

Virtual Conference Management System

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Abstract

In recent years, with the improvement of network technologies and hardware supports, we can find that network have become an important part in our daily life. In traditional, scholars can get new knowledge and exchange their ideas with others by joining a conference. But, however, this will cause time and cost consuming. It is feasible to use electronic conferencing technologies to organize future international conferences. Consequently, we develop a virtual conference environment system to help the people who want to hold a conference or want to join a conference. This paper focuses on the Virtual Conference Management System. We will develop a complete suite of integrated tools to support your planning, design, and implementation efforts during the deployment of new network conference scheduling of an existing network infrastructure.

Keywords: Virtual Conference, Workflow, Scheduling, Web-Based Computing.

1. Introduction

With the enormous use of the Internet, there are many real-world activities applied on Internet. We proposed a complete virtual conference system. In virtual conference management system, we introduce the viewpoint of administration on each step of conferences or workshops. This system can provide service for following members:

- **System Administrator:**
- **Conference Holder(s):**
- **Referee(s):**
- **Author(s):**
- **General User(s):**

We will apply the flow of real-world conference. Associated with the feature of Internet, we established the flow of virtual conference. That is the schedule of conference. There are many phases or levels on holding a complete conference or workshop. We must take all situations in consideration.

This paper is organized as follows. Section 2 describes other related researches. And, we address the Virtual Conference Management System (VCMS) in section 3. We discuss the schedule of virtual conference. And we also address the architecture of virtual conference management system. Section 4 discusses the user interfaces of Virtual Conference Management System. We address the strategies for final program in section 5.

Finally, we give a short conclusion and future works in section 6.

2. Related Works

Many researches about holding a conference have done several years ago. But these works are developed on desktop. No research focuses on providing the whole, complete environment for holding a conference. In general, in order to solve the problems of special or particular phase, some works will be done. For example, In the WIMPE[1] Model, David M. Nicol uses Perl Scripts and Tcl/Tk to build the toolkits for paper submission and reviewing papers. The members in the conference can get the newest information by auto email sending system. The system provides 2 ways to get the electronic paper file from authors. The first one is providing the upload mechanism, and the second is using the attaching file by email sending. WIMPE provides the auto email notification to the authors. Besides, the paper format required in WIMPE is in the uniform style because of the Perl Scripts programming.

In the implementation consideration, We also visit some of web-based conference management system. There are many famous conferences held by the IEEE organization. Some of the conference provides online conference management system. In the IEEE ICME 2000 [2], it provides some toolkits for academics to submit the research papers, such as paper format required, paper electronic file uploading, and so on. In the ICOIN14 [3], it also provides online tool for conference management. In the registration part, it provides a secure environment. In the Fourth International Conference on Visual Information Systems, Visual 2000 [4], it provides the evaluation toolkits for referees. With the identification verification, referees can evaluate the paper assigned to them, and see the information of the papers submitted to the conference. The evaluation is according to the appropriateness, originality, technical strength, presentation, and overall evaluation of the paper with 5 degrees (Strong Reject, Weak Reject, Undecided, Weak Accept and Strong Accept).

3. The Architecture of Virtual Conference Management System

If a researcher want to hold a conference or a workshop, he/she is always busy because of the heavy load of academic activities. The traditional method for holding a conference is non-automatic. It costs much human power. In order to solve this problem and conform to the trend of the Internet, we develop this virtual conference management system to assist interests for

handling conference organizing works. The schedule of virtual conference is shown as figure 1. In real-world conference, there is a schedule for holder. The holder deals with all events according to this schedule. Therefore, the holder of virtual conference also has adaptive schedule in virtual world.

The architecture of Virtual Conference Management System is composed five parts we mentioned before. Each component in the Virtual Conference Management System environment is designed for the different kinds of the roles playing in the Conferencing processing. The main architecture is shown in figure 2.

The Conference Holder Management System is a suite of integrated tools for the professor who wants to hold a conference and maintain the conference he/she holds or held. There are three subsystems in the Conference Holding Management System, which are Registration System, Conference Management System, and Querying and Maintaining System. In the Registration system, this is a subsystem for the researcher who wants to hold a conference. Before the researcher want to hold a conference. He/she should have to register in this subsystem, and after the registration, he/she will get a Holder ID. After that, a new conference can be held, and also, the subsequent tools can be used.

The Conference Management System is designed for the Conference Holder to process the schedule of conference. There are three subsystems in the Conference Management System. The first one is the New Conference System. Conference Holders can submit the information of the conference they want to hold, such as the conference title, the important dates of the conference, the file format required, and so on.

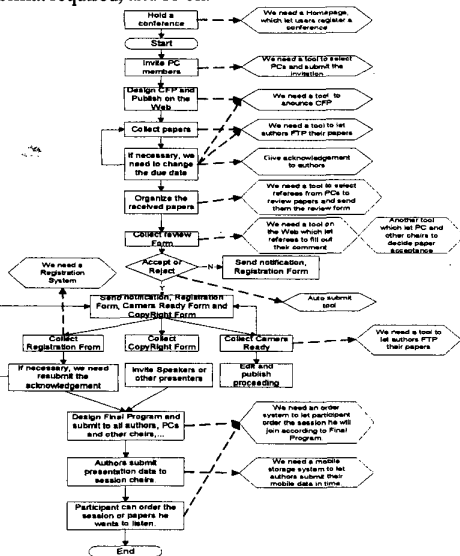


Figure 1. The schedule of virtual conference

The second subsystem in Conference Holders Management System. can invite the program committees and the authors who are interested in the concepts of the conference by auto sending email. And also, conference holders can design the fee charging of the conference. After collection of paper due to the paper submission deadline, conference holder can assign each paper to

the referees who have already registered to this conference. After the referees have finished evaluated the papers, conference holders can decide the acceptance of papers by 3 mode as following.

- ◆ By percentage.
- ◆ By thresholds.
- ◆ By the Program Committees voting.

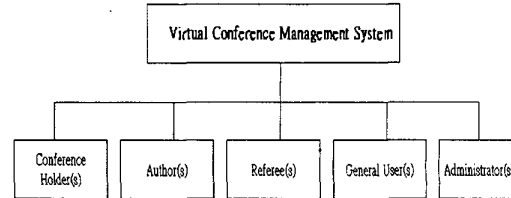


Figure 2. Virtual Conference Management System Architecture

Also, the authors will be notified the status of their own papers by auto email sending. After selecting paper acceptance, conference holder can process the final program of the conference scheduling according to the paper acceptance. In the third subsystem, conference holder can check the status of the finished conference(s) they held before.

In the querying and maintaining system, conference holder can see the status of each conference they hold or held. Also, if they want to change some information about the conference, they can use the toolkits in the system. Also, conference can know the detail of the paper status and the processing if the referee(s). The whole architecture can be shown as figure 3.

In the Author(s) Management System, it offers the online services for the authors. Authors can submit their own paper and new researches to each conference in the system, and also, authors can manage their own papers on line. There are six subsystems provided in the Author(s) Management System. The architecture of Author(s) Management System is shown in figure 4.

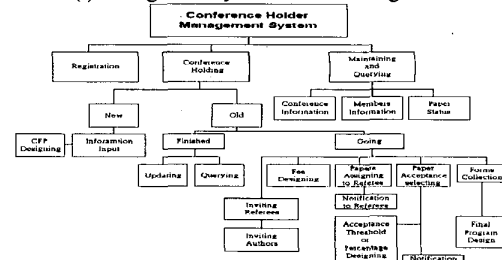


Figure 3. Conference Holders Management System Architecture

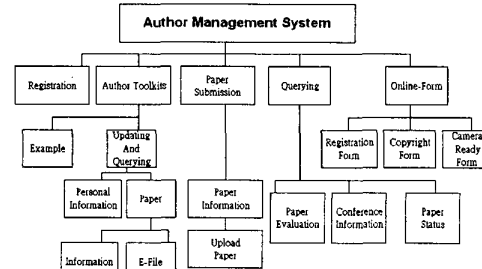


Figure 4. Authors Management System Architecture

In the conference schedule, Referees play the most important roles [7]. Accordingly, the Virtual Conference Management System provides a set of tools for referees to facilitate to finish the evaluation easily. After the Conference holder invited the referees in his conference, the system will automatically check the referee database, and find the referees if already in the database. If not, system will create a new ID for referees, and notify each invited referees to enter the Referee(s) management System by automatically email sending. The first part is the Registration System. After registering to the conference, referees can be assigned some paper to evaluate in the Conference. The second is the Evaluation Management System. In this part, Referees can evaluate papers consigned to them in difference conferences. After clicking on the paper listing, The subsystem provides the suitable evaluation tool for referees to evaluate the paper online. Also, the system provides some useful toolkits in the Referee Toolkits System, referees can updating the personal information if need. And referees can also update the review form if the evaluations have not been processed. The conference information can be queried in this subsystem, too. The forth subsystem is designed for the referees to make an online registration with the Attendee Registration Form. Referees can be charged automatically according to the fee calculation. The architecture of Referee(s) Management System is shown in figure 5.

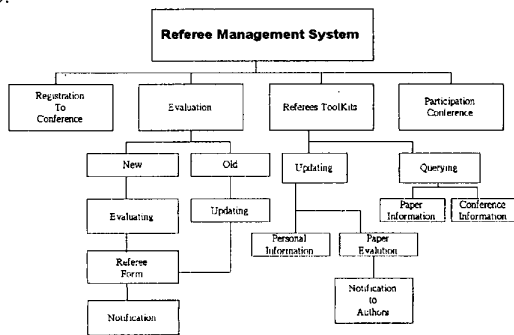


Figure 5. Referees Management System Architecture

For general users, Virtual Conference Management System also provide adaptive, friendly, and useful tools named General Users Management System, such as registration, and making good querying in paper information, authors information, and conference information. The architecture of General Users Management System is shown in figure 6.

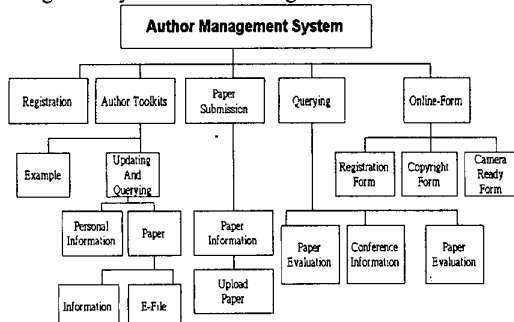


Figure 6. General Users Management System Architecture

The VCMS is established by accessing the database like the figure 7. Consequently, the final subsystem is Administration Management System. The administrators have the highest priority to maintain the whole database of VCMS. Administrators can see the status of the conference in detail, such like the disk quota of each conference used, or the situation of the conference going on. Also, administrators can notify the conference holder some important messages with the conference processing.

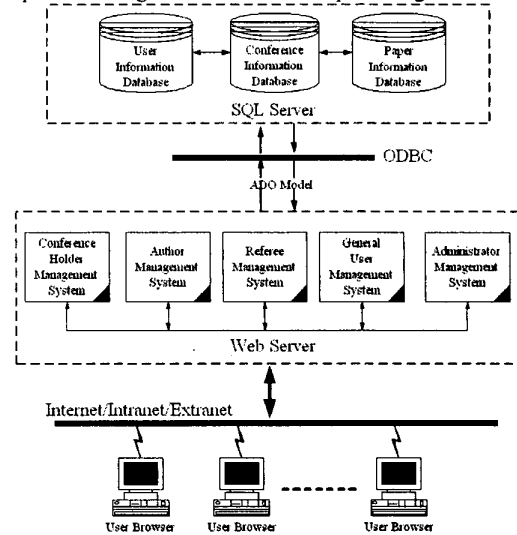


Figure 7. Database accessing in VCMS

4. The Design and Implementation

Virtual Conference Management System includes five subsystems that we mentioned in section 3. Figure 9 shows the main page of Virtual Conference Management System. Users can enter the subsystem according to their memberships in the conference environment. As mentioned, there are five subsystems included in the environment

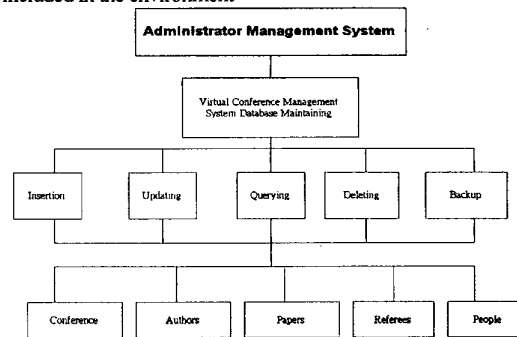


Figure 8. Administrators Management System Architecture

The most important system in the VCMS is the Conference Holder System (Figure 10). The system provides some toolkits for the academics who want to hold a conference or maintain the conference they hold. After registered to the conference in the Registration System, the system will give the academic an ID automatically as the conference holder identification.

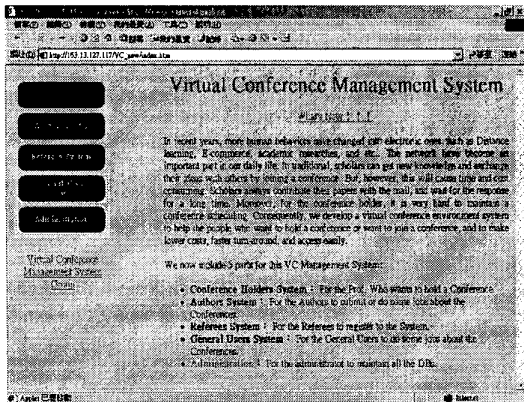


Figure 9. The Virtual Conference Management System

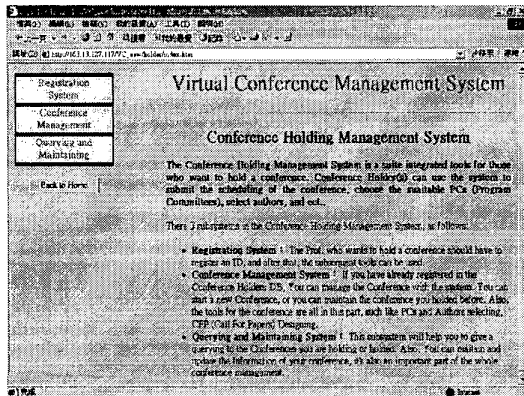


Figure 10. The Conference Holding Management System

After having the holder identification, the academic can enter the Conference Management System with the holder ID and start the conference scheduling. In Figure 11, conference holder can establish a new conference in the New Conference System, or control the scheduling of conference(s) that he/she holds query and maintain system for the held conference, and conference management.

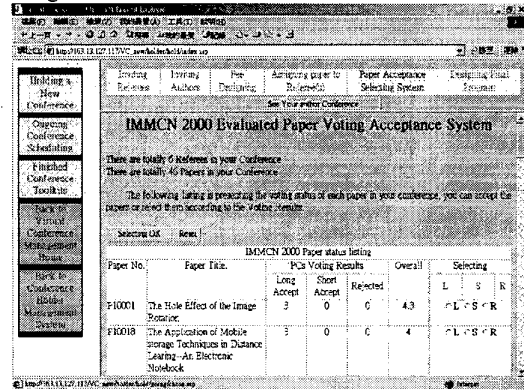


Figure 11. The Conference Management System interface

Author(s) Management System (See Figure 12) can process

all possible events for authors, including the Registration System, Author Toolkits, Paper Submission, Querying System for submitted paper, Camera-Ready Form Submission, Attendee Registration. With the Author management System, authors can save much time and money in paper submission and evaluation turn around. In this subsystem, not only the submission tools have been provided, but the querying tools have been included in the system, too.

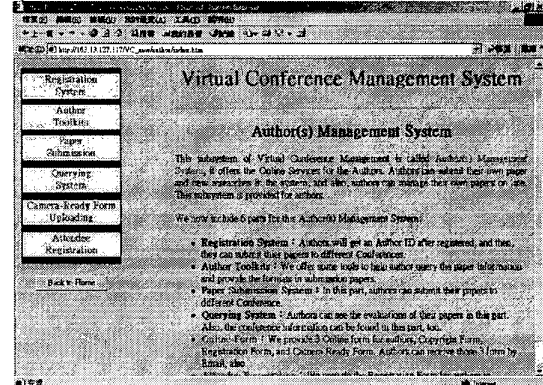


Figure 12. Author(s) Management System

However, referee plays a very important role in conference. We provide a powerful tool for referee. Referee(s) Management System can handle the evaluation, and review papers on-line after clicking the "Evaluation Management" in figure 13.

General user can check all status of ongoing conferences by the General User Management System (Figure 14). After registered in this subsystem, they will be treated as the member of the whole Virtual Conference Management System environment. They can get the newest information of conferences.

Administrators (Figure 15) can see the status of the conference in detail, such like the disk quota of each conference used, or the situation of the conference going on. Also, administrators can notify the conference holder some important messages with the conference processing. Besides, they can backup the whole database ten times a day because of the disk quota of the system concerned.

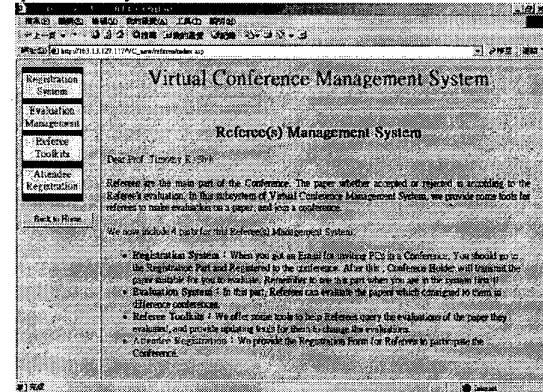


Figure 13. Referee(s) Management System

5. How to make a perfect final program?

In the final phase of the virtual conference management system, the final program must be provided on the conference Web.

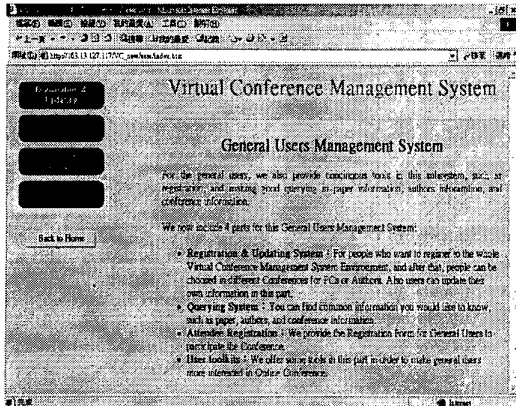


Figure 14. General User Management System

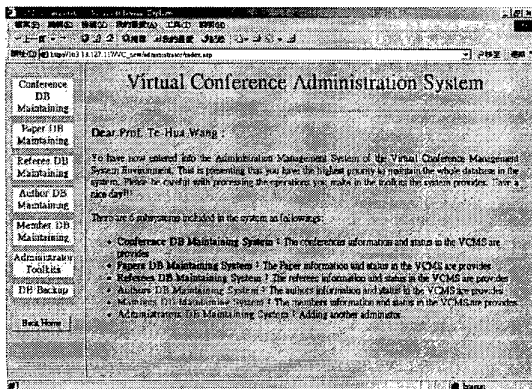


Figure 15. Virtual Conference Administration System

A. Strategy 1: Based on Time Zone

As we know, the earth rotation makes the time difference. We want to make a final program for all participants and complete the wonderful presentation. Due to this reason, everyone should be aware. Besides technology, this research is also very important according to viewpoint of the human nature.

While the session is opened, presenters and participants of the session should be on-line. Unfortunately, the time difference makes the different spirit status of people in different time zone. We try to set the adaptive session time in which can be joined by the maximum number of participants. At the same time, the number of presenter is max. The following algorithm describes this methodology. Strong zone means the unsleeping time and weak zone means the sleeping time for normal human. The following figure is the time zone distribution.

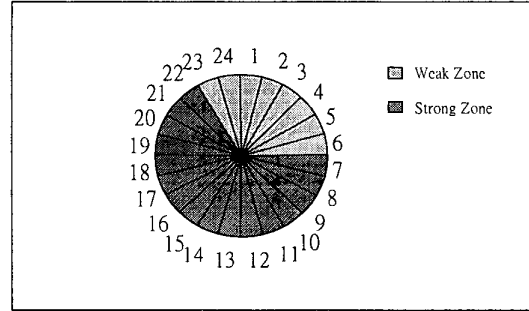


Figure 16. Time zone distribution.

Algorithm: E-meeting scheduling according to time zone

Given:

Strong Zone is for day hours (7:00 ~ 23:00)

Weak Zone is for night hours (23:00 ~ 7:00)

MAX_Session is the maximum number of sessions

TZI is the set of time zone intersection

EXCEPT is the set of in the Weak Zone

GMT is Greenwich Mean Time

PRESENT_TIME is the time of each presentation

Q = Sequence-of (session, GMT)

Constraints:

For each Time of IP IPT, it should be normalized according to GMT

For each session, $1 \leq i \leq \text{MAX_Session}$

Output:

For each session, find its adaptive GMT_i such as $Q = \{ \text{session}, \text{GMT}_i : 1 \leq i \leq \text{MAX_Session} + \text{Additional_Session} \}$

Steps:

Normalize all participants' and presenters' Strong Zone using GMT.

For each session, $1 \leq i \leq \text{max_session}$ do

```
{
  For GMT + j,  $0 \leq j \leq 23$  do
  {
    Calculate the maximum number of presenters in Strong Zone.
    Find the maximum number of participants.
  }
  Assign the presenters in the time zone intersection set TZI.
  Assign the presenters not in the Strong Zone to the EXCEPT set.
  Select the GMT of all presenters in TZI; is minimum and set as GMTi
}
m = MAX_Session
For each member of the EXCEPT set do
{
  m = m + 1
  Assign sessionm as new session
  Assign the GMT of presenter as GMTm
}
For each sessionk,  $1 \leq k \leq m$  do
{
  post the schedule, and allow max. number of participants to join
}
```

According to the previous algorithm, we can find the adaptive time for each session and set some additional sessions for the conference.

B. Strategy 2: Based on Bandwidth.

The network situation of every country is distinct. This method tries to find the time, which have the maximum bandwidth to set the session time. The algorithm is as following.

Algorithm: E-meeting scheduling according to bandwidth

Given:

MAX_Session is the maximum number of sessions

BI is the set of Bandwidth Intersection

TI is the Time Interval

AB is the Acceptable Bandwidth
 EXCEPT is the set of unacceptable bandwidth
 GMT is Greenwich Mean Time
 PRESENT_TIME is the time of each presentation
 Q= Sequence-of (session_i, GMT_i)

Constraints:
 For each Time of IP IPT_i, it should be normalized according to GMT.
 Set the Acceptable Bandwidth as a threshold
 For each session_i, 1 ≤ i ≤ MAX_Session

Output:
 For each session_i, find its adaptive GMT_i, such as Q = { session_i, GMT_i : 1 ≤ i ≤ MAX_Session + Additional_Session }

Steps:
 Normalize all participants' and presenters' time using GMT
 For each session_i, 1 ≤ i ≤ MAX_Session do
 {
 Check the bandwidth status of each presenter's IP according to Time Interval (TI)
 If the bandwidth of each presenter's in each TI is acceptable (i.e. The bandwidth ≥ AB)
 Then
 Assign the presenter in the Bandwidth Intersection set BI_i
 Else
 Assign the presenter to EXCEPT set.
 }
 For each BI_i do
 {
 Find the most acceptable duration T
 For each member in BI_i do
 {
 Compare the time of acceptable bandwidth with T
 If the time ⊆ T Then
 Leave the member in BI_i
 Else
 Assign the presenter to EXCEPT set.
 }
 }
 Set BI_i as session_i
 Set T as GMT_i, and the number of participants is the maximum
 }
 m = MAX_Session
 While EXCEPT set ≠ ∅ do
 {
 m = m + 1
 For each member of the EXCEPT set do
 {
 Check the bandwidth status of each member according to TI
 If the bandwidth of each member is acceptable (i.e. The bandwidth ≥ AB)
 Then
 Assign the member in BI_m
 Else
 Assign the member to EXCEPT set.
 }
 }
 Set BI_m as new session_m
 Set the T as GMT_m and the number of participants is the max.
 }
 For each session_k, 1 ≤ k ≤ m do
 {
 post the schedule, and allow the maximum number of participants to join
 }
 }

C. Tradeoff

There are some tradeoffs between the based on the time zone strategy and the based on bandwidth ones. They are summarized as following.

- (1). The traffic consideration
- (2). Time zone convenience consideration
- (3). Irrelated topics
- (4). Loss track victims

6. Conclusions and Future Work

In this paper, we provide a virtual conference system for the academic society. This virtual conference management system can

reduce much human power for holding conference via an automatic mechanism. It also supplies many tools for different members, including administrator, conference holder, authors, referees, and general users. The Virtual Conference Management System is the front end to handle the processes of conference organization. The contributions of this paper are summarized as the following:

- Reducing the overloading (time, money, and works) when the conference holding.
- A complete conference system was established according to the conference holding procedure.
- The user interfaces are friendly for the tasks of each member in the conference scheduling.

The Virtual Conference Management System has already been implemented for the conference holding scheduling control. With the improvement of broadband network infrastructures over the Internet, in the near future, virtual conferencing is attractive.

Finally, the interested readers are welcome to visit our Web site at (http://163.13.127.117/VC_new/index.htm).

7. References

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