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Author(s)	鈴木, 義崇
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Fusion of Pedigreed Preferential Relations as Beliefs

Yoshitaka Suzuki
School of Information Science,
Japan Advanced Institute of Science and Technology

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Abstract

Belief fusion, instead of AGM belief revision, was first proposed to solve the problem of inconsistency, that arose from repetitive application of the operation when agents' knowledge were amalgamated. However in the theory, all the sources must be totally ordered and thus applicable area is quite restrictive. In this paper, the author realizes the belief fusion of multiple agents for partially ordered sources. When the author considers such a partial ranking over sources, there is no need to restrict that each agent has total pre-orders over possible worlds. The preferential model allows each agent to have strict partial orders over possible worlds. Especially, such an order is called a preferential relation, that prescribes a world is more plausible than the other. The author introduces various representation of beliefs of agents, that is, belief states, generalized belief states, preferential relations, and generalized preferential relations, and formalizes an operation which combines multiple beliefs of agents. In addition, the author shows that this operation can properly include the ordinary belief fusion.

Key Words: belief fusion, belief revision, nonmonotonic reasoning