DALEK: a Tool for Dialectical
Explanations in Inconsistent Knowledge
Bases

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Abstract. In this paper we present a prototype of a framework called
DALEK (DIALectical Explanation in Knowledge-bases). This framework
implements dialectical approaches to explain query answers in inconsis-
tent knowledge bases. The motivation behind the prototype is as fol-
loows: given an inconsistent knowledge base represented within Datalog\textsuperscript{±},
a semantics for handling inconsistency and a query $Q$, the goal is to
explain why $Q$ is accepted or not accepted under such semantics. The
explanation takes a dialogical form (cf. [1,3]).

Keywords. Applications of Argumentation, Explanation and Argumentation
Dialogues, Datalog\textsuperscript{±}.

1. DALEK Framework: Explain!

DALEK engages a User and the Reasoner in a dialogue about the entailment of
any boolean conjunctive query in Datalog\textsuperscript{±} knowledge bases. The dialogue could
be of argumentative or explanatory nature. In DALEK the User can shift between
dialogue types (i.e. dialectical shifts). The framework is general enough to carry
out a standalone argumentation dialogue as well as a standalone explanatory
dialogue. DALEK also implements commitments and understanding stores.\textsuperscript{1}

When the User interacts with the GUI, the latter communicates with the di-

glogue manager which possesses the configuration structure and the stores. Then,
the dialogue manager, at its turn, communicates with the semantics structure
through the sub-module “Syntax and semantics handler” and with the dialogue planner
through the sub-module “Utterance dispatcher”. Next, the dialogue planner and the semantics structure communicate directly with the logical model that
uses the Datalog\textsuperscript{±} GRAAL library [2] to query the knowledge base. Hereafter we
detail each module of Figure 1.

Configuration structure. This module specifies: (1) the set of allowed locutions
with their legal replies, (2) the parameters of the protocol, e.g. unique-move,
multiple-move, the participants, etc. and (3) the parameters of the planner.

Dialogue manager. This is the referee between the User and the Reasoner (i.e.
dialogue planner), it dispatches their utterances through the sub-module “Utter-

\textsuperscript{1}See \url{http://www.lirmm.fr/~arioua/dkb/#rulesdalek} for more details.
Figure 1. The DAlEK’s architecture. Each layer is composed of modules and each module is composed of sub-modules.

The dialogue manager communicates with the module semantics structure through the submodule “Syntax and semantics handler” that makes use of the stores. The syntactical verification ensures the legality of any advanced utterance with respect to: (1) legality of the utterance itself, and (2) legality of the reply within the dialogue. The semantics verification ensures, among other things, the legality of the utterances with respect to the content. It checks whether the advanced utterance holds a legal content and it replies with a legal content.

**Semantics structure.** This structure implements an operational semantics of the dialogue. It associates with each reply a procedure that should be called by the dialogue manager to check the legality of the reply.

**Dialogue planner.** This module receives the utterances from the user through the dialogue manager and plans the next utterance. The planner in its current state tries to answer user’s utterances as they come.

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References

