Design of Target Cyber Counseling System using Counseling Assistance Agent

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ABSTRACT

Because of the characteristics of the cyber world, such as usefulness, anonymousness, patency, economic performance, rapidness, etc., cyber counseling has great possibility. Because he or she may not meet a consultant directly, a client can expose his/her inside problems or secret personal problems, keeping anonymousness. However, existing cyber counseling has the limit in durability of counseling because target counseling appropriate to a client is impossible and a counseling activity is done by one time counseling.

In this paper, we attempt to develop a target cyber counseling system in which target cyber counseling is possible. The system will use a counseling assistance agent who can play the role of a counseling supporter as well as a counselor in the cyber space. If target counseling becomes possible, it can heighten efficiency of cyber counseling because a client is satisfied with the result of counseling and thus counseling activities can be continued.

Key words : Cyber Counseling, Counseling Assistance Agent, Target Counseling

1. Introduction

The virtual society, activated by the Internet, is changing the human culture and patterns of human behavior. In this society, there exist the varieties in the rapidity by fast interaction, easy approach, equality and tolerance, the sense of freedom and anonymity, experience of a multiple personality, sociality, power, satisfaction of sexual desire, experience of mood inspiration, etc. Any rapidly evolving fence, which would interrupt the Internet in the future, is not seen at the present time. Especially, such virtual society may become the principal axis for our life in the future. The spread of the cyber space in 21st century will set another task of preventing mental illnesses. It is also important for counseling to occupy a position in an area or paradigm, which will be different from those at the moment.

The cyber counseling has formed a new space of understanding and the information exchange by combining computer and communication techniques. Cyber counseling means 'real time or non-real time counseling in the cyber space carried out by a counselor spacially separated from a client to expedite a solution to a problem or the client's growth and development. Various features of the cyber world, such as the convenience, anonymity, openness, economical efficiency, and rapidity, give the cyber counseling many possibilities[1].

The counseling desire of a client is various in the pluralistic society of the day. It can be natural to introduce a new counseling method, namely cyber counseling, to meet such needs. But currently, cyber counseling is single-session counseling for the most part. Therefore the durability of counseling is limited.

The cyber counseling is composed of various types. Two major types of cyber counseling are realtime and non-realtime cyber counseling. Realtime cyber counseling is realtime meeting through a computer; for instance, video counseling and chatting counseling. Non-realtime counseling means that the counselor and the client meet each other through e-mail, bulletin board, a slip of paper counseling, or data base counseling. The counseling can be achieved although the client and the counselor do not exist at the same place at the same time.

Most cyber counseling is currently non-realtime counseling. Public bulletin board counseling has been utilized very frequently. The relation between the counselor and client is temporary and superficial. And the possibility of the single-session counseling is high and the counseling is ended easily. So, we can not achieve the efficiency of the counseling. Secret counseling can access to a problem more deeply and continuously than open counseling, and also has the advantage of counseling with sufficient time. Secret counseling should be recommended for those clients who want in-depth counseling.

Currently, secret counseling achieved in the cyber space, has many problems in terms of a progress method of the counseling. Counselors counsel without the information about the client, namely population statistics information such as age, sex, occupation, as well as the previous counseling information of the client. Counselors in the cyber space counsel, only depending on the information the client simply uploads. It is difficult to verify the effectiveness of the counseling since most of the counseling is finished without receiving any feedback from the client by which one can

confirm how the client is satisfied.

In order to overcome such deficiencies in the cyber counseling, we try to develop a new counseling method by which a counseling assistance agent is employed for satisfactory target counseling. This new method will make the cyber counseling become more efficient.

2. Relate Research

2.1 Feature of cyber counseling

The cyber counseling solves the problem of a client who needs help. The counseling process in the cyber space helps make efforts to develop the client's thought, feeling, and behavior. The purpose of cyber counseling can be considered identical to that of off-line counseling. But it is different from traditional counseling in the media to accomplish the purpose and its method.

(1) Peculiarity of counseling relationship.

Most prominent external feature of cyber counseling is computer-mediated communication. For the counseling, a counselor and a client do not meet in person. The counselor can grasp the features of the client's feeling, thought, behavior or problem only through the characters or images on the computer monitor.

(2) Anonymity.

In the cyber counseling, we do not have to reveal our names, that is, we can take the advantage of anonymity, but we can open the information about self optionally. Because of such feature, we can be more frank and open in cyber counseling than off-line counseling.

(3) Interaction with character.

In cyber counseling, we communicate mainly through character. So, it is difficult to exchange much information in cyber counseling as freely as in off-line counseling. But when the opinions and ideas are expressed in a written form, the client can have more time to think to arrange and express his/her own thought.

(4) Easiness of usage.

A client must visit a counselor for face-to-face counseling, that is, off-line counseling. On the other hand, it is not necessary for cyber counseling; counseling is possible, wherever, whenever if there is a PC. Cyber counseling make it possible to overcome restriction in space and time. And we can use various different types of counseling service such as e-mail counseling, group counseling, chatting counseling, psychological test, counseling case bank, etc.

(5) Economical efficiency.

There are many free sites one can easily access for counseling. When there is charge, it is far cheaper than off-line counseling. Moreover, a client can take the lead during the counseling[2].

2.2 The types of cyber counseling.

The types of cyber counseling, which have been carried out

in Korea, can be divided mostly into bulletin board counseling, chatting counseling, e-mail counseling and multimedia counseling.

(1) Bulletin board counseling

Clients upload their own agony on a bulletin board. Then, counselors answer about them. Sometimes a third person answer to the agony. In this way, the agony can be shared and resolved.

(2) E-mail

Through e-mails, clients deliver their own agony to a counselor. The counselor delivers the sympathy or the resolution to the client in reply. The content of the counseling is not open to others.

(3) Realtime Chatting Counseling.

Chatting counseling is a process of helping each other in the course of exchanging a character message on the computer connected to the network. Chatting counseling can make the clients feel that they are conversing with the counselor more directly than e-mail counseling. The clients feel easier and more comfortable when they receive counseling on the computer since there is no fear to face the counselor unlike the off-line counseling.

(4) Video Counseling.

Thanks to technical development, we can exchange the voice and image through the Internet easily[3]. At former times depending chiefly on character chatting, counseling was provided like a face to face conversation.

(5) The Counseling using database.

A counselor uploads on the Web what is expected to be beneficial to the client and have the clients use them. A typical database counseling is the agony solution in the format of Q & A (question and answer)[4].

2.3 The current situation of cyber counseling

Today, at the time of an information society, the settlement of professional counseling service is a great task in a field of cyber counseling. There has been a great deal of expansion in practice of cyber counseling since the Internet was introduced into Korea in 1996. "Deung-dae" began in 1991 as a private BBS. "Telephone of the love" was established in 1993. Currently the number of counseling institutes including those above outnumbers 100, which offer counseling service through PC communication or the Internet. It is easy to find a counseling corner in the portal site like daum.net, yeozawa.com, healthkorea.net, etc. Counseling portal sites such as Counpia, Counsel24 have been operated and managed. Major counseling site names, their progress methods, and features are shown at table 1.

Most of the current cyber counseling has been provided in the type of non-realtime counseling. Non-realtime counseling is divided into two types: secret counseling and open counseling. Open counseling is the type where a counselor or other clients can put their opinions about the client's problems on the bulletin board. Consequently the durability of

counseling can not be achieved. If counseling should be durable, the counseling must be conducted based on the reliability between the counselor and the client. On the other hand, secret counseling is the type by which the client's secret is guaranteed during and after the counseling. If secret is revealed, the client will not express his/her problems. Even though s/he does, it will not be sufficient enough for the counselor to grasp the major or key problems of the client. Therefore it can be said that secret counseling is much more efficient than open counseling in establishing a reliable relation with the client[5].

Table 1. Present condition of major counseling sites

Sites	Method	Comment
Korea Institute Youth Counseling	Chatting, E-mai, Open bulletin board counseling , Secret counseling	Youth counseling, Generalized information network
Counsel 24	E-mail, Online group counseling, Open bulletin board counseling, Mobile counseling	Special consulling professors, Counseling researcher, Mind counseling education
SWIM Counseling Office	Secret counseling, Open bulletin board counseling	Counseling office operation to Internet Missionary Work Learned Society
Youth world	Secret counseling, Open bulletin board counseling	Youth site for guidance and Upbringing
Counpia	E-mai, Secret counseling, Open bulletin board counseling	Counseling by Experts/Specialists

In the following sections, our discussion will be focused only on the secret counseling.

2.4 The problems of existing cyber counseling.

The relation between the counselor and the client in cyber counseling cannot be stronger than that in off-line counseling. The cyber counseling is ended easily when the client gets a negative impression about it. The counseling period, counseling frequency, counseling method, counseling kind, etc must be organized in order to meet the client's need. However, current secret counseling on the Web has various problems.

First, counseling has been provided without sufficient information about the client, the person to take the counseling. Counseling can be more effective when enough information of the client is provided. The one-time counseling can be caused by the lack of information about the client; information about personality, what the person is, the reason for the counseling, what kind of help he needs, whether he has a precious counseling, how he reacts, etc.

Second, clients get counseling without knowing about their

counselors and thus have a little credibility of counseling. In the counpia.com, which provides charged secret counseling, the counselor list is identical to any client to visit, regardless of their interests, and thus the client must choose his own counselor among the list, after reviewing their profiles.

In order for the client to select the suitable counselor for his needs, sufficient information of the counselors should be provided when the list is provided for the clients. For this, database about the counselors should be gathered and organized, based on the feedback from the clients about their counselors, including their levels of satisfaction. According to this database the future client can choose his own counselor who would be suitable for his needs of counseling.

Third, there has not been any systems by which the level of clients' satisfaction can be checked after the counseling.

Fourth, as an alternative of post-counseling service, the client's condition should be checked after some time has passed.

Fifth, if the site provides any kind of educational program for the counseling field, it can raise the effectiveness of counseling by providing the clients with appropriate information.

In this paper we try to design and develop a counseling assistance agent system which is suitable to the client' need, in order to supplement the problems described above. When a suitable system is utilized, clients can feel a stronger sense of satisfaction, and thus continuous counseling service can be possible.

3. Design of the Target Cyber Counseling System

3.1 Design of Counseling Assistance Agent

An open cyber counseling site, based on Java Servlet, has been operated since December, 2000. The site is mainly for open counseling service. And it started to support charged secret counseling service in 2004, which is much more effective in counseling and establishing the relationship between client and counselor. However, this charged counseling service does not seem to satisfy the clients, and thus most counseling ends up with one-time service. In order to make the counseling continued, a counseling assistance agent is designed to support the target counseling. The process of this customized counseling assistance agent is as follows.

[step 1] : A client connects and gets authorization.
[step 2] : An agent sorts out the lists of the client's previous counseling records and prints them out.
[step 3] : A client chooses a counseling field which he wants.
[step 4] : A client can choose his own counselor according to his membership status:
A new member can choose the counselor the computer-aided counseling agent recommends or he can choose the counselor after reviewing the profiles in the counselor list.
An existing member can choose the counselor, new or old,

whom the computer-aided counseling agent recommends.

[step 5] : The counseling agent e-mails the client's personal information such as his age, sex, the environment, as well as the counseling record to the counselor the client choose.

[step 6] : There are two types of reply to the client. They are the text document and the sound file which record the reply. At the same time, a questionnaire will be sent to the client to check and evaluate the level of the client's satisfaction with the counseling result.

[step 7] : The agent stores the evaluation result in the Counselor Assessment DB and the counseling record in the client's Counseling history DB.

[step 8] : A week after the counseling, a questionnaire will be sent to ask about the client's current state for the continuous management of the client.

[step 9] : The agent send the result of the questionnaire about the client's state to the counselor.

[step 10] : After reviewing the client's present situation, the counselor send an email to the client if he needs any further treatment or counseling.

Step 8 through 10 should be repeated until the client overcomes his problems. When the client does not want to continue his relationship with the counselor or the site at any step, the counseling service terminate. However, the counseling record is stored in clients' Counseling history DB.

3.1.1 Membership function design of triangle form for counselor evaluation

In this paper, membership function of triangle is applied to evaluation items for counseling in order to recommend an appropriate counselor for the client. Since fuzzy set is generally used to express individual's subjectivity, differences between individuals exist definitely in the expression of their linguistic values. Therefore it is necessary to use standard in the comparison of individuals[6]. When fuzzy set is dealt with from this viewpoint, it is desirable to utilize standard parameter membership function which has controllable parameters control. Triangle membership function is expressed by 3 points (a_1, a_2, a_3) as in Fig 1.
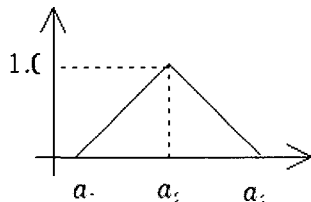

Fig. 1. Expression of triangle membership function

Five input values are used for evaluation items about counselor's counseling disposition. They are expressed with fuzzy sets as in Table 2.

After a client receives counseling, he evaluates the counseling at the step 7. The final counselor evaluation result is stored in counselor DB according the area, and the client's evaluation is stored in clients' counseling history DB. In the recommendation of a counselor, it follows the evaluation

score. In other words, the counselor with the highest score on the evaluation is recommended first and the one with the lowest is recommended last.

Table 2. Variables of fuzzy membership function about counselor evaluation items

Fuzzy Variable	Fuzzy Vale	Membership Interval
Vp	very positive	[16, 19]
p	positive	[12 ,15]
m	moderate	[8, 11]
n	negative	[4, 7]
Vn	very negative	[0, 3]

Table 3. Client evaluation results about three counselors

Counselor / Client	A	B	C
	Evaluation for each item / Satisfaction about whole evaluation		
kim	vp, p, vp, p	vp, p, vp,...	p, p, p,...
	92%	92%	84%
hong	vp, p, vp, p	vp, p, vp, ...	p, p, p,...
	90%	88%	84%
park	p, p, vp, ...	vp, vp, vp	vp, vp, p,...
	80%	98%	88%
...	...	...	...

Clients Kim and Hong show the same evaluation result, but their total satisfaction value about their counselors are different; 92% and 90%. Each item of counselor's counseling dispositions is evaluated by clients before their total satisfaction value is input in percentage. Even though the evaluation results for each item are same, the total satisfaction values can be different. Accordingly, the evaluation results can be different.

3.1.2 fuzzy membership function about counselor evaluation item

Four evaluation items were used for counselor evaluation, and membership function was applied to each of them for the counselor evaluation. Weight was given to each item when the counselors were evaluated. The weight fuzzy number for each item is w_i, The evaluation results are expressed as follows:

$$g = w_1 \times q_1 + w_2 \times q_2 + \cdots + w_n \times q_n \qquad (1)$$
$$= \sum_{i=1}^{n} w_i \cdot q_i$$

Here, g means the result of the total evaluation value for four evaluation items for which clients evaluated. w_i means the weight for each item, q_i means the evaluation for each item. A client inputs his satisfaction value after he evaluates for each item.

The final counselor evaluation result fg, which is obtained

after applying the evaluation result g for evaluation items and clients' total satisfaction value, can be expressed as in formula (2). The final counselor evaluation result can be evaluated with $a \in [0,1]$, a, fixed fg, and a client's total satisfaction value λ, $\lambda \in [0,1]$.

$$fg = \lambda g_1^{(a)} + (1-\lambda)g_3^{(a)} \qquad (2)$$

The final evaluation level of a counselor, who has been evaluated by several clients, is calculated as follows:

$$tg_A = \frac{\sum_{i=1}^{n} fg}{n} \qquad (3)$$

Therefore, those with high tg_A value is a good counselor. When a new client evaluates the counselor and inputs his evaluation in counselors DB, this new evaluation value cg_A is added to the previous evaluation value tg_A, and the average of the two values becomes a new evaluation value for the counselor. m is the number of new clients.

$$TG_A = \frac{tg_A + cg_A}{m+1} \qquad (4)$$

4. Conclusions

The rapid development of the Internet has caused changes in the pattern of counseling, from off-line counseling to cyber counseling, which has a little time and spacial restriction. However, it is also true that there has been several problems in opening and managing a counseling site on the Internet. Thus we tried to design a new effective cyber counseling system to use a counseling assistance agent, and currently we are trying to change our site in order to engage the above mentioned counseling assistance agent for cyber counseling.

The operation process by which a target counseling is possible with the counseling assistance agent was suggested. Membership function of triangle form is utilized for the right recommendation of a counselor, who would be suitable for the client. The different weight for each item and the introduction of optimism index λ make flexible counselor evaluation possible, since they allow different values added according to the client's total satisfaction value. This effective target counseling can raise the client's satisfaction level, and thus make the counseling continued.

In the future, cases stored in counseling DB should be reviewed and analyzed for a better application of population statistical method.

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