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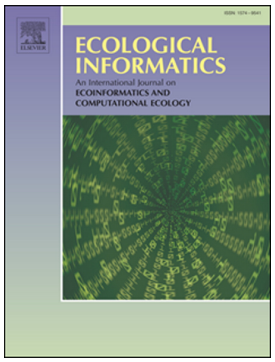

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Aurona Gerber, Nishal Morar, Thomas Meyer, Connal Eardley

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Ontology-based Support for Taxonomic Functions

Aurona Gerber[a,b], Nishal Morar[b,d], Thomas Meyer[b,c] Connal Eardley[d,e*]

[a]*Department of Informatics, University of Pretoria, Pretoria, South Africa*
[b]*Center for Artificial Intelligence Research (CAIR), Cape Town, South Africa*
[c]*Department of Computer Science, University of Cape Town, South Africa*
[d] *Department of Computer Science, University of Kwazulu-Natal, South Africa*
[e]*Argricultural Research Council, South Africa*

Abstract

This paper reports on an investigation into the use of ontology technologies to support taxonomic functions. Within the broader context of the life sciences support for taxonomy is imperative based on several recent discussions and publications that voiced concern over the taxonomic impediment. *Taxonomy* is defined as the scientific classification, description and grouping of biological organisms into hierarchies based on sets of shared characteristics, and documenting the principles that enforce such classification. Under *taxonomic functions* we identified two broad categories: the classification functions concerned with identification and naming of organisms, and secondly classification functions concerned with categorization and revision (i.e. grouping and describing, or revisiting existing groups and descriptions).

Ontology technologies within the broad field of artificial intelligence include computational ontologies that are knowledge representation mechanisms using standardized representations that are based on description logics (DLs). This logic base of computational ontologies provides for the computerized capturing and manipulation of knowledge. Furthermore, the set-theoretical basis of computational ontologies ensures particular suitability towards classification, which is considered as a core function of systematics or taxonomy.

Using the specific case of Afrotropical bees, this experimental research study represents the taxonomic knowledge base as an ontology, explore the use of available reasoning algorithms to draw the necessary inferences that support taxonomic functions (identification and revision) over the ontology and implement a Web-based application (the WOC). The contributions include the ontology, a reusable and standardized computable knowledge base of the taxonomy of Afrotropical bees, as well as the WOC and the evaluation thereof by experts.

Keywords: taxonomy; systematics; taxonomic functions; systematics; computational ontologies; reasoning; classification; Afrotropical Bees.

* Corresponding author: *E-mail address:* aurona.gerber@up.ac.za .