

# An Online Discussion Support System Which Promotes Creativity of Legal Minds

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## ABSTRACT

An online discussion support system is introduced. This system consists of an online discussion user interface and a tutor agent. The online discussion user interface has the function to communicate via a computer network with animated characters. The utterances of participants are translated into XML documents and they are stored in a case base. The agent chairs the discussion instead of a tutor.

## 1. INTRODUCTION

To promote creative legal minds, discussing among students and a tutor is very important. Examples of discussions are a moot court, an ADR, and a seminar discussing a concrete legal case.

To participate in the discussion, a tutor and students have to come together at one place. If a tutor has several classes, to arrange the schedule of discussion may become a difficult problem. If s/he can participate in the discussion from outside, the arrangement becomes easier. TV conference systems or online chat systems with TV camera are examples of promising methods to help a tutor to participate in the discussion from outside. If s/he uses such system, s/he can participate in the meeting as if s/he is in the same room.

However, current TV conference systems and online chat systems with TV camera have following problems. First one is that sometimes participants may want to hide their faces to retain anonymity. For example, in the case of

arbitration, both participants don't want to meet the opponent and want to keep their faces secret. Second one is that these systems don't have the functions to navigate the discussion. Therefore, if the subject of discussion is complicated, some questions may be left unanswered or some issue points may be repeated. In such cases, the tutor may want the help to arrange the issue points during the discussion. Third one is that these systems don't have the function to refer to old cases. If a participant can refer to similar old case during discussion, s/he can make better argument.

The target of our research is to develop an online discussion system which deals with these three problems. For the problem of anonymity, our system uses a user interface with animation characters. For the management of the progress of the discussion, our system shows the flow of issue point as a diagram. For the third problem, our system has a module which searches for similar old cases from a case base.

In Section Two, we introduce the overview of the online discussion system. In Section Three, we explain the components of our system in detail. In Section Four, we will show the overview of a software agent which behaves as a tutor.

## 2. OVERVIEW OF ONLINE DISCUSSION SYSTEM

Our online discussion system consists of a discussion server and several client PCs.

The functions of the system are as follows.

- (1) It provides the users the basic online communication environment such as a bulletin board, speech understanding module (IBM ViaVoice), and several buttons for giving signals to other participants. For example, when a participant wants to talk, s/he sends a signal whose effect is "raising hand." And when a chair give the participant a right to talk, s/he can tell opinions.
- (2) Our system provides each participant an animated character. A participant can control the facial expression of his (her) character. These characters appear on the screen of each participant (Figure 1). By controlling the facial expression carefully, discussion progresses smoothly.
- (3) Our system manages the progress of discussion, and shows participants a list of the current issue points and a diagram which shows the flow of issue points. Participants can discuss effectively by referring to this information
- (4) Our system stores all arguments made by participants in the form of XML documents. The instructor can attach comments or several indexes to the documents. These indexed documents are stored in a case base. During the discussion, each participant can refer to the old similar case by using indexes.

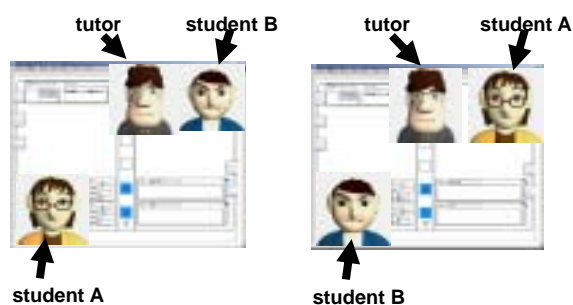


Figure 1: Animated Character

### 3. SUBMODULES OF THE SYSTEM

In this section, we will explain the moot court server and the client interface in detail.

#### 3.1 User Interface

The role of a client interface is to translate the utterance of a participant into a text document and transfers it to other participants. Also the instructor can join the

discussion and give advices to other participants.

When a participant tells his (her) opinions before the microphone, the phonetic signal is recognized by the speech recognition module (IBM ViaVoice) and translated into a text data. After s/he edits it, s/he inputs the types of utterance. The type of utterance is used to manage the flow of issue points. Currently, our system prepares following types.

- 1) Assertion:
- 2) Ask Opinion: ask the participant if s/he concedes the assertion or not.
- 3) Ask Argument: ask the participant the reason or explanation of former assertion.
- 4) Ask General: ask general questions
- 5) Concede: concede the former assertion or argument
- 6) Deny: deny the former assertion or argument
- 7) Argue: Give argument to the former assertion
- 8) Other

The flow of utterance type is represented as a discussion diagram (Figure 2). The utterance type is rough information because participants often recognize their utterance type incorrectly and because the utterance type is superficial information and it doesn't have information about contents. However, by referring to this diagram, participants know how they recognize the progress of discussion and they can progress the discussion effectively.

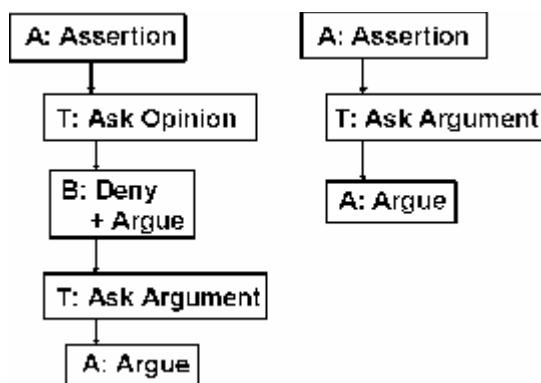


Figure2: Example of Discussion Diagram

Then, s/he selects facial expressions of animated character. There are five kinds of facial expressions such as HAPPY, ANGRY, SAD, SURPRISED and

NEUTRAL (Figure 3). By preliminary experiments, we confirmed that the facial expression is effective information to conduct negotiation smoothly [1].



Figure 3: User Interface

### 3.2 Description of a Case

When a discussion finished, all utterances are stored in the form of XML documents. To the XML documents, a tutor can attach various kind of information. For example, a tutor may extract WARRANT parts, CONCLUSION parts and DATA parts from utterances, and attach XML tags to the documents. By using these tags, we can construct Toulmin diagram (Figure 4) [5].

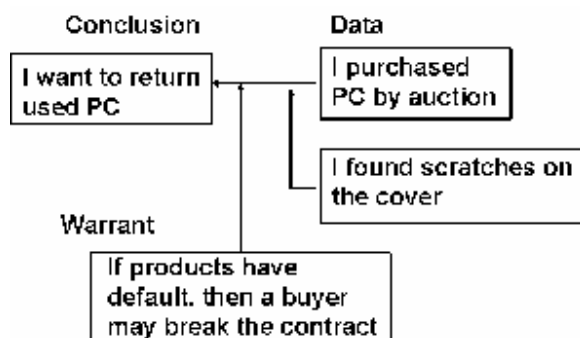


Figure 4: Toulmin Diagram

Moreover, a tutor may extract several distinctive parts which are predefined Hypo like factors containing features of the case [5]. Followings are example factors in the case of auction trouble.

- 1) The item is a mass product

- 2) The item is a rare product
- 3) The default part is substantial
- 4) The default can be fixed
- 5) The default is not explained on the auction site

Following is an example of XML documents. This example shows the case that the tutor asked a question about the student A's statement, and the student B answer the question. Tags <Warrant>, <Data> and <Conclusion> are components of Toulmin diagram.

...
<pre>&lt;utterance id="3" speaker="student A" type="Assertion" face="ANGRY"&gt; &lt;Data factor="F20"&gt; When this antique doll was put in the auction Web site, there was no explanation about the tear of dress. As it is important defect, &lt;/Data&gt; &lt;Conclusion factor="F80"&gt; I wish to return the doll. &lt;/Conclusion&gt; &lt;/utterance&gt;</pre>
<pre>&lt;utterance id="4" speaker="tutor" type="Ask Opinion" object="3" face="NEUTRAL"&gt; Mr. B, do you agree to the fact? &lt;/utterance&gt;</pre>
<pre>&lt;utterance id="5" speaker="student B" type="Concede" object="4" face="SAD"&gt; I didn't explained the tear. &lt;/utterance&gt;</pre>
<pre>&lt;utterance id="6" speaker="tutor" type="Ask Opinion" object="3" face="SURPRISED"&gt; Then, do you agree to return the money? &lt;/utterance&gt;</pre>
<pre>&lt;utterance id="7" speaker="student B" type="deny" object="6" face="ANGRY"&gt; &lt;Conclusion factor="F10"&gt; No, I won't . &lt;/Conclusion&gt; &lt;Warrant factor="F40"&gt; The reason is when I put these magazines to auction, I noticed as " I will not accept any claim." &lt;/Warrant&gt; &lt;/utterance&gt;</pre>
....

Figure 5: An example of XML

These XML documents are stored in a case base. A case is retrieved by key words or factors. Usually, as a tutor has several classes, s/he can gather several discussion cases whose subjects are the same. By referring to old cases, a tutor will chair the discussion effectively.

## 4. A TUTOR AGENT

By several experiments of discussion using our system, we confirmed that if we have a sufficient case base, mostly we can find similar situations of a discussion. Therefore, by referring to old cases, a student may chair the discussion instead of a tutor if the situation is simple. And we found that users of our system are interested in controlling facial expressions initially, but they become tired to control it if they have to discuss a long time.

Based on such observation, we developed a tutor agent experimentally. A tutor agent is a computer program which helps a tutor by searching similar cases and by controlling facial expressions instead of him (her).

### 4.1 Searching Similar Cases and Navigation

The basic function of a tutor agent is to search similar old case using Hypo like factors and key words. After several similar cases are found, using types of utterances, the agent selects appropriate action and chairs the discussion. For example, when a participant utters some statement, a tutor agent may take one of following actions.

- (1) The agent asks the other participants if they agree to the statement or not.
- (2) The agent asks the speaker the detail reason of his statement.

### 4.2 Facial expressions control

By several experiments, we observed that different participants have different patterns of controlling facial expressions, but the pattern does not change so much during the discussion. Therefore, if the agent recognizes the pattern of controlling facial expression for each participant by machine learning techniques, the agent can control it instead of the participant.

We assumed that the facial expression is affected by the transition of participant's psychological state just after s/he received other participant's utterance, and we constructed a model of facial expression based on the Bayesian network. We developed a learning module in the tutor agent and confirmed that the agent selects the facial expression with high accuracy rate (more than 70 %).

## 5. CONCLUSION

We introduced an overview of an online discussion support system. The basic function of this system will be helpful in the fields such as moot court, ODR, and various exercise.

A tutor agent is developed experimentally to reduce the burden of the tutor. In experiments, a tutor sometimes used an agent to chair the discussion in simple cases. If the agent chairs in a short time, other participants didn't recognize it.

The power of the agent depends on the quality of a case base. To show its effectiveness, we started to gather discussion cases such as moot court and ODR.

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