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Formal concept analysis and semantic file systems

Ben Martin
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PhD Thesis: Formal Concept Analysis and Semantic File Systems

by

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B.I.T., Queensland University of Technology
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A thesis submitted to the
School of Information Systems and Technology
University of Wollongong in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
School of Information Systems and Technology
2008

Thesis Certification

CERTIFICATION

I, Benjamin M. Martin, declare that this thesis, submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy, in the School of Information Systems and Technology, University of Wollongong, is wholly my own work unless otherwise referenced or acknowledged. The document has not been submitted for qualifications at any other academic institution.

(Signature)
Benjamin M. Martin
19 October 2008

Ben Martin, Mr (Ph.D., Information Science)

PhD Thesis: Formal Concept Analysis and Semantic File Systems

Thesis directed by Prof. Peter Eklund

The thesis is that a branch of discrete mathematics, Formal Concept Analysis, when applied to Semantic File Systems can lead to an improved personal information space. Semantic File Systems share many properties with their non semantic brethren, bringing more rich metadata and the ability to directly resolve user queries within the filesystem interface itself.

A filesystem might offer upwards of a million files each of which having in the order of hundreds of discerning attributes. Formal Concept Analysis has typically been applied to a much smaller input data set and there are issues with scalability both in the initial finding of the set of Formal Concepts and also ongoing issues such as finding the list of files which are currently applicable (the extent) for a Formal Concept.

The thesis is largely dependent on improving the scalability of Formal Concept Analysis in order for it to be applied to such a large dynamic data store.

Dedication

To the authors of great novels:
Though I have enjoyed many of your works, I have enjoyed too few of your works.

Acknowledgements

Professor Peter Eklund has made this PhD possible. I thank him for his understanding of the value of applied research, the difficulty in performing it and his encouragement and guidance throughout the candidature.

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Thanks to Robert Murphy for listening to queries about indexing and relational database design and providing valuable insight into SQL throughout the years both of the PhD and predating it. Apologies for always wanting to talk about libferris over the years.

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