Intelligent Recommender in Stock Market

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ABSTRACT: Internet users around the world have been growing rapidly and this growth has the opportunities for global and regional investments

This paper analyses the impact of investment on markets we discuss the relevance of our findings for differentiation in risk, price convergence and decline in profit in a variety of markets where traditional agents are faced with changing competitive landscape as a result of online investment and trading.

A recommender system based on web mining techniques to trace investor's behaviour and learn his/her preference adaptively. The system can provide practical recommendations, and is able to help web users to save enormous time for internet browsing.

 "With Web Intelligence, we can deploy a trading-chain to investors and brokers so they can analyse pattern and identify processes that will save considerable time and cost."

KEYWORDS: Recommendation System, Trading, Investment, AI, Web mining.

I. INTRODUCTION

Online Trading involves buying and selling of shares and services through internet and computer networks. Demat account service helps in increasing economic growth, increasing business opportunities, profitable access to share markets.

This paper analyses and shows the impact of e-Trading on stock exchange where established firms offering a range of shares and stock services encounter competition from Web-based entrants with local brokers.

Trading Recommendation systems were initially defined as ones in which "people give recommendations as inputs, system applies some internal calculations and aggregates it and provide result to appropriate users"[4].
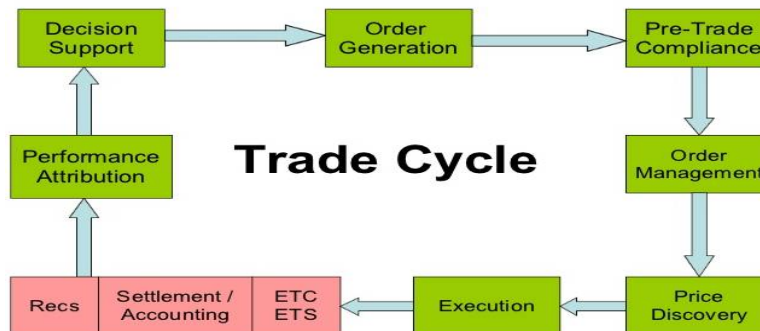
Intranet: Trade Process goes Online

A *recommender system… To avoid Information overload!*

Advantages Of Online Trading:

- **Boundary less (global location):** Online Trading has been covered globally since no specific boundary is required. It allows companies to enlarge them globally.

- **Time saving:** Since there is no need to go anywhere, hence save customers time.

- **No time constraints:** It can be used any time and any place as there is no time constraints.

- **Profit/Risk comparison:** It helps consumers to compare profit and risk in investment efficiently and effectively.

- **Cost effective:** Reduces problems related to contact and reaching to broker on time.

- **Direct communication with investor:** Social networking sites and Web advertising networks, can be used to advertise about E-store.

- **Improve customer intercommunication:** comment forms and Feedback are features to communicate with investors.

- **Flexible target market segmentation:** Targeted market segment in online trading is flexible can be refined.

- **Easier and Simple exchange of information:** Improves sharing of information among brokers and investors.

- **Less transaction cost:** If online trading facility is available then brokerage cost can be cut off.

- **Easy recommendation of shares:** Online trading makes it quite easy to buy and sell of stocks.

- **Faster buying procedure**: Online trading means better and faster investment services. The absence of brokers for buying share makes, buying stocks will be fast.

- **No physical office set up:** Online Stock exchange business is cost effective because physical set up is not required.

- **Easy transactions:** Financial transactions through electronic fund transfer and dematerialized accounts are fast and can be done globally.

- **Less operating cost:** Online trading can be initiated and sustained with very less investment.

II. OBJECTIVE OF PAPER

As the Internet continues to grow, the complexity and size of many web applications grow along with it. The operators of these web sites are finding it challenging, tough and time consuming to find the data they are interested in. Operators find the data that is in accordance with their   attentiveness by personalizing a web applications. Recommendation systems can be expanding a website for individual handlers by dynamically adding hyperlinks.

Recommendation are both Personify and camouflage can be built using a set of rules. Examples include sharekhan uses Request recommendation lists and organic navigation. Commonly used procedures in recommendation systems are Nearest Neighbourhood approach. Some others include algorithms such as Model based filtering approach; Bayesian based approach; Clustering approach.

- Present recommendation system face the constraint of requirement of lot of information to make recommendations.

- Varying information is another constraint since trends are never same. Certain conditions are volatile like recessions or demonetization.

- These set of rules can explore thousands of probable neighbours in real-time, but the needs for modern online trading explore are to search millions of probable neighbours.

- Quality of Recommendations is not satisfying with investors necessities.

1.1 Recommender Techniques:

Recommendation techniques have numerous of categories. Specifically, recommendation systems should have

(i)   Background information, the meta data which the system has before the recommendation procedure commences,

(ii)   Input statistics, the data which the investor must communicate to the system so that it can make some recommendations

(iii)   A set of rules that combines both background data and input information to come up its proposals. On this basis, we can differentiate three different commendation techniques as shown in Table I

Considering all the below problems, we propose an idea that can be counted as a possible, Plausible, tenable and efficient solution, which will include the study of relevant issues and the current scenarios. The crucial point is that AI is regarding representations, and how they can be constructed, stored, accessed, compared, and transformed. A computer program is a set of representations, a symbol system that models the world more or less adequately

The recommender system based on web mining is proposed to solve problems in earlier system. It utilized a variety of data mining techniques like web usage mining, association rule mining etc. Based on these methods, the system can trace the investor's behaviour and study his/her recent preferences adaptively.

Table I: Relating Recommendation Techniques Method

Technique	Background	Input	Process	Problem field
CONTENT BASED FILTERING	The content-based filtering approach has its origins in information retrieval and data filtering. The stocks recommended by content-based filtering often indicate textual information, such as news webs and documents and these items usually describe with keywords and its weights.	investor's ratings of stocks in s.	Generate a classifier that fits investor's rating behavior and use it on stocks.	It parsed text or the features that assigned to shares manually. Retrieval techniques work well in extracting features from text documents extraction methods are much harder to apply to multimedia data, e.g., graphical images, audio streams, and video streams.
COLLABORATIVE FILTERING	As one of the most successful and earliest recommendation technology, collaborative filtering approach works on building a investor dataset from investors and present recommendation by collaborative algorithm. Collaborative filtering approach lies in searching the similar preference investors with the active investor.	Ratings from investor in i of stocks in s.	Identify investors in I similar to i, and extrapolate from their ratings of s.	Collaborative systems rely solely on investors preferences to make recommendations. Therefore, until the new stock is rated by a substantial number of investors, the recommendation system would not be able to recommend it.
HYBRID FILTERING:	Features of stocks in S. Knowledge of how these stocks meet a investor's needs. The algorithm first calculates the similarity ("weight") between two investors or two shares. The algorithm then computes the weighted average.	A description of i's needs or interests.	Infer a match between s and i's need.	Cold-start problem and stability & plasticity problem. Cold-start problem occurs when learning based techniques. Stability /plasticity problem means that it is sometimes hard to change established users' profiles

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2.2 Why Recommender systems?

A recommendation system is a mechanism to solve the problem of data overload in Internet. Its significance is to build the high effective learning algorithm to capture requirements of investor and assist them what to hunt.

Web-based Intelligence has grown with development of Internet as a way for information gathering, managing, consumption and storing. It is always-altering and indivisible branch of computer science. The web offers the new means of execute and transmit information eminent beyond the other media. It is a new revolution in information intelligence.

The most important task of the recommender system is to get or gather the customers' up-to-date preferences using web mining techniques, in order to provide decision support for their Internet shopping. It gives an overview of the personalized recommender process of the system. We only select few member customers as the target customers for providing recommender services, considering the efficiency of the system maintenance and running. The recommender process consists of three phases as follows.

- After required data cleansing and transformed in the form usable in the system, target preferences of customers are mined first in phase 1. In the first phase, how to trace the customer's previous shopping behaviour effectively in the system is important and can be used to develop preference analysis.

- To set different rules of association that are mined from customer purchase database, integrated and used for finding product associations between products.
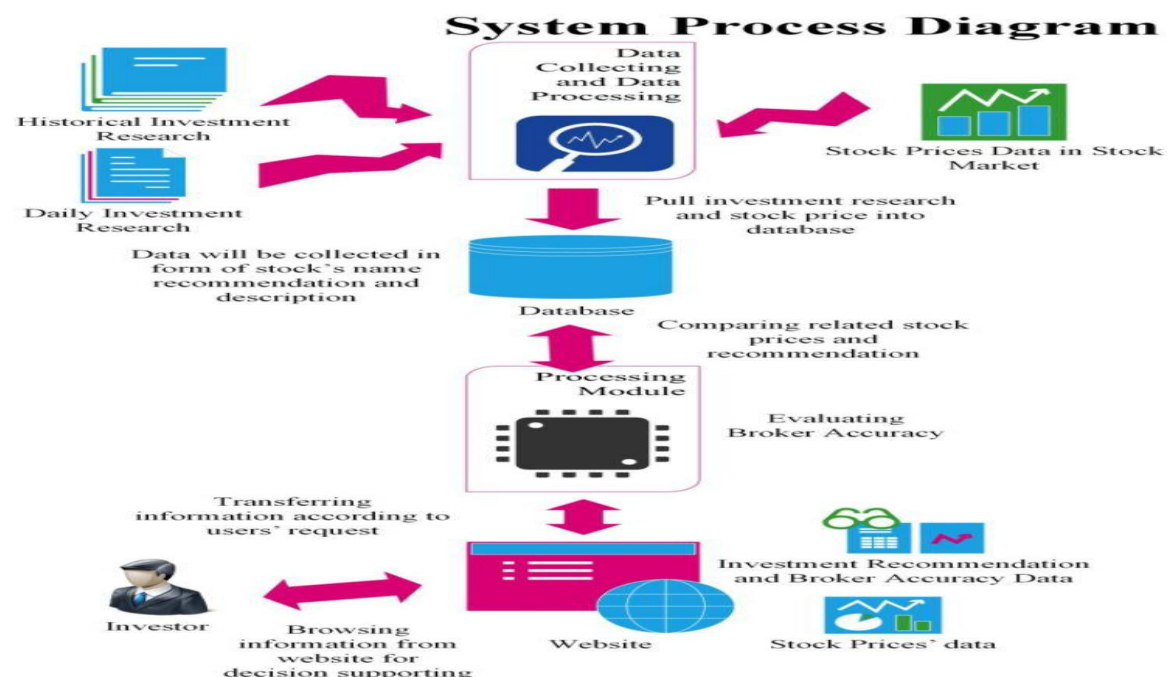

Figure:. An overview of system processes

- To use the match algorithm to find customer preferences and product associations discovered in the previous phases, so the recommendation products list, having the products with the highest scores, are returned to a given target customer.

II.   FORMULATING PROBLEM AND RESEARCH METHODOLOGY

We have tried to mention all those activity or procedures which were carried out during analysis and design of the system which will ultimately lead to final implementation of the recommender system. Descriptive research methodology used to survey which will include the study of relevant issues and the current scenarios and based on data, explanatory method based on quantitative technique used to clarify and explain how to overcome problem arises in existing system and also to solve them. We have developed a recommendation system to provide personalized information services in making a successful Internet business.

III.   CONTENT/ FINDINGS

How Artificial Intelligence based Recommendation system is helpful?

Basically, trading involves buying and selling of shares or stocks on the internet. The development of trading has led to companies moving much or a part of their business efforts to online environments. The craze of dot com has stimulated a global trading environment. This craze is now being exploited by lot of firms who are engaged in trading.

Concept of remote access is the obsolete method in globalization. The web with integration with these methods, people are getting higher position than any other media for information analysis for trading. Complexity and size are the features of WI to make it useful and unique for the companies, research and application. The huge size of the web leads to difficulties in efficient and effective storage and retrieval of web pages. WI is a networking pipeline, it is also the actual application platform on par with – indeed, integrated within- major operating system. Such applications are known as thin clients. Web documents have links of structured, semi-structured or unstructured information and heterogeneous collection. The immense diversity of web pages forces the investor to reconsider many technology and methodology of existing information system. Hence, a new disciple directed to web related research and application is needed that might have a significant value. To accommodate the information of web investors, need to study the design and implementation of web information system.

- First, the preference of investor and shares association are automatically mined from click streams of investor.

- Improved Collaboration filtering that aims to identify investor whose interests are similar to that of current investor, and recommend shares that similar investors have liked.

- One of the important key features of this is its ability to address the issue of higher recommendation scores being accepted over lower scores. This is done by comparison of the distribution of scores for accepted recommendations with analogous distribution for offered recommendations.

- The methodology used in this system improves scalability and also precision of buying or selling.

- In this system, the chosen strategy is adopted that for all shares in the same classes, those shares that were purchased latest would be assumed to be the most popular and the more buyable. Hence, we use the strategy of choice to provide the recommender services.

IV.   SUGGESTIONS/ STRATEGIES

5.1 The System

The planned system is .NET based system. The purpose behind making it .NET based system is its popularity and its easily available applications. Without writing a single line of code, .NET provides you with a scalable and powerful framework to code upon. Everything in .NET is an object. This means that everything user uses and writes is also an object. This is a useful way of controlling and accessing your Web applications as user deals with properties to retrieve

information and helps in responding to events occurring within the application. ASP.NET includes a very powerful and easy to use caching system[8].

5.2 The recommender process consists of three phases:

- After required information cleansing and transformed in the form usable in the system, target preferences of investor are mined in phase 1 first. In the first phase, how to trace the customer's previous buying and selling behaviour effectively in the system is of extreme importance and this can be used to develop preference analysis.

- In the 2nd phase, the different association algorithms are mined from the investor stock purchase database, integrated and used for finding share associations between different stocks.

- In the 3rd phase, we make use of suitable set of rules to equal preferences of investor and stocks associations revealed in the previous phases, so the recommendation shares list, comprising the stocks with the maximum scores, are returned to a given target investor.

ALGORITHM OF THE PROPOSED SYSTEM

The overall recommendation process consists of following three steps:

- Investor preference mining
- Stock data association mining
- Suitable set of rules for recommender

The suitable score σ_{mn} between investor m and Shares class n can be computed as follows:

$$\sigma_{mn} = \frac{\sum_{k=1}^{N} c_{mk} p_{kn}}{\sqrt{\sum_{k=1}^{N} c_{mk}^2} \cdot \sqrt{\sum_{k=1}^{N} p_{kn}^2}}$$

Where,

C (m)	-	row vector of the M × N investor selection matrix C
P (n)	-	a row vector of the N × N stocks association matrix P
M	-	Total number of target investors
N	-	Total number of share classes.

The suitable score σ_{mn} range between 0 to 1, where more relationship between $C(m)$ and $P(n)$ result in larger value.

Figure: Overview of the recommender process of the system

V. CONCLUSION

The key research field for the Wisdom Web (including the Semantic Web) is Web Intelligence. WI provides environment for distribution and analysis of the information for the business development. The preference of investor and shares association are automatically mined from click streams of investors.

The matching algorithm which combines the preference of investor and shares association is utilized to score each share and produce the recommended share lists for a specific investor. An essential issue discussed here is evaluating the quality of recommender is the degree to which recommendations with higher recommender scores are accepted over recommendations with lower scores. This issue is addressed by comparison of the distribution of scores calculated from the formula of computing the matching score for accepted recommendations with the analogous distribution for offered recommendations.

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