Linköping Electronic Articles in
Computer and Information Science
Vol. 5(1999): nr 27

Encoding classical fusion in ordered knowledge bases framework

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Linköping University Electronic Press
Linköping, Sweden

http://www.ep.liu.se/ea/cis/1999/027/

Posted on April 6,
formally published on December 21, 1999
by Linköping University Electronic Press
581 83 Linköping, Sweden

Linköping Electronic Articles in
Computer and Information Science
ISSN 1401-9841
Series editor: Erik Sandewall

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Typeset by the author

Recommended citation:
<Author>. <Title>. Linköping Electronic Articles in
Computer and Information Science, Vol. 5(1999): nr 27.
http://www.ep.liu.se/ea/cis/1999/027/. *December 21, 1999.*

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Abstract

The problem of merging multiple sources information is central in many information processing areas such as databases integrating problems, multiple criteria decision making, expert opinion pooling, etc. Recently, several approaches have been proposed to merge classical propositional bases, or sets of (non-prioritized) goals. These approaches are in general semantically defined. Like in belief revision, they use priorities, generally based on Dalal's distance, for merging the classical bases and return a new classical base as a result.

An immediate consequence of the generation of a classical base is the impossibility of iterating the fusion process in a coherent way w.r.t. priorities since the underlying ordering is lost.

This paper presents a general approach for fusing prioritized bases, both semantically and syntactically, when priorities are represented in the possibilistic logic framework. Different classes of merging operators are considered including conjunctive, disjunctive, reinforcement and adaptive operators.We show that the approaches which have been recently proposed for merging classical propositional bases can be embedded in this setting. The result is then a prioritized base, and hence the process can be coherently iterated. Moreover, we also provide a syntactic counterpart for the fusion of classical bases.

For technical reasons, this article is stored as two separate computer files, labelled "Part I" and "Part II", respectively. Please replace the present page by a printout of the "Part II" file.