	AMER EXPRESS CO
BA.N	BOEING CO
BAC.N	BANK OF AMERICA
C.N	CITIGROUP
CAT.N	CATERPILLAR INC
CVX.N	CHEVRON
DD.N	DU PONT CO
DIS.N	WALT DISNEY CO
GE.N	GENERAL ELEC CO
GM.N	GENERAL MOTORS
HD.N	HOME DEPOT INC
HPQ.N	HEWLETT-PACKARD
IBM.N	INTL BUS MACHINE
INTC.O	INTEL CORP
JNJ.N	JOHNSON&JOHNSON
JPM.N	JPMORGAN CHASE
KFT.N	KRAFT FOODS INC
KO.N	COCA-COLA CO
MCD.N	MCDONALD'S CORP
MMM.N	3M COMPANY
MRK.N	MERCK & CO
MSFT.O	MICROSOFT CP
PFE.N	PFIZER INC
PG.N	PROCTER & GAMBLE
T.N	AT&T
UTX.N	UNITED TECH CP
VZ.N	VERIZON COMMS

WMT.N	WAL-MART STORES
XOM.N	EXXON MOBIL
.DJI	DJ INDUSTRIAL AVERAGE

The second column contains the date of the order of trade. The Third and fourth columns contain the time of the transaction; column three contains the GMT time of the transaction and column four contains the number of hours that the exchange time is offset from GMT. The fifth column contains a flag, which indicates whether the record is an order, indicated by a Quote flag, a trade, which will have the Trade flag or a news headline, which will have a News flag. The sixth column contains the trade prices the seventh traded volumes. The next two columns contain the highest bid (buy) and lowest ask (sell) prices recorded when each new order is placed. The last column contains news headlines.

The data file can be downloaded from:

http://data.sirca.org.au/visualisation_challenge_data.csv.zip

Other publicly available data may be used in combination with the provided data set in creating a meaningful visualization.

Aim

The competition aims to harvest the best examples of meaningful (as opposed to purely artistic) visualizations of market dynamics, to raise the bar for the documentation and communication of the process applied to generate those visualizations, and to sensitize people to the importance of visualization for formal and informal education and the communication of information.

Judging Criteria

Correspondingly, visualizations will be judged based on:

- Truthfulness of the data representation
- How well the visualization serves the needs of its 'clients'
- Quality of data preparation and analysis
- Layout and design of the visualization
- Potential re-usability of both the visualization and underlying software used to generate the visualization
- Extent of interactivity, reconfiguration and adaptability of the results
- The significance of insights gained
- Educational value
- Visual appeal
- Description of work and documentation outlining underlying technologies that were employed

Submission Details

To enter the Visualization Challenge, please complete the template below and upload it with your entry to

<http://www.easychair.org/conferences/?conf=era09vischallenge> .

Entries must be received by 6 October 2009 AEST. If you have not used EasyChair before, you will need to create a login account before entering your submission. If you have forgotten your username or password, help is available from the login screen.

[Download the entry template](#) (MS Word format)

Each entry needs to include:

- Title of Work
- Author(s) name, email address, affiliation, mailing address
- Copyright holder (if different from authors)
- Area(s) of expertise
- Description of work: data used, data analysis, visualization techniques applied, and main insights gained (50-300 words)
- Scientific and/or commercial value (50-200 words)
- Educational value (50-200 words)
- Links to related projects/works
- Permission to display the work at the Conference and to distribute online and via DVD
- Link to file according to the following specifications:

Images must be 300DPI or higher.

	Image(s)	Video & Animation
Minimum	A4 size	352 x 240 pixels
Maximum	A2 size	HD (1920 x 1080 pixels)
File Type	TIFF	Quicktime (.mov)

Important dates

- Tue 6 Oct: Entries due
- Tue 27 Oct: Finalists notified so they can be certain to have a representative at the conference
- Tue 10 - Thu 12 Nov: Entries displayed at the Sirca booth in the exhibition area
- Thu 12 Nov: Winner announced and prize awarded during the morning plenary session

Contact

Please refer any questions on the Visualization Challenge to ereseach2009@ereseach.edu.au.

Award

The winning entry will receive a prize of A\$5,000 which has been donated by Sirca. The winning entry will be announced and the prize presented at the conference on 12 November 2009.

Eligibility

Staff of Sirca and Thomson Reuters and members of the

Judging Panel are not eligible to enter the challenge. A representative from the winning entry must be present at the conference in Sydney, Australia, on 12 Nov 2009 to collect the prize.

Panel of Judges

An international, interdisciplinary panel of judges will judge all valid entries.

Acknowledgements

The challenge organisers would like to thank Sirca for sponsoring the prize for the challenge and Thomson Reuters Enterprise Information for making the market data set available.