Interaction Design for the Stocktrader Workstation

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Abstract

While considerable attention has been paid to the development of HCI principles for the design of real-time systems such as air traffic control and process control, there is serious lack of research on the real-time financial markets such as stock exchange and foreign exchange, although they are of similar complexity and may provide valuable lessons to other real-time work domains. In this paper, we describe our effort on the study of stocktraders' activities in a trading room and the development of the interaction design principles for the stocktrader workstation.

1   Analysis of Stocktraders' Activities

Of all the white-collar professions, modern stock trading is one of the most complex and stressful. Traders must perceive and analyze huge amounts of news and market information fed simultaneously from different news agencies and different trading floors. They must extensively communicate to other traders in their own companies and counterparty firms. Based on these activities, they must make immediate decisions, on their own risk and responsibility.

The electronic stock market has no trading centers. Instead, it consists of hundreds of brokerage firms located throughout the country and doing business by computer network and telephone. Firms in the electronic stock market are generally referred to as "broker-dealers". The electronic stock trading is being performed by traders in dealing rooms of broker-dealer companies.

Stocktraders have a continuous responsibility to buy shares at their published bid price or to sell shares at their offered price. In this way broker-dealers make a profit on the difference between the prices at which they buy and those at which they sell. Primarily, dealing in shares takes place over the telephone between different broker-dealer firms' dealing rooms or by making transactions via the networked computer workstations. After a deal is made, whether through the telephone or computer workstation, it has to be recorded and transferred to the trading system's centralized database (Heath, Jirotka, Luff, & Hindmarsh, 1995). Stocktraders have a range of devices to assist them in understanding the current state of the market and making trading decisions: advanced telephony, displays for monitoring prices at different markets, signals from analytic software packages, terminals of news agencies, such as Bloomberg and Reuters, local and international TV news, Internet terminals with different financial and political information, Internet based chat and conferencing facilities for financial professionals. Traders are often bounce back and forth among the various monitors.

2   Interaction Design

The analysis of user activities showed that, in many aspects, they are similar to those of the air traffic controllers or high-ranked officers in command and control military settings. Our system, *RTS Plaza* design is based on electronic warfare techniques. In the trading war (McCall, 1997), the enemy is primarily counterparty – other broker-dealer firm. This understanding guided the development of the trader's workstation and the choice of user interface standards and guidelines.

We developed our own set of user interface guidelines different from conventional guidelines for windowing applications in "office" work environments. In particular, many elements usual for desktop-oriented environments such as overlapping windows and pop-up dialogues were banned in our guidelines, because they are extremely navigationally loaded and may hide important information. Instead, fixed screen arrangement of information was recommended. The main reason behind this decision is that speed of interaction with the system is a crucial factor in trading. Fixed arrangement of screen areas supports sensorimotor coordination, speeds up visual search, and minimize a waste of time during window navigation activities, such as window selection or scrolling. The *RTS Plaza* user interface is quite different from usual office-style interfaces: it is not "windowing", but "frame-based", or "tiling" interface. In contrast to windowing interface, the tiling interface is the display environment in which users do not lose their view of the process or alarm status, even while they access and view data in multiple screen areas from a number of sources. They have complete control over every tile in their system, and interact with permanent windows that can never be hidden or overlaid.

Since speed is a key issue in trading, especially in very high workload situations (breakouts), it is important to choose appropriate main interaction style. The primary interaction style in *RTS Plaza* is drag-and-drop operation via the mouse. About 90% of data input and manipulation can be performed with single input device, a mouse.

The contradiction between the necessity to represent massive market information and limited screen "real estate" is common to any trading software. Our approach to the problem was to represent high-level information about the current state of the market alongside with more detailed information on particular stocks and activities of broker-dealer firms available on request.

RTS Plaza is designed to filter vast amounts of stock data from about 450 stocks and to provide alerts to traders relating to the movements and trends in the stock market. The system color-codes every inside bid/ask change for each stock selected by the trader to be tracked in the special tile. Besides color coding, special never-overlapped screen areas are used to alert trader about important news and events on the market and necessity to perform urgent actions, e.g. to confirm counterparty's trade report. The tiling interface and color-coding make alerts more persistent and prominent.

References

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McCall, R. D. (1997). *The Way of the Warrior-Trader*. McGraw-Hill.