

Universal Configuration Language and Core-Architecture for Dialogue Systems

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Nowdays, human-computer interaction is changing dramatically toward the forms of human communication, i.e., it takes the human-human interaction as a basis, and tries to mimic/realize it in multi-modal computer systems. Since spoken dialogue is the most important media for transmitting information in the case of humans, the core of a multi-modal computer system is a so-called dialogue system. Such a system receives text-typed input, and emits text-typed output based on the actual input and the inner state of the system. A common feature of the state-of-the-art dialogue systems is the strictly limited usage. Each of them is language- and application-dependent, and can be incorporated with only well-defined modules because of the dependency on application. The aim of our research is to propose such a dialogue system core architecture and such a configuration language for the core, which are universal in the sense of language- and application-independence, and can be extended with arbitrary modules. Futhermore, we have kept the followings in mind:

- effective language parsing, language generation, and semantic data representation, futhermore their arbitrary extensibility;
- effective low-level procedural knowledge formulation;
- easy usage for even naive users, i.e., effective heuristic abstraction.

We have named the proposed configuration language to Conversational Agent Markup Language (CAML), and the proposed architecture to CAML Core. The CAML is an XML-compliant language for defining so-called categories, which can consist of parse-specific, procedural, and heuristic information. Since the inner engine of the CAML Core is a CLIPS core, the defined categories represent CLIPS rules, which are fired on the actual input and the inner state of the core as CLIPS facts. The arbitrary extensibility of the CAML Core is solved through the already existing text-typed input and output channels with the use of XML tags in the input (output) stream, i.e., it is not needed to create new channels associated with the news modules.

The creators of the CAML were inspired by several existing configuration language and dialogue systems, like Artificial Intelligence Markup Language (AIML), Dialogue Management Tool Language (DMTL), Phoenix Semantic Parser, and Alice Bot. The CAML Core has been implemented, and tested in a web-based agent application.