FireStox: Exploring NASDAQ Velocity and Forces

Presented by Adam Bazinet, Robin Berthier, and Huyen Tue Dao
Introduction: Stock Markets

• Two kinds of stock markets:
  – Stock markets with physical floors (e.g., NYSE)
  – Stock markets with completely electronic systems (e.g., NASDAQ)

• Traditionally, on physical floors, noise and physical presence gave vital information on activity, which is lacking in electronic markets

• NASDAQ’s challenge: capture information found in physical floor interaction in data pulled from wholly automated trading

• NASDAQ’s solution: Market Velocity and Forces
NASDAQ Market Velocity and Forces

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Market Velocity indicates surge in activity
Market Forces indicates direction

Market Forces indicates change in direction
Visualizing Market Velocity and Forces

- Clients purchasing Velocity and Forces data get a data feed.
- NASDAQ’s Experimental Market Information has graphing demos for Velocity and Forces
  - Static, old data for demonstration purposes
  - Simple graphs that are given by sector only
Visualizing Market Velocity and Forces

• NASDAQ’s Marketsite provides visualizations of Velocity and Forces on a per-issue basis.
  – Visualizations are currently not available on the Web or in another easily accessible format
  • Visualizations do not provide overviews of Velocity and Forces trends throughout the whole market
Our Goals

• Provide a visualization that shows not only Velocity and Forces information for a single stock at a time, but many
  – We focused on the NASDAQ 100, an index of the largest, non-financial NASDAQ-listed companies

• Allow for exploration of trends and events related to changes in Velocity and Forces
  – Playback: ability to display Velocity and Forces and their changes over the course of the day
  – Provide information per issue including price and volume information for analysis
  – Provide sector-level information as well as issue-level information
SmartMoney Map of the Market
Comparison to *Map of the Market*

- Size of companies in the treemap are proportional to market capitalization, which does not rapidly change.
- Velocity and Forces both rapidly change and thus could make for a treemap that is constantly shuffling around.
- So, we brainstormed something else...
Introducing FireStox
Features

• View Velocity and Forces at a glance for up to 100 companies
• Search, browse, and filter companies
• View aggregated V/F information for entire sectors at a time
• Select a window of time and replay market evolution minute-by-minute
• Correlate V/F with price and volume at a glance with stacked line graphs
Velocity and Forces Radar

- Each wedge represents a company
- Velocity is proportional to wedge length
- Forces is indicated by color of a wedge
  - brighter red = greater selling pressure
  - brighter green = greater buying pressure
- Companies are sorted alphabetically within their sector
Data Sources

• We received data feeds from NASDAQ for February 7th, 2007
• Each entry is a buy or a sell order, and contains calculations of current Velocity and Forces values for a given stock
• There are millions of orders in the day
• Thus, we decided to aggregate V/F/price/volume data by the minute
Demonstration
Acknowledgments

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Questions?