

# REASONING IN MULTI-CONTEXT SYSTEMS

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## Abstract

This thesis presents an approach to formalization of some aspects of common sense human reasoning, such as locality of reasoning, sketchiness of reasoning, locality of inconsistencies, and ability to specialize and generalize situations. The reasoning process is broken into local reasoning fragments each of which is associated to a context. A context is thought of as a logical theory presented as an axiomatic formal system consisting of a language, a set of axioms and a set of inference rules. A multi-context system is defined as a pair of a set of contexts and a set of bridge rules - inference rules switching the reasoning process from one context to another. Two separate sets of context inference rules are discussed and their equivalence is proved. The most important result is that the consistency of a context does not depend on the consistency of any other context. A set of operators for building a variety of compound context on the basis of the initial ones is defined and demonstrated through examples. A sample Prolog meta-interpreter is presented as an illustration of some of the advantages and some of the problems from the implementation point of view. Some ideas of further extensions of this model are outlined.