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# Constructing a model checker for multi-agent epistemic logic with changing communication channels between agents

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The term, agent, is used to mean “intelligential software” in the field of Distributed Artificial Intelligence. Although the field is roughly divided into distributed problem solving and multi-agent system. Multi-agent system is the system which solves a problem with the interaction between agents, and it is thought that this system has a superior ability to solve problems in comparison with single-agent system. Several studies which introduce the channel of multi-agents to logical system have been conducted; for example, formalizing the communication between agents by FIPA, formalizing the success or failure of the logical system called BUL, and constructing a logical system to treat the communication to refer what kind of state other agents are and so on. Furthermore, studies about inference patterns of agents have also been conducted to understand dynamic changing of knowledge, belief and/or preference in a community. For example, a new logic copes with knowledge of agents in a community such as Facebook of Social Network Service has been defined, which is called Facebook logic. Facebook logic is different from the logic of knowledge and faith. This logic can reflect agents relationship without other agent in community. It can apply to communication between agents by converting friend relations into agents with or without channel. As for the belief change of

agent by communication, announcement of commitment and permission are defined. These announcement can add world relationships or delete it. Announcement of commitment is defined to deletion of accessibility But, announcement of permission is to add them.

In this research, announcement of permission is defined. Furthermore, we define the logic of the addition and deletion of the communication channel by the announcement, and I construct model checker for multi-agent epistemic logic with changing communication channels between agents. As for the relationship of the agent we use BUL to express it, and I formalize communication between agents and confirmation communication of having channel or not. When there is not a channel, I refer to the other agents for having communication channel or not with the agent of the communication. When a channel can confirm, I perform indirect communication and I predict the action of the agent when a channel cannot be confirmed.