Web Design Patterns for Online Derivatives Trading

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1. Introduction

Online share trading mainly deals with selling and buying of shares electronically. Online share trading is categorized into two types. One deals with the equity trading and the other deals with derivatives trading. Our focus is on derivatives trading. Online derivative trading involves share broker, stock exchange and customers. Share broker is responsible for opening the new account for the user and providing the interface to the user for trading. Stock exchange maintains a list of shares along with their prices. Companies that are registered with the stock exchange can only be traded. Most often, this list expands to involve new companies. Derivative trading is of two types. One is future trading and the other one is option trading. A derivative contract expires at a specified date in a month after which it will not exist. In both the cases the number of shares to be traded is fixed and it is called a "lot size". For performing trading, necessary fund can be transferred to the trading account using online fund transfer. Whenever the necessary amount is to be withdrawn it can be done through payment request. We propose six design patterns for online derivative trading namely derivative search, derivative lot size, derivative buy/sell, payment request, online fund transfer and derivative watch list. All these design patterns are user interface design patterns and they can be conveniently implemented in any scripting language.

2. Design patterns for online derivatives trading

We propose six design patterns for derivatives trading which are essential interface designs namely derivative search, derivative lot size, derivative buy/sell, payment request, online fund transfer and derivative watch list.

2.1 Derivative search

Context

Online derivatives trading deals with the buying and selling of derivative contracts of various companies. A derivative contract implies selling and buying of shares with a fixed multiple quantity called lot size. These contracts can be traded at a premium without paying full amount. To know the current premium levels of a script there should be user interface for derivatives searching.

Problem

How can a derivative contract be searched?

Forces

- There will be several companies in derivatives trading.
- There will be several contracts even for a single company.

- It is very difficult for the user to look at all the contracts at one time.
- Direct searching always gives price details quickly.

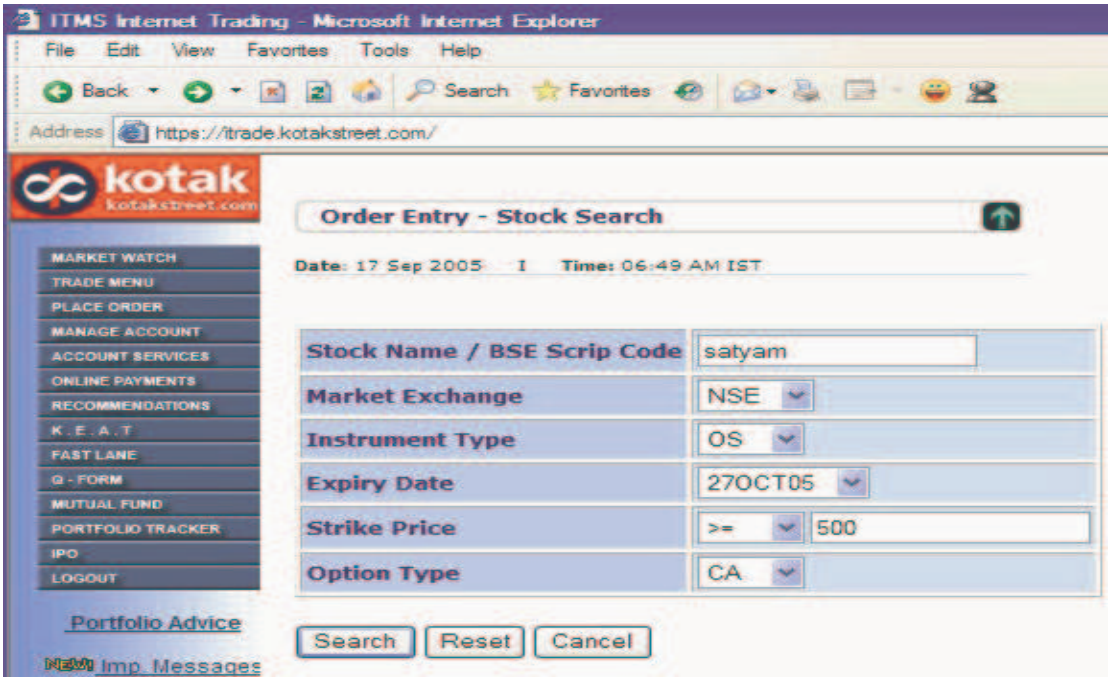


Figure 1

Solution

Details of all contracts will be maintained in a remote database. User will be asked to select or enter the details of company name, strike price, type of contract and expiry date.
Entire database will be searched for finding the contracts.

Example

This pattern is available in many trading sites. For example in www.kotaksecurities.com the user finds a contract as shown in Figure 1.
Consequences

- The user can find a contract very easily instead of looking at all the contracts one after the other.
- It is very useful to look at the contract details at the earliest because the price variation will be too high in stock markets.

Related Patterns
The ***Derivative watch list pattern*** is another way of looking at a contract.

2.2 Derivative lot size

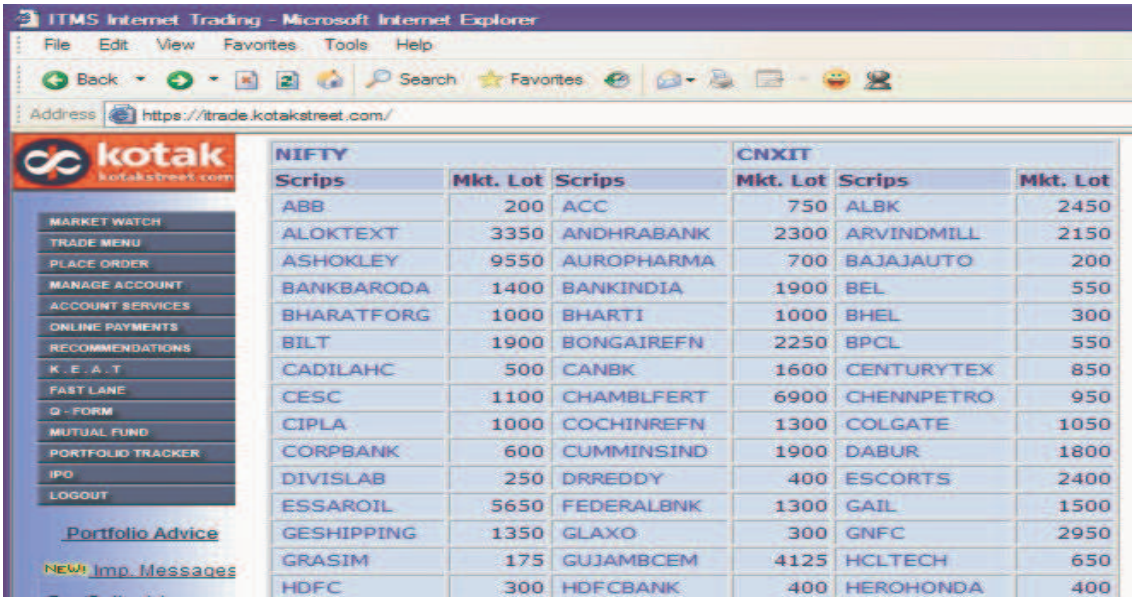
Context
In derivatives trading, all the contracts are made with a fixed quantity of shares called lot size. These lot sizes are fixed based upon the total trade value. The concerned authorities make changes to the lot sizes whenever required. This information must be immediately reflected in the website so that the user can check by looking at the lot size before trading.

Problem
How the customer knows about the lot size of a company?

Forces
- It is necessary to look at the lot size to know the trading limits.
- Lot sizes can vary after some time period.

Solution
Lot sizes of all companies are to be stored in a database. When ever the user requests for this information display it to the user.

Example
This pattern is available in many trading sites. One such example is taken from www.kotaksecurities.com .It is shown in **Figure 2**. For the first company **ABB** the minimum tradable lot size is **200**.



NIFTY			CNXIT		
Scrips	Mkt. Lot	Scrips	Mkt. Lot	Scrips	Mkt. Lot
ABB	200	ACC	750	ALBK	2450
ALOKTEXT	3350	ANDHRABANK	2300	ARVINDMILL	2150
ASHOKLEY	9550	AUROPHARMA	700	BAJAJAUTO	200
BANKBARODA	1400	BANKINDIA	1900	BEL	550
BHARATFORG	1000	BHARTI	1000	BHEL	300
BILT	1900	BONGAIREFN	2250	BPCL	550
CADILAHC	500	CANBK	1600	CENTURYTEX	850
CESC	1100	CHAMBLFERT	6900	CHENNPETRO	950
CIPLA	1000	COCHINREFN	1300	COLGATE	1050
CORPBANK	600	CUMMINSIND	1900	DABUR	1800
DIVISLAB	250	DRREDDY	400	ESCORTS	2400
ESSAROIL	5650	FEDERALBNK	1300	GAIL	1500
GESHIPPING	1350	GLAXO	300	GNFC	2950
GRASIM	175	GUJAMBCEM	4125	HCLTECH	650
HDFC	300	HDFCBANK	400	HEROHONDA	400

Figure 2

Consequences
- User can guess the trade limits by looking at the lot size. The trade value is lot size*price of the stock.

- User can use it as a ready reference instead of remembering all of them.

Related Patterns
It is used before ***derivative buy /sell pattern***.

2.3 Derivative buy/sell
Context
When the user watches the contracts he may be interested in buying or selling of such contract. In this case a user interface with buying and selling option must be provided.
Problem
How the user can able to trade a derivative contract?

Forces
- An interface must be provided for selling or buying of derivative contracts.
- Expiry date of contract, price, lot size, company name must be taken in t consideration.

Solution
Provide the user with the option of selecting a company name, number of lots and price and contract type. When the user makes a selection confirm it and store in the order book database for trading possibility.

Example
This pattern can be found in many trading sites. One such site is www.kotaksecurities.com. It is shown in **Figure 3**. The current contract is for the company **SATYAM** for a **call** option.

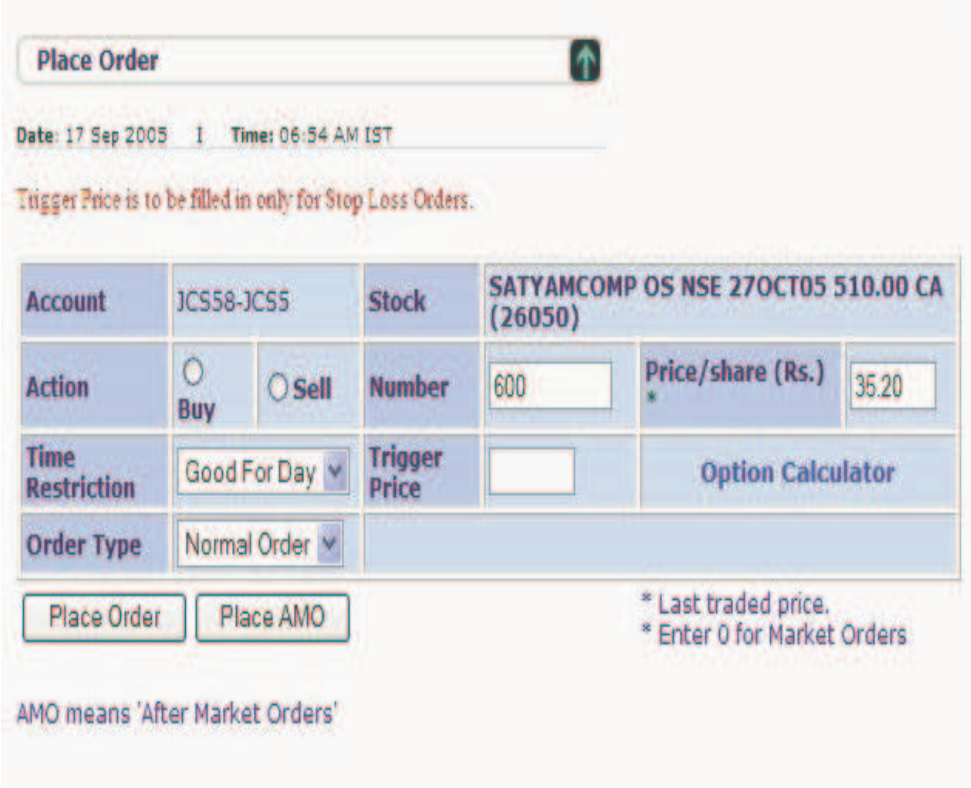


Figure 3

Consequences

- User can sell or buy derivative contracts.
- The trading limits are set based on the user account balance.

2.4 Payment request

Context

It is often required by the user to request for the profit that he makes in trading. A user interface for such request is necessary to simplify the pay out process.

Problem

How the user's pay out request can be taken?

Forces

- User should able to request for money from his account.
- Online requests will take less time to process.

Solution

Provide the user interface for accepting required amount and to the required bank account. Store the details and prepare a cheque.

Example

Pay out process is an essential part of trading. It can be seen in many web sites. For example in www.kotaksecurities.com this pattern is implemented as shown in **Figure 4**.

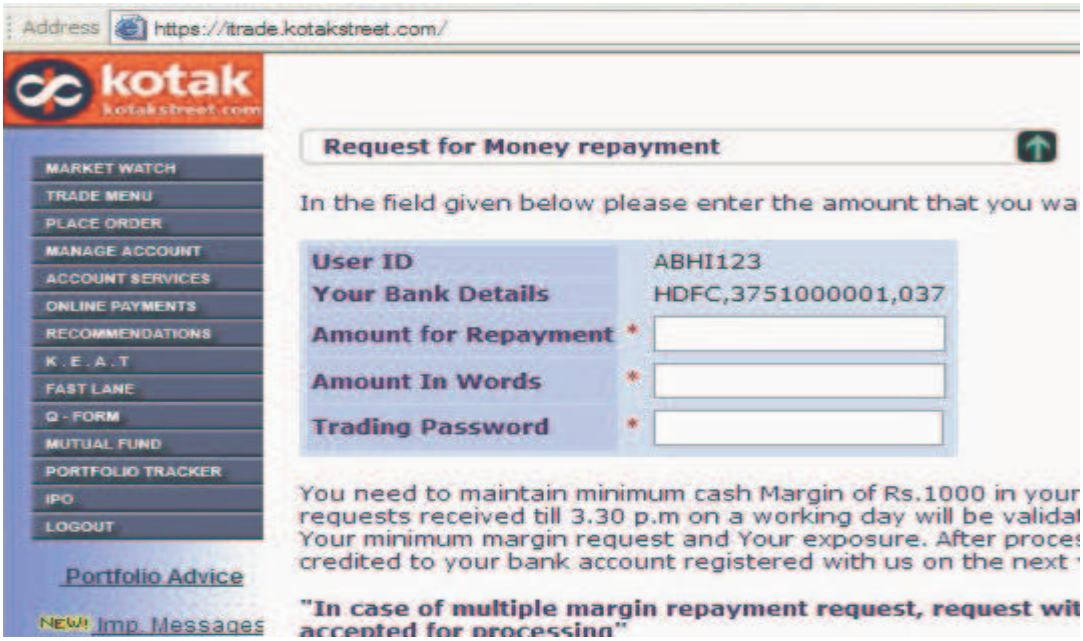


Figure 4

Consequences

- It saves time because of direct communication.

- It can be used as a reference in future.
- There is surplus balance in the trader's account.

2.5 Online fund transfer

Context

User should able to transfer funds from his bank account to the trading account. It is very common for the traders to transfer funds.

Problem

How the fund transfer request from the user can be taken?

Forces

- There must be a user interface for taking the request of fund transfer.
- Transfer time should be as less as possible.

Solution

Provide the user interface for getting the details of amount to be transferred and the bank account. Use the bank's payment gateway to transfer the funds.

Example

Fund transfer is an efficient and fast method of transferring the funds. It can be seen in many web sites. For example in www.kotaksecurities.com this pattern is implemented as shown in **Figure 5**.

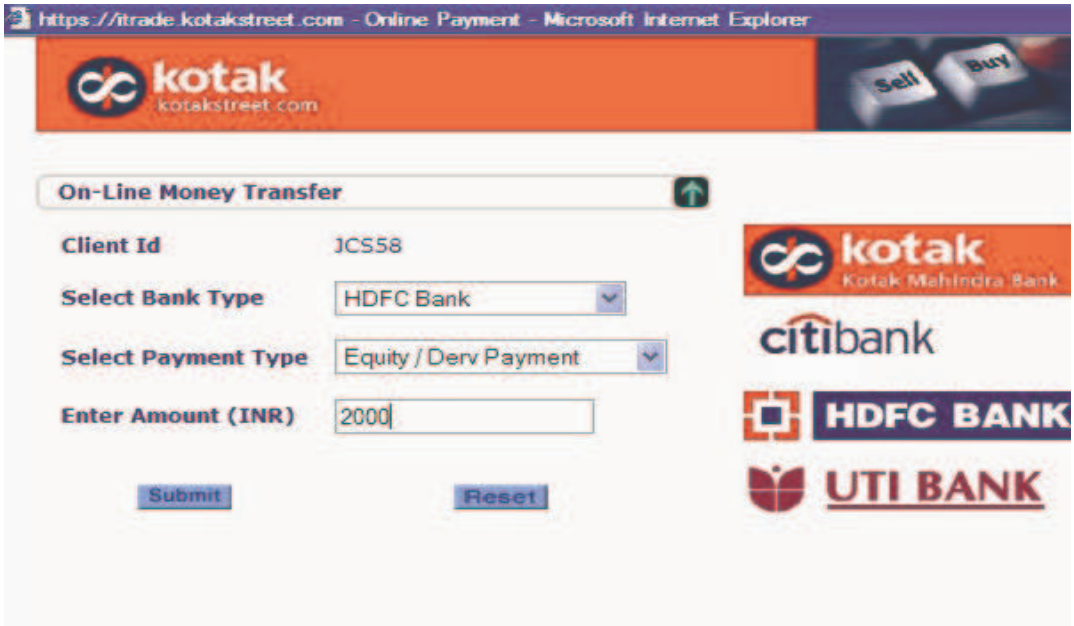


Figure 5

Consequences

- It saves time by avoiding cheque clearance delay.
- The balance can be immediately reflected in the traders trading account.

2.6 Derivatives watch list

Context
It is often useful for the user to look at all the contracts of a company in one view. It helps the user in understanding the bullish or bearish trend of the script in the stock market.

Problem
How the user will be given the information about all the contracts of a company?

Forces
- User would like to look at all the contracts of a company.
- It reflects the trend of a company.

Solution
Provide an interface for selecting a script and retrieve the details of all the contracts of that company and display it the user.

Example
Many websites are providing using this pattern. One such example can be seen in www.nseindia.com which is shown in **Figure 6**.

All contracts of TATASTEEL

As on 31-JAN-2006 15:30

Instrument Type	Underlying	Expiry Date	Option Type	Strike Price	High Price	Low Price	Prev Close	Last Price	Number of contracts traded	Turnover in Rs. Lakhs
FUTSTK	TATASTEEL	23FEB2006	-	-	410.40	395.70	396.90	408.00	27665	75537.69
OPTSTK	TATASTEEL	23FEB2006	CA	400.00	19.00	12.05	12.10	17.35	1289	3619.08
OPTSTK	TATASTEEL	23FEB2006	CA	410.00	13.65	8.25	8.15	12.50	524	1490.21
OPTSTK	TATASTEEL	23FEB2006	CA	390.00	26.50	17.15	17.10	24.50	478	1326.83
OPTSTK	TATASTEEL	23FEB2006	PA	400.00	15.70	8.90	15.00	9.35	478	1325.58
OPTSTK	TATASTEEL	23FEB2006	PA	390.00	10.00	6.00	10.35	6.20	381	1023.07
OPTSTK	TATASTEEL	23FEB2006	CA	420.00	9.35	5.00	5.35	8.30	220	634.96
OPTSTK	TATASTEEL	23FEB2006	PA	380.00	6.90	4.00	6.90	4.25	232	603.21
OPTSTK	TATASTEEL	23FEB2006	CA	380.00	34.00	24.00	23.20	32.65	178	492.30
FUTSTK	TATASTEEL	30MAR2006	-	-	412.00	399.90	399.45	410.20	104	284.77
OPTSTK	TATASTEEL	23FEB2006	CA	370.00	42.10	33.00	31.50	41.00	98	270.39

Figure 6

Consequences
- User can compare all the contracts in one view.
- User can understand the trend of a company by observing all the contracts.

3.Related work
The concept of design pattern was conceived by Christopher Alexander in the field of urban architecture in 1970's and was recently adapted for object-oriented software. In this field a catalogue of design patterns has been successfully defined and shared among software

developers. Moreover several software patterns have been defined which concern different aspects of design and specific application domains.

Alexander proposed a description template for design patterns that included the *name*, the *problem statement*, the *context*, the *forces*, the *solution*, the *examples*, the *resulting context*, the *rationale* and the *related patterns*. In 1987, Ward Cunningham and Kent Back, while designing user interfaces with the programming language Smalltalk, suggested small catalogue of five patterns for novice programmers[2].

Major progress in design patterns was presented as a catalogue in [3]. A pattern language for online auctions management was suggested in [8]. Few online shopping process patterns were suggested in[5]. A pattern language for online share trading was suggested in[9]. Sharing design patterns as a means for reusing design experience can be defined as a communication paradigm. Patterns enhance communication between designers by providing a sharing vocabulary [1].

Web design patterns evolved from the software engineering idea of pattern and have been adapted by the hypermedia community to off-line and on-line hypermedia applications. Reusing other designers experience is useful in improving the productivity of development in other words "reuse consists in taking advantage of any of the efforts done for previous works to reduce the needed effort to achieve a new one" [4]. Few navigational patterns were suggested in [7]. Few e-commerce design patterns were suggested in [10].

The main benefits of using web design patterns are quality of design, time and cost of design and time and cost of implementation [6].

4.Conclusions and future work

The proposed interface patterns are very useful in understanding and implementing online derivative trading websites. These are addressing the major issues of online derivatives trading. We are working on mining some more design patterns in online derivatives trading. We would like to develop a complete pattern language for online derivatives trading.

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