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NEW KNOWLEDGE EVALUATION USING MESSAGE MODEL OF NLT DOCUMENT

The algorithm of evaluation of a new knowledge of natural language text represented by its message model is developed. This method is based on estimation of a difference between known and new algorithms utility functions.

Keywords: knowledge base, ontology, utility function

1. Introduction

The problem of an automatic knowledge acquisition foresees estimation of an importance of a new knowledge. Agent approach helps us to estimate "usefulness" of an information. Knowledge by its definition is an algorithm of a task solving. Each task solving algorithm provides expenditure of resources. An award of a task solving also is measured in dimension of resources. Therefore total prize for an agent is a difference between the spent and received resources. Let it will be the **utility function** for the correspondent algorithm, or knowledge. If a new knowledge appears, an agent estimates its utility function and compares it to value of utility function for already known algorithms. Its gain (in dimension of resources) it is proposed to consider as a resulting measure of a knowledge novelty.

2. Intention

In this article the method of estimation of utility function of natural language text on the basis of its message model is considered. The basic requirements to this method are: unambiguity, independence from the size of text fragment, adaptability and efficiency.

Our approach to knowledge representation in the form of semantic network (conceptual graph) start with the precondition, that any possible generalization concept appears in a knowledge base as separate concept. Therefore if some generalization has common characteristics or methods, they can be realized by means of properties and event handlers of correspondent summarizing concept. Such kind of generalization corresponds to a container of organized algorithms with a resulting prize evaluated in terms of resources. Each included sub algorithm recursively evaluates its own part of common prize.

Agent by the definition follows to its own knowledge base algorithms with aim to achieve his purpose of functioning. Success on all stages is measured in generalized resources as utility function. If some text document describes new algorithm, it could obtain nonzero utility function which will be estimated as difference between known for agent and new algorithm prizes. The task of present article is to introduce the method of utility function evaluation of new knowledge in text fragment.

3. Model of knowledge in natural language text

Agent receives natural language text document in form of message. The message is formed by the agent as well. The structure of the message is focused on perception by other agent, therefore contains at least two parts (Fig. 1): ascertaining part, by which the addressee estimate relevancy of the message (1) and defines its context (2), and constructive - potentially new knowledge in given context (3).
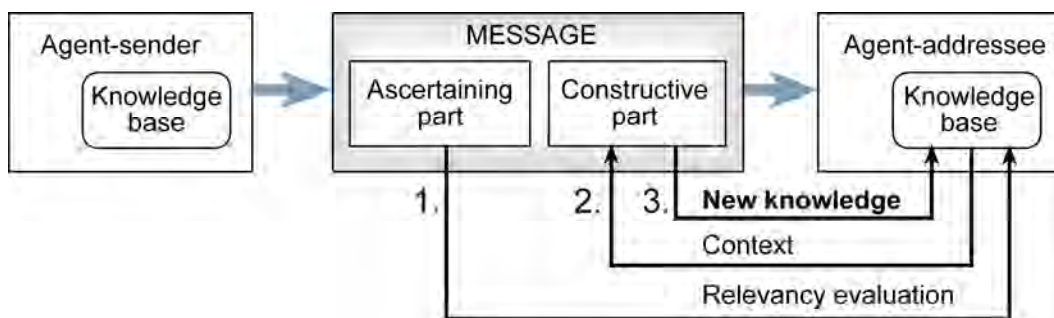
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Fig. 1. New knowledge evaluation in a message with a purpose to selective knowledge base completion.

Each existing knowledge has its own utility function which provide an agent its MEU behaviour. Therefore recognized new knowledge has two parts: common with prototype knowledge part and difference part which utility function must be evaluated or described explicitly (Fig.2):
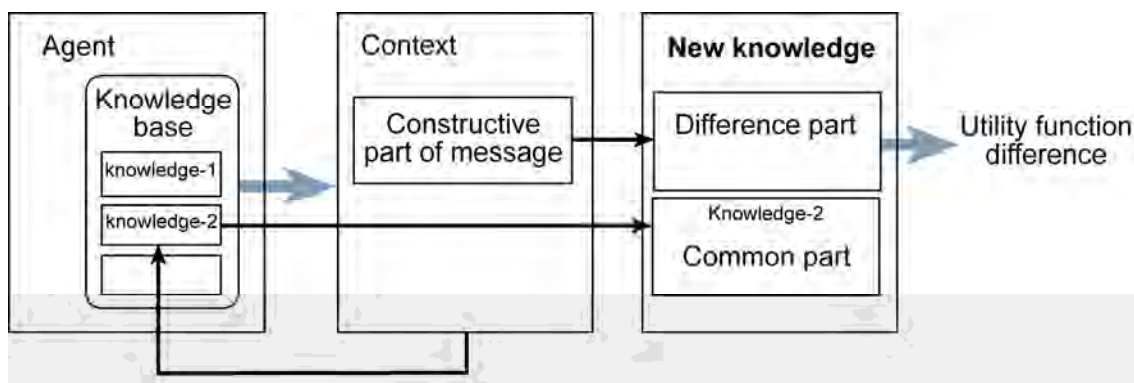

Fig. 2. Utility function evaluation for a new knowledge as a difference between utility function of prototype knowledge and utility function estimated from context of proposed in a message new algorithm.

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