

# Voice Cafe: Conversation Support System in a Group

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**Abstract.** We propose a system for sharing *wet information* in a group. Wet information, which is informal information on group members, is important for collaboration in a group. Wet information facilitates members to know each other. The problem is a lot of time is required for exchanging wet information. Busy members have little time to exchange wet information. We propose a system called Voice Cafe for sharing wet information in a group. In Voice Cafe, conversational agents gossip about group members. Members can easily find other members' conditions, schedules, thoughts and opinions by listening to gossips made by agents. Design concept and an overview of Voice Cafe are described.

## 1 Introduction

*Wet information* is important for good collaboration in a group. Wet information here means informal information that is not critical to the tasks of the group[1]. When we have a chat with colleagues in lunch time, we exchange wet information, that are not related to their tasks, such as sport games, plans for holidays, movies and music, and so on. These kinds of wet information facilitates members to understand each other, and enhance relationship among members. The problem is that chat takes a lot of time. Busy groups often have little time to have a chat.

We propose a system called Voice Cafe for sharing wet information in a group. In Voice Cafe, conversational agents (CAs) speak gossips on members. Gossips include members' conditions, schedules, thoughts and opinions, and so on. By listening to the gossips, members can easily find about others.

This paper consists of following sections. In section 2, our design concept for sharing wet information is described. In section 3, an overview of Voice Cafe is described. Section 4 discusses privacy related issues.

## 2 Design concept

Gossips have advantages to facilitate sharing wet information in a group. CAs are designed to elicit and circulate gossips in a group.

### 2.1 Gossips for sharing wet information

Gossips have a role for sharing information among people[2]. We often get information of others from gossips. We also find much about others' reputations, conditions, attitudes, thoughts and opinions from gossips. Although these gossips are not always true, it is easy for us to get information on others.

In this paper, we regard a gossip as a medium that mediates information among people. Fine et al. define a gossip as one's opinion of other's endowments or behaviors[3].



(a) Screen images of Voice Cafe. Right screen shows a display image of Voice Cafe server, and the left screen shows a display image of a client (CA). Each CA's figure is appeared on the server's screen.

(b) CAs are embedded in physical objects. In this case, CAs are embedded in a pot and a cup. Speakers are connected to client PC. Client PC speaks by their TTS system.

Figure 1: Overview of Voice Cafe.

In addition to their definition, we regard a gossip as a medium that mediates information in a group. Although the term “gossip” has negative image, we focus on positive aspects of gossip that facilitate sharing information in a group.

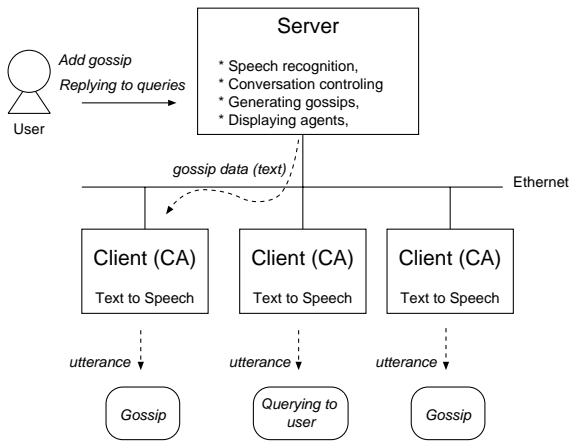
Existing Computer Mediated Communication (CMC) tools such as e-mail, BBS, chat have limitations for sharing wet information in a group. This is because existing CMC tools are not designed for sharing wet information in a group. Exchanging wet information is easier in Face to Face (FTF) situations than communications by existing CMC tools. We need a CMC tools for sharing wet information in a group.

In the field of CSCW, several researches on awareness support systems are proposed. Siiio proposed the coffee aroma display that generates coffee aroma when group members are gathered in a meeting room[4]. Users can easily find that people are gathering in the meeting room by coffee aroma. Although this system enables user to have an opportunity to have FTF conversation, users can't know about what members talk in the room. We think to know contents of talking directly is important for sharing wet information.

Brave proposed a haptic communication system that enables to share tactile information over the network[5]. This system enables a user to touch information such as gentle or hard touch each other. Although this system facilitates a user to share non-verbal wet information, it is difficult to understand the meaning of the touch. Much tacit knowledge is required for understanding the meaning of touch. We think verbal communication is also needed to share wet information in a group.

## 2.2 Implementation design

We design Voice Cafe based on *conversational agent (CA)*. CA is a physical object that gossips on members. CA inquires questions to members. When a member answers, the answer is utilized as a gossip by CAs. Member also add gossips on others by typing in



(a) Architecture of Voice Cafe. Voice Cafe consists of a server and several clients (CAs). Server recognizes speeches from users, and generates gossip data that is spoken by clients. Clients speak according to gossip data received from the server by their Text-To-Speech systems.

(b) Conversation with CAs. A cup inquires a question to a user. The user replies to him by using a microphone connecting to the server. Answers from the user is stored in gossip database in the server, and utilized as gossip data.

Figure 2: Architecture and interaction.

the gossips. CAs gossip according to those gossips.

Gossips are made by CAs. When a member comes to CAs, one CA inquires variety of topics such as his or her condition, whether s/he likes baseball, what kind of music or movies does s/he like and so on. When the member answers, CA recognizes the contents of the answer and store the answer to a database. When another members comes to the CAs, CAs gossip on the topic what they heard from other members. When there is no one in front of CAs, they gossip about members freely. By hearing gossips, members can easily find wet information of others.

### 3 Voice Cafe

We describe a prototype system called Voice Cafe. Voice Cafe enables users to hear and talk gossips on members. Figure 1(a) and Figure 1(b) show an overview of Voice Cafe. We describe an architecture of Voice Cafe and examples of gossips in this section.

#### 3.1 Architecture of Voice Cafe

An architecture of Voice Cafe is shown in Figure 2(a). Voice Cafe consists of a *server* and several *clients* (CAs). Server recognizes speeches from users, generates and provides *gossip data* to CAs. Gossip data is the contents to be spoken by a CA. CAs speak according to the gossip data received from server by using TTS.

When the server generates a sequence of a gossip, server selects a topic from *topic database* that contains various topics such as baseball players, music, movies, and so on. Then, server retrieves related topics from *members database* that contains members'

Table 1: An example of gossips. Agents gossip about a baseball player and a group member who likes the player.

Talker	Utterance
User A	( <i>Inputting description of "Ichiro".</i> )
Agent A	I remember "Ichiro".
Agent B	Ichiro plays gardening.
Agent A	You are kidding me.
User A	Do you remember "Ichiro"?
Agent A	Yes, I do. "Ichiro" is a baseball player. Tomohiro is an "Ichiro" fan.
	...

(a) Inquiring a question on a baseball player.

Talker	Utterance
User B	Hi, boys and girls.
Agent A	Who are you?
User B	My name is Midori.
Agent A	Hi, Midori.
Agent C	Do you like "Ichiro"?
User B	I don't like him.
Agent C	I remember that you don't like "Ichiro".
Agent B	Tomohiro said that he was an "Ichiro" fan.
	...

(b) Gossip on a member.

opinions and preferences on the topics. Finally, server defines which CA to speak gossip data, and send the data to the client.

Figure 2(b) shows a conversation between a user and a CA. In this figure, user listens to gossips made by a cup and a plant. User also replies to the cup by using a microphone connecting to the server.

### 3.2 Conversation

Examples of gossips are shown in Table 1. In these examples, CAs gossip on a baseball player. In Table 2(a), agent A remembers that a member named Tomohiro likes a baseball player. User can type in what he wants to gossip by agents. In this case, he typed in that he likes the baseball player. Typed data is utilized for gossiping among CAs. Table 2(b) shows gossip on a member. In this example, CAs gossip about Tomohiro when another member named Midori appears.

## 4 Discussion

In this section, we discuss the following issues.

1. Privacy of members
2. Malicious information

### 4.1 Privacy of members

Privacy of members must be kept. We suppose that there are two kinds of personal information: (1) innocuous personal information and (2) deep personal information. Former information includes one's condition, tastes for movies and music and so on. Latter information includes his or her age, credit card number, his or her salary and so on. CAs should talk innocuous personal information, however, to distinguish innocuous information from deep personal information is difficult. This is because what is innocuous information is depend on users, i.e., some topics are allowed in some members, on the other hand, those topics are forbidden in the other members.

One approach to keep privacy is to let group members to choice privacy level of CAs manually. There are several levels of personal information from level 1 to level  $n$ . In each level, members can set what topics are safe and allowed to talk by CAs. Once topics and levels are set, CAs gossip by obeying those topics and the level. We are planning to implement a function in which users can set topics and privacy level.

#### 4.2 Malicious information

There may occur situations in which some members put malicious information of others to the system such as abuse of others or untrue information. This kind of information may harm members and relationship between them. To identify malicious information from other information is difficult because to define malicious information is different in groups. In some groups, members may allow CAs to talk abuse of others. On the other hand, members are not allowed to talk abuse of others in another groups.

We are planning to implement a function to reveal speaker's name when CAs gossip. By revealing speaker's name, member has to responsibility to their utterances. To prevent malicious information in Voice Cafe is our future work.

### 5 Conclusion

We described a system for sharing wet information in a group. Wet information is important for good collaboration in a group because wet information facilitates members to know each other. We propose a gossip-based conversation system called Voice Cafe. We are planning to implement a privacy control function in Voice Cafe, and to apply the system to a real group.

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