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ON SEMANTIC ANAIYSIS OF A NATURAL LANGUAGE PHRASES

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Abstract

The present work describes methodology for developing an algorithm of automatic semantic analysis of phrases, of preparing a relevant knowledge base and of using instrumental means [12-13] for the algorithm.

Keywords and phrases: semantic analysis, micro-cosmos, micro-theory, software tool, knowledge base, deduction, semantic graphs.

Scientific researches, translating from one language into another, teaching, identifying faces and solving other problems connected with these processes are nowadays in the scope of humans competence. However, people use computers more and more to cope with them, and at present only a miserable part of computers abilities is utilized relevantly. The role of a natural language in solving these problems is well known, in particular, solving the question of deducing meanings from a text and formalizing them. This problem is considered to be solvable and is known as semantic analysis of a natural language. Little is done for computerized semantic analysis of Georgian texts [1- 6]. Complications of semantic analysis are caused by peculiarities of sentences. Lets discuss some of them:

1) A sentence can be true or false. The total of inner corners of a rectangle is equal to 360, whether it is true or false can be proved logically, but the truth of the sentence which describes some historical event can t be proved logically. It must be accepted by historians as a fact or denied by them as such.

2) A sentence can be universal or typical, e.g. All humans are mortal-it is universal, but All men like alcohol it is not universal, but is typical

3) A sentence can be trustworthy or unbelievable.

4) A sentence can be rare or approximately trust-worthy.

5) A sentence can be homonymous with its meaning.

The list of such examples can be continued [t], but even the above maintained examples are enough to make sure how complicated the nature of a sentence meaning can be and that it cant be characterized by its truth or falsity only. For some sentences discussion of their truth or falsity is useless. Hence, to define the meaning of a sentence it is necessary to discuss its constituents-word. Possible meanings of each word should be studied, word interactions within a sentence should be considered and all these will make it possible to deduce the meaning of a sentence. It is essential to know the real world in which the natural language is used. The real world is described by means of knowledge bases, where for imagining real or possible world the semantic networks are used. Classification of semantic networks according to their usage is given [8]. Stank

[9] and Shapiro s [10] graphical imaginations have been especially widely used and they are known in scientific literature as conceptual graphs. Equally widely is used Schmidt s graphical imagination for presenting meaning of conversation and is known as DRS [11]. Our aim is to define semantic meaning of a whole sentence. To achieve this we shooed knows semantic characterization of certain words with the list of their semantic peculiarities, and with meanings of certain peculiarities. At the same knowledge of the universe which is hidden in the semantic meaning, et this sentence should be taken into consideration. Affair this words syntactically connected in a sentence should be semantically limited, which is expressed by semantic features of words and by their meanings. By means of them correct semantic correction between syntactically related words can be defined. The same can be said about more complicated syntactic connections such as syntactic connections between noun groups and verb groups. Limitations themselves represent logical images built on semantic features and their meanings. After this the formalism, which was used by us when analyzing Georgian sentences morphologically and syntactically, can be utilized for semantic analysis [12,13]. To achieve this it is important to define correctly semantic features of certain word classes, concepts of microcosms and micro theory are used by us with this purpose, they are utilized for transforming a text in a natural language into TMR language [14]. According to this theory microcosms consists of micro theories. Micro theory is compiled for certain word classes. To illustrate better how such a micro theory is compiled, let s discuss it for adjectives. It is based first of all on syntax and semantics of adjectives, which is widely accepted in literature. It is based on the following principles:

1. attributive adjectives define nouns they are related to,
2. not all adjective define nouns, especially if they are usage as predicative Attributive and predicative usage of adjectives is one of those s features by which adjectives are connected with attributively / productivity; modification by means of adverbs; statically / dynamistic; gradability / nongradability ; inheritability / non- inheritability.
3. Taxonomy of adjectives,
4. Predicative / non- predicative adjectives.
5. Relative adjectives.
6. Relative qualitative adjectives.
7. Series of adjectives.
8. Comparative degrees of qualitative adjectives. and scales and etc. besides, semantics of adjectives. Based on ontology and lexicology is important too. Ontological approach presupposes characterizing each word according to the above mentioned classification with presenting corresponding features and their meanings [15]. In our case features and relevant meanings are written with a word in a dictionary. Such features and their meanings are used to compile limitations by means of which semantic meaning of a word or a whole syntactic construction will be defined. Micro theory for other word classes (nouns, verbs and other word classes) must be built in a similar way. Such a presentation enables to use instrumental means created by as for semantic analysis without any modification of these instruments. It will enable compilers of algorithms of semantic analysis to use instrumental means created by us to check their algorithm and correct it without programming an algorithm.

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