

# Stock and News Application of Intelligent Agent System

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## Abstract

Recently, there has been active research conducted on the intelligent agent in various fields. The results have been widely applied to intelligent user-friendly interfaces. In this system, we modeled, designed, and implemented an intelligent agent system that can be applied to stock and news. Some procedures such as login sequence to the web site, process to get stock information, setting stock in concern, intelligent news system module, news analysis module, and news learning module are modeled in detail and described in block diagram level. In our experiment on stock system, it showed quite a useful alarming screen avatar result and also on news system. it successfully rearranged the order of the news according to the user's preferences.

**Key words :** Intelligent Agent, stock information, avatar, intelligent news system, news learning system

## I. Introduction

Agent can be defined as an information processing program that can be applied to numerous fields such as autonomous agent, electronic commerce, knowledge discovery[4], bank asset management system[5], intelligent user interface[1, 3], internet[2], pattern classification[6], and intelligent avatar system[8].

Intelligent agent is generally considered as an intelligent system that can obtain synergy effects by combining practical user interface and theory of intelligent system based on Artificial Intelligence, Neural Networks, fuzzy theory, and combinations of those theories[7].

But, the problems of efficient connection between several agents, job distribution between agents, human-like agent adjustment, and conflicts and errors between agents are not solved yet[1]. Those kinds of problems can appear in any kind of applications that is based on intelligent agent.

The goal of our study is to design and implement an intelligent agent system for stock and news application.

The major characteristics of the system are monitoring function of user-designated stock information, stock alarming function, and user-oriented optimal news monitoring function depending on the user's news reference frequency.

Stock and news were provided to the user through portal sites and the interface of intelligent system model provides only the necessary stock information to the user and plays the role of user-adjusted news information.

Stock and news services are considered to be the most interesting agent services, therefore these two services are implemented in this research. and additional services are under construction based on diverse schema.

## II. Conceptual Modeling

The conceptual modeling of intelligent agent system for the stock and news is illustrated in <Figure 1>.

Intelligent system model provides stock and news services through Stock/News System Module. Agent Manager resides among Agent Interface, Stock/News System Module, Database, and internet. It take part in the communication among several parts. It sends internet data to each module after referencing database. The final information is sent to the user.

Database consists of data sets of System Configuration information and News System that stores News learning data. These information is transferred to each module via Agent Manager. Transferred data is passed as the parameter through the lower level interface inside the System Module. The Stock Module receives user information and parsed stock name and stock prices and report the interesting stock information. This value is used as a referencing value to reconstruct the web page by using News Schema in News System Module.

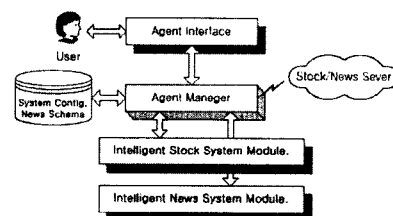


Figure 1. Conceptual Modeling of Intelligent Agent System

## III. Stock System

Many people are interested in the real-time stock information and that can be obtained by various internet sites. But most users use stock related Client Program that occupies the whole screen or the users access to the internet stock sites

directly. This method occupies too much resources and is inconvenient in case of multiple jobs. Also it does not have alarm function to the user.

Therefore we designed and implemented an intelligent avatar stock system that make it possible implement multiple jobs and adopt alarming system only when the value of a specific stock changes.

First, the user decides on an interesting stock name to be alarmed and set up an ID and password in the related internet homepage to make it possible for the avatar to get real-time stock information.

The user gets the information through the avatar window when the value of the stock changes or the stock market is closed. The information between stock web site and avatar is communicated by TCP or UDP packet.

Login process is done by TCP packet transfer. If a user inputs an ID and password, Agent System does some work and pass this result to the socket module. When a socket module of web site and a socket module of Agent System communicate with each other and complete the login steps, the alarming process starts.

The web site login process is illustrates in <Figure 2>. The user inputs ID and password through the user-friendly interface and passes this information to the Agent System via GetID and GetPass function. Transferred ID and password are sent to the corresponding web site and logged in. The stock information can be sent to the Agent System by UDP packed.

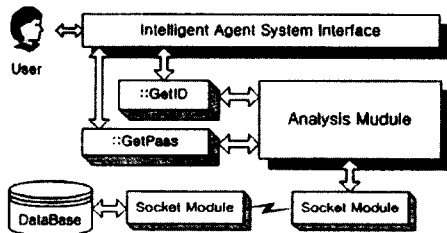


Figure 2. Login sequence to the web site

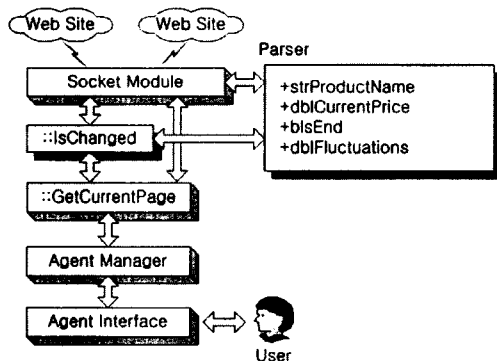


Figure 3 Process to get stock information

The process to get the stock information is illustrated in <Figure 3>. Agent manager of Agent System receives the corresponding stock information through the UDP packet after the login process

If the socket module receives the datagram, it compares it with the previous information. The strProductName is a string type character sequence that a user set up an interesting stock name and the dblCurrentPrice is a variable of current stock price, and the dblFluctuation is a rise/fall information. IsChanged function checks whether the received information and the previous information is the same or not.

The user communicates with Agent Interface module, Agent Interface communicate with Agent Manager Module, and it communicates with GetCurrentPage. It communicates with IsChanged and Socket module.

If the user sets the interesting stocks in the interface as illustrated in <Figure 4>, Agent System executes the corresponding job in the database. Agent System executes Stock Administration module when the user changes the setting from environment to stock in concern.

In the Stock Administrator module, it make it possible to call some functions like GetProductName, SetProductName, and update table. By utilizing these functions, database and RealTime Symbol Table can be updated.

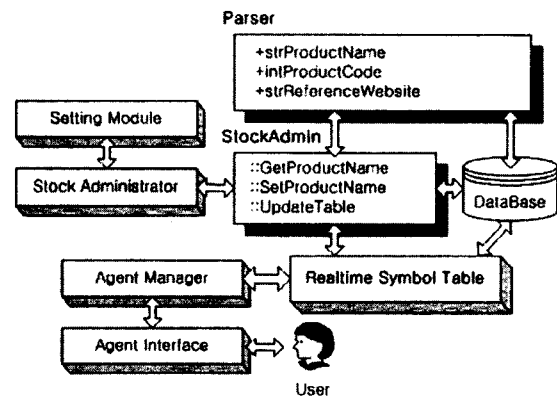


Figure 4. Sets interesting stocks

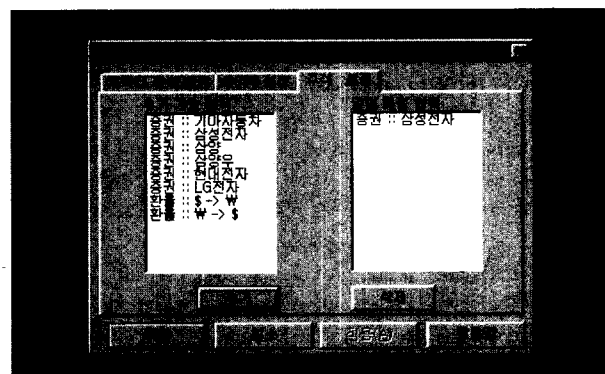


Figure 5. Setting screen

<Figure 5> is the setting screen. By clicking the right button in the Agent System, we can enter the environment setting mode and can add more interesting stocks. GetProductName shows existing stock items and SetProductName make it possible to add and delete. In this screen, StockAdmin class updates database for the user and make it possible for the Agent

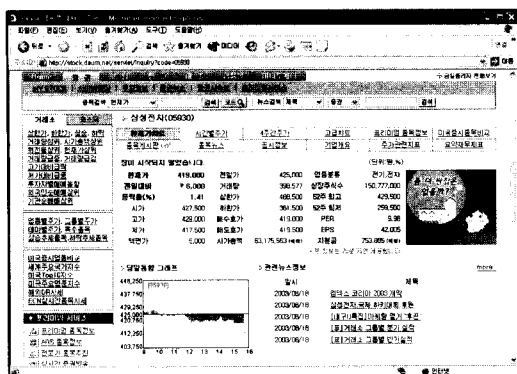


Figure 6. Stock information from Daum site



Figure 7. Alarming screen of avatar

Manager to compare more easily by calling UpdateTable function.

<Figure 6> is a sample stock information menu from Daum portal site. It uses internet Explorer. Each stock item is classified by code and Agent System module can access wanted information by the combined code URL.

If we get the desired datagram from the web site, we begin to parse to classify strProductName and dblCurrentPrice. Datagram is in the format of HTML, it calculates dblFluctuation by referencing dblCurrentPrice that has the same strProductName in the database. If the dblFluctuation is same, IsChanged member function waits for the next socket module event.

If not, it calls GetCurrentPage function. GetCurrentPage function analyzes datagram received from the socket module and pass the string type information to the Agent Manager.

Agent Manager transfers customized information to the user by global hooking, the location of the screen, the location of the window, and the location of avatar. In stead of the whole stock market information, it alarms only the user setting information as illustrated in <Figure 7>.

Without allocating many working resources, the user is to be alarmed and get the customized information in the corner of the screen.

#### IV. News System

Intelligent news system was designed to highlight the headline news that a user frequently reads in the web site. The overall system configuration is depicted in <Figure 8>.

The news page from the web sites is transferred to the News Analysis Module. News Analysis Module extracts the user wanted information by parsing this page after referencing web site information and user information in the database. The news page is analyzed and reconstructed by the Re-composition Module. Reconstruction is performed depending on the priority as the user frequently used. Therefore, the contents of the original news page and the reconstructed news page are exactly the same except that the order of the headline is changed. The priority related information is performed by Learning System.

As illustrated in <Figure 9>, News Analysis Module consists of several modules such as Socket Interface, GetNewsPage, Analysis Module and Configuration Module. Socket Interface take the role of communication between sites and it consists of asynchronous communication UDP.

The transferred web page information is parsed and digested. Disassembly parses the wanted information and reconstruct them by recognition/classification for each section.

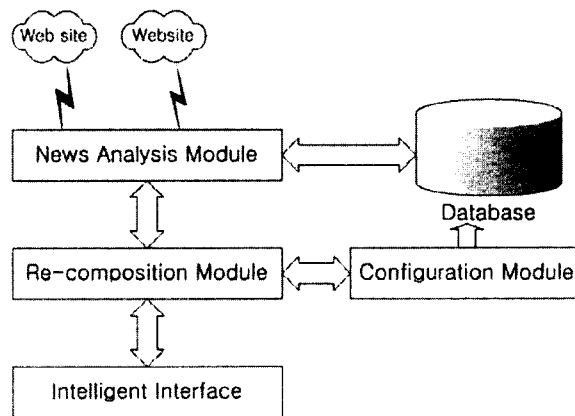


Figure 8. Intelligent News System Module

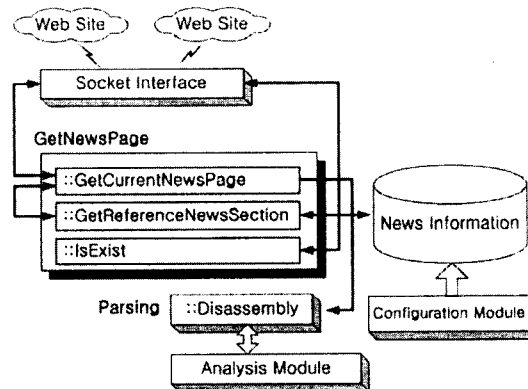


Figure 9. News Analysis Module

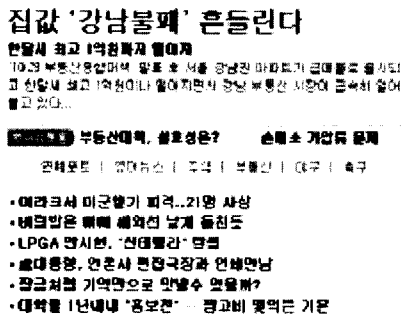


Figure 10. Original news

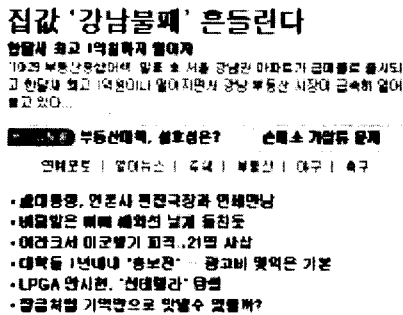


Figure 11. Reconstructed news

Table 1. Original priority table

/* Fields */	File Name	Priority
social work	news01.gif	1
politics	news02.gif	2
culture	news03.gif	3
sports	news04.gif	4
economics	news05.gif	5
international	news06.gif	6
digital	news07.gif	7
media	news08.gif	8
opinion	news09.gif	9

In the Learning System, the user's access frequency information is referenced by the parsing class when it is reconstructed. Depending on priority change, the user wanted information is reconstructed for the user to access more easily. Finally, Analysis Module changes the transferred page to the complete web page and sends to the user.

<Figure 10> and <Figure 11> illustrates the original news and the reconstructed news from Daum portal site respectively. The six titles under the headline is in the order of the topic of international, economics, sports, politics, digital, social work. But the reconstructed site after learning is changed to the order of politics, economics, social work, international, sports, digital.

Table 2. Reconstructed priority table

/* Fields */	File Name	Priority
social work	news01.gif	1
politics	news02.gif	2
culture	news03.gif	3
economics	news05.gif	4
sports	news04.gif	5
international	news06.gif	6
digital	news07.gif	7
media	news08.gif	8
opinion	news09.gif	9

Learning should be performed for the section that a user frequently accesses. The total number of the section is 9 and each section has different number from 1 to 9 depending on the priority. When a section is clicked, the priority counter is increased and that section is compared to the next upper section and the order can be changed.

Original priority table in [Table 1] has been changed to Reconstructed priority table [Table 2] after the user clicked the news related with economics.

News Learning System module consists of as illustrated in <Figure 12> The information of the Priority table is stored in database as a file format. This system consists of News Interface, News Rebuild Module, Configuration Module and database.

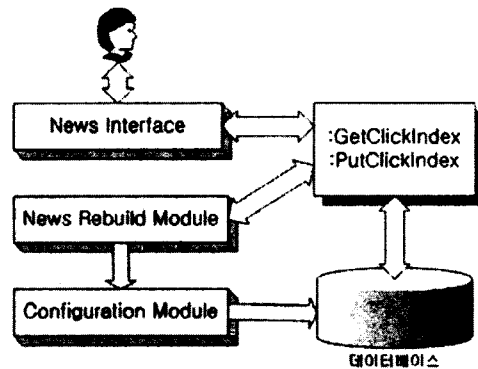


Figure 12. News Learning System

## V. Discussion and Conclusion

In our experiment on stock system, it showed quite a useful alarming screen avatar result. In stead of the whole stock market information, it alarms only the user setting information as illustrated in <Figure 7>. Without allocating many working resources, the user is to be alarmed and get the customized information in the corner of the screen.

And also on news system experiment. it successfully rearranged the order of the news according to the user's

preferences. Once the original news priority table is given like <Figure 10>, the reconstructed news table can be obtained like <Figure 11>.

In this paper, we modeled, designed, and implemented an intelligent agent system that can be applied to stock and news.

Some procedures such as login sequence to the web site, process to get stock information, setting stock in concern, intelligent news system module, news analysis module, and news learning module are detailed modeled and described in block diagram level.

Further researches are concentrated on the additional services based on diverse schema.

### References

- [1] S. Bird, "Toward a taxonomy of multi-agent systems", *International Journal of Man-Machine Studies*, Vol 39, pp. 689-704, 1993.
- [2] F. Cheong, *Internet Agents : Spiders, Wanderers, Brokers, and Bots*, New Riders, 1996.
- [3] R. Goodwin, "Formalizing properties of agents", Technical Report CMU-CS-93-159, School of Computer Science, Carnegie Mellon University, 1993.
- [4] T. B. Ho, T. D. Nguyen and N. B. Nguyen, "An Agent-based Architecture in Knowledge Discovery and Data Mining", *Proceedings of the 1st Asia-Pacific Conference on IAT*, 1999.
- [5] Dae Su Kim and Chang Suk Kim, "Modeling of Bank Asset Management System based on Intelligent Agent", *International Journal of Fuzzy Logic and Intelligent Systems*, Vol 1, No. 1. June 2001.
- [6] Dae Su Kim, et. al, "Design and Implementation of Intelligent Agent System for Pattern Classification", *International Journal of Fuzzy Logic and Intelligent Systems*, Vol 1, No. 2. Nov. 2001.
- [7] Dae Su Kim, Chang Suk Kim, and Kee Wook Lim, "Modeling and Design of Intelligent Agent System", *International Journal of Control, Automation, and Systems*, Vol. 1 No. 2, June 2003.
- [8] Dae Su Kim, "Modeling of Intelligent Avatar System", *Journal of Fuzzy Logic and Intelligent Systems*, Vol 13, No. 5. pp. 558-563, 2003.



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