The Role of Emotion for Creative Collaborative Works

OOSAKI Yuuich

SUMMARY In this paper, we provide a methodology of building collaborative working environments where, people at physically distributed location, can work together to achieve the same organizational task goals. We especially discuss the concept of emotional intelligence and the role of emotion for creative works and better cooperation. The virtual organization is defined as various members of the task forces or teams can work together over the networks. We develop the prototype model that provides the virtual organization that provides for users to explore, to work with, and to discover.

Key words: mirror agent, cooperative works, emotion, personalized knowledge environment,

1. Introduction

As the tasks in our organization grow in complexity, the growing interests have been given toward methodologies that allow for efficient coordination among each member in the same organization[1],[2],[5]. To take advantage of the growing internets, for instance, the ways must be found to process organizational knowledge beyond specific problem domains and they must access other members of the organization. The integration of heterogeneous knowledge or view points is crucial in utilizing relevant knowledge resources distributed in an organization [3],[9],[10]. The virtual organization provides a knowledge world for each member of the organization to explore, to work with, and to discover. The challenge for the virtual organization is also to provide a rich working environment of a variety of subject domains that is rich enough to draw many members to use it, detailed enough to provide substantial real-world working experiences.

2. Concept of Emotional Intelligence

Our concern here will be with the role of emotions as guilt, anger, envy, and even love. These emotions often predispose us to behave in ways that are contrary to our marrow it to be, others must have some way of discovering we have these emotional commitments. We will use the term commitment model as shorthand for the notion that seemingly irrational behavior is sometimes explained by emotional predispositions that help solve commitment problems. The critical assumption behind the commitment model, again, is that people can make reasonable inferences about character trains in others. By "reasonable inference" we do not mean that it is necessary to be able to predict other people's emotional predispositions with certainty just as a weather forecast. The rational model assumes certain tastes and constraints, and then calculates what actions will best serve those tastes. Widely used by military strategists, social scientists, game theorists, philosophers, and others, it influences decisions that affect all of us. In its standard form, it assumes purely self interested tastes; namely, for present and future consumption goods of various sorts, leisure and so on. Envy, guilt, rage, pride, love, and the like typically play no role.

3. The Role of Emotion for Efficient Coordination

In an organizational activities, two types of ac-

おおさき　ゆういち（経営情報学科）

tivities may occur: all members can learn as an organization, while at the same time, each member can learn by adjusting his views and actions. For the individual, he can learn to improve his problem-solving skills based on his own observation and experiences. At the cooperative stage, they can put forward their learnt knowledge for consideration by others using their own local experiences. As a group, efficient cooperative works takes effects in the form of better coordination. Cooperation would require the exchange of knowledge held by agents. The group of learning agents can offer something not available in the individuals. As a group, learning takes effect in the form of (1) better coordination (2) more efficient task and resource allocation. The improved coordination can be achieved by knowledge sharing. The task and resource allocation process can be improved by learning the specialization of learning agents by learning the group characteristics, by learning the patterns of tasks and by learning environmental characteristics. The improved coordination can be achieved by knowledge sharing or more efficient communication among members. Problem solving in an organization is a dynamic process and the actions of each member must be coordinated to achieve globally consistent and good solutions. However, the communication limits the amount of interactions among members. Thus, the coordination is always an important consideration, and the coordination process can be deployed in a manner parallel in which each member has a specialized representation of its characteristics and learning capability. Learning as a group can be also improved by learning the specialization of agents. An important requirement of the cooperative works, organizational decision making is also these abilities to communicate their emotion.

4. A Model of Mirror Agents

An agent model specializes the framework by fixing the mental state of the agents to consist of components knowledge about the world, about themselves, about one another. The various components of the mental state and their properties are defined as follows. The mental state is determined by the past history, and the current action of agents. The actions of an agent are determined by its decisions, or choices. The agent's beliefs refer to the state of the world to the mental state of other agents.

The basic components of the mirror agent is depicted Fig. 1. It consists of the internal model and the internal memory. The internal model consists of the message processing component, the training set, the learning algorithm, and the adaptive function. The message processing component is the part of the communication board with the other mirror agents. The training set contains the specific knowledge resources to be collected, and these specifications are stored in the form of the training examples.

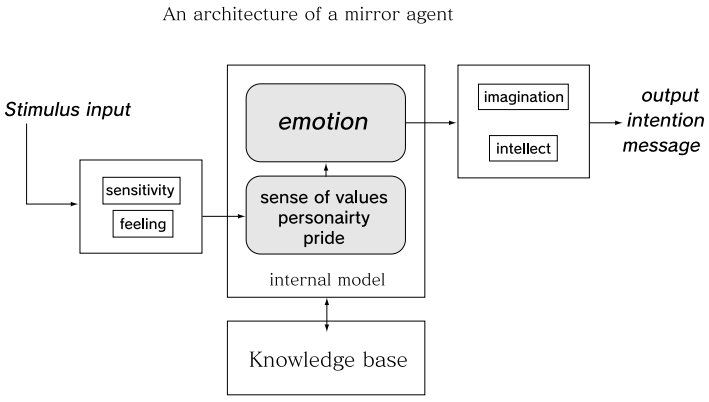


Fig. 1 : An architecture of a mirror agent

5. Building of the Collaborative Working Environments

The principle of cooperative works is to create a team of experts from different fields and make the team responsible for carrying out a specific task. All of the activities start at the same time, and there is a close cooperation between all the team members. Essential to the cooperative work approach, is that each team member while focusing on his area must openly share and exchange his information and results with other team members. Similarly, the team member must make sure that his work is consistent with that of other team members' work. Cooperative work therefore, creates a dynamic, interconnected network of knowledge among the team members. Cooperative work, if it is by a team of engineers, or by a group of members, requires coordination, communication, knowledge sharing and sharing their emotion [2],[4],[10]. The computing environment to support such teams is an open, interactive, distributed environment. For information management, each member, needs to have a large degree of autonomy in structuring and organizing his own information, while he has to also consider the needs of the other team members. The act of cooperation creates dependencies that have to be negotiated, and administered. These dependencies transform in turn into obligations, which have to be respected by each team member, and which constrain the autonomy of each team member. The integration of independently developed information systems into a cooperating federation of agents poses similar problems. These information systems are heterogeneous, use different data models, inference mechanisms, and so on, but the integrated system should provide a common universe of discourse.

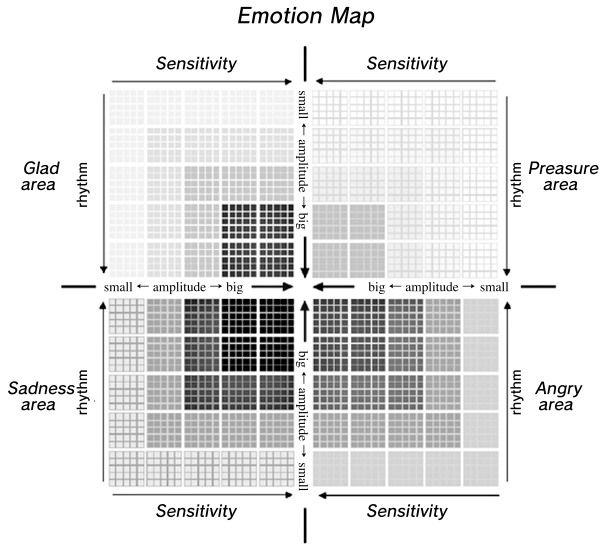
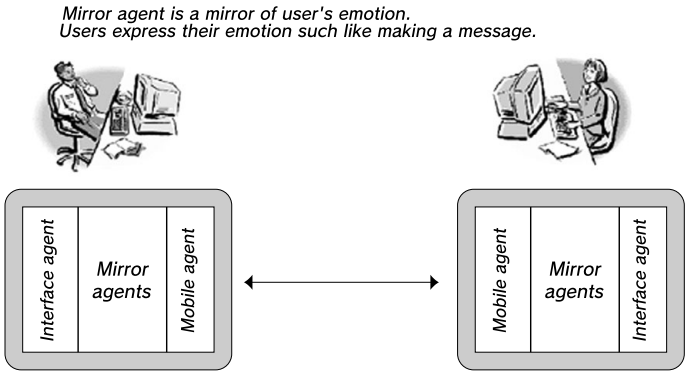


Fig.2: Emotion map



- Interface agent is an editor of message which contains user's emotion.
- Mirror agents support user's intention and emotion expressing.
- Mobile agent supports communication between agents.

Mirror agent is a screen of user's emotion

Fig.3: Emotion expressing in Mirror agent

Our current work centers around command decision-making in a simulation of modern military planning. The military planning process requires a commander to formulate a tactical plan to perform in order to accomplish their goals given their current situation. Decision makers often explain their decision in a new situation by referring to processes and outcomes of a priori analo-

gous situation. They often try to solve problems by retrieving cases or stories from their own experiences. The Virtual Organizational Decision Making Environments (VODM) can be used by a group of managers for improving their decision-making skills. The user can create concept nodes and links which describe his or her understanding the task environment impacting strategic plans.

The Virtual Organizational Decision Making Environments (VODM) can be used by a manager or a staff to make implicit decision making procedures more explicit. That is, the user can create concepts nodes and links which describe his or her understanding of the decision-making environment. The user can specify the decision making procedures by evaluating the resources that are required to achieve the decision-making aims. The prototype system utilizes Java for implementation.

There are a variety of potential benefits to using decision aiding systems for novices, experts, and corporations. For novices, such a system can provide a range of experience they haven't had. Rather than solving problems from scratch, the wisdom of many experts is available and novices may be able to perform better using such a system. Using these systems during training period also provide peoples with a model of the way decision making ought to be done, for example, what things ought to be considered, and provides them with concrete examples on which to hang their more abstract knowledge. Much of the expert decision-making skill people comes from observing experts why they solved problems in certain ways. In some domains, there is much to remember. Decision makers often explain their decision in a new situation by referring to processes and outcomes of a priori analogous situation. They often try to solve problems by retrieving cases or stories from their own experiences.

Our research seeks to design a system which would assist a decision-maker by representing the important element in his or her mental model for decision-making. As new information arrives, he may extend or revise his mental model of the strategy. His mental model is both dynamic and unique to his view of the world. The representation of the mental model of a single decision-maker is not sufficient. wet is necessary to integrate the plans of a network of several decision-makers in order to produce a coherent global plan which satisfies the corporate objects. Conceptually, the key task of the decision-making process is the organization of problem knowledge structures. Problem knowledge structures refer to the organization of ideas. Ideas are referred to as schema. A schema for an object, event, or idea is comprised of a set of attributes. These schema describe what a decision-makers know, which provides the foundations for acquiring new ideas, that is, expanding the decision-maker's semantic network. This is the richest conceptual model of the decision-making process. Decision-making, then results from the interactive processes of accretion, restructuring and tuning. Accretion describes the accumulation of information in order to fill existing schemas. The decision-maker adds information such as argument or attributes to the knowledge structure that exists.

6. Conclusion

This paper provided a new methodology for building personalized working environments as the virtual organization. We especially discussed the concept of emotional intelligence and the role of emotion for creative works and better cooperation. The virtual organization is defined as where various members of the task forces or teams co-work over networks. We introduced the concept of mirror agents each of which endowed with the learning capability, represents a specific problem domain and is specialized to interact with the environment. The most important character-

istic of mirror agents is that they may be amended or modified. Each mirror agent is encapsulating a specific set of knowledge obtained from a different set of training examples. At the cooperative stage, mirror agents put forward their learnt knowledge. We defined the virtual organization as repositories of various and heterogeneous knowledge resources distributed over in an open network environment.

As an application, we proposed the Virtual Organizational Decision Making Environments (VODM) may provide highly structured computer-based decision-making environments.

Acknowledgements

I wish to express my sincere thanks to Prof. Akira Namatame of National Defense Academy for leading and suggesting in this paper.

References

[1] Alan. H.B, and Gasser. L. : Readings in Distributed Artificial Intelligence, Morgan Kaufmann, 1988.
[2] Baecker. R.M.,:Readings in Group-ware and Computer-Supported Co-operative Work, Morgan Kaufmann, 1993.
[3] Carley. K, & Prietula. M.,:Comput-ational Organization Theory, Lawrence Erallbawn, 1994.
[4] Collet. C, Huhns. M.N, & Shen. W.,: Resource Integration Using a Large Knowledge Base in Carrot, IEEE Computer, Vol. No.12, pp.55-65, 1991.
[5] Cutkosky. M, Geneseret. M, Mark.W, and Tenenbaum. J.M.,: An Experiment in Integrating Concurrent Engiee-ring System, IEEE Computer, pp.28-37, Dec. 1991.
[6] Deen. S.M,: "Cooperating Agents-A Database Perspective", in Cooperating Knowledge Based Systems, Springer, pp.3-29, 1990.
[7] Gasse. L.,: Social conceptions of knowledge and action:DAI foundations and open systems semantics, in Arti-ficial Intelligence, Vol.47, pp.107-135,1991.
[8] Maes. Pattie.,: "Agents that Reduce Work and Information Overload" Communications of the ACM, Vol. 37, No.7, pp. 30-40, 1994.
[9] Neches R.and Fike R.," EnablingTechnology for Knowledge Sharing", AI Magazine, Vol. 1991, pp.37-55,1991.
[10] Witting T., ARCHON: An Archi-tecture for Multi-Agent Systems, Ellis Horward, 1992.