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Review of existing methods of parsing and grammatical text analysis

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Annotation: This article will cover parsing and grammatical methods. The parsing of the text and its correctness play not the least role in the task of modeling and understanding natural languages. Non-fluctuative languages (English) are especially difficult, in which the spelling of a word does not always guarantee its unambiguous semantic or lexical identification.

Key words: Parsing, grammatical method, analysis, formalism, segmentation, word order, formalism, syntax.

Syntactic structure of the text

The task of parsing is to explicitly describe the syntactic structure of the text. Most of the models for representing the syntactic structure are based either on the grammar of dependencies or on the grammar of the direct components. The grammar of dependencies assumes that the sentences of the text are trees of dependencies, in which words are connected by oriented arcs, denoting syntactic subordination. It is believed that this formalism well reflects the specificity of languages with an arbitrary word order, in which a significant number of non-projective connections can be present between words. These languages include German, Czech, Russian, as well as other East Slavic languages. in grammar directly - the constituent sentences of the text are represented in the form of the Hierarchy of constituents (syntactic groups): the entire sentence is divided into non-intersecting projective groups, which in turn consist of smaller groups, etc. down to atomic groups - sentence words. In the grammar of the constituents, in fact, unprojective syntactic relations between words are not allowed. Therefore, this formalism is considered suitable for languages with a fixed word order, for example, for English, where projectivity is more strictly enforced. In English, there are also unprojective connections: "John saw a dog yesterday which was a Yorkshire Terrier". This sentence intersects the relationship between "saw - yesterday" and "dog - was". Nevertheless, despite a number of exceptions, for most constructions in English, the property of projectivity is observed. It should be noted that these two formalisms are applied to the parsing of different languages approximately equally.

The properties of this civility without sacrificing much completeness, take into account only projective relationships and apply both formalisms with equal efficiency. There are known works in which the grammar of connections is used for the syntactic analysis of the Russian language. This model cannot be attributed to either dependency grammar or constituent grammar. It differs in that the text in it is presented not in the form of a tree, but in the form of a network in which the root element is absent. Despite the fact that there are a number of projects using LinkGrammar, this formalism has not been widely used. Methods of parsing Parsing is divided into deep parsing and shallow parsing. The task of deep syntactic analysis is to construct a complete syntactic tree of a sentence with maximum connectivity, taking into account long-distance connections, as well as to determine the grammatical functions of words in a sentence (subject, predicate, circumstances of place, time, etc.). There is no clear definition for superficial syntactic analysis; this concept combines various approaches working at the syntax level, which are aimed at constructing an incomplete (partially related) syntactic structure of a text of varying complexity. Surface syntactic analysis covers such tasks as dividing a sentence into recursively non-nested syntactic groups (chunking), segmentation (highlighting different phrases in a sentence and simple sentences as part of a complex one), as well as building a surface syntax tree. Review of methods for syntactic and semantic analysis of texts with the results of deep syntactic analyzers. However, surface

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analyzers are usually not designed to establish all syntactic relationships in a sentence, do not take into account long-distance relationships, and are not designed to determine the grammatical functions of words in a sentence. This simplification of the parsing problem in comparison with deep analysis makes it possible to use computationally and algorithmically simpler and more robust methods. In addition, within the framework of a simplified task (for example, to highlight syntactic groups), it is possible to achieve high quality indicators. Both full and surface parsing methods are used in a wide range of different applied word processing problems. Deep syntactic analysis is traditionally used in machine translation systems, surface analysis, as an alternative to deep analysis, is used in information retrieval and information analytical systems. In addition, in some linguistic analyzers, surface analysis is a stage of text preprocessing before deep analysis, which allows, on the whole, to simplify and speed up the procedure of syntax analysis .

Grammar Analysis Methods:

a) distributive method;
b) transformational method;
c) opposing-component method;
d) context-situational method;
e) quantitative analysis.

The methods of grammatical analysis are based on the paradigmatic and syntagmatic relations of linguistic elements and are divided into qualitative and quantitative.

At the heart of grammatical research, whatever the specific techniques, is the semiotic principle of correlation between form and content. All the complexities of grammatical analysis stem from the asymmetry of the plane of expression and the plane of content.

Distributive method.

Based on the syntagmatic relationship between linguistic elements. It allows you to divide the speech chain and, in general, higher-level units into lower-level units and group these units into classes, providing the delimitation of linguistic units (their isolation, determination of their boundaries) and the identification of units (their classification).

Every element in a word or utterance is characterized by a certain environment. The collection of typical environments constitutes the distribution of this element. For example, an English adjective occurs in environments: det + A + N (a fine day) or det + N + A (the first steamer available) or It's + A (it's difficult) or det + N + is + A (the river is long). Any word with the same distribution (distribution) should be classified as adjectives.

The distributive method is also used to identify parts of speech. French lesson begins at nine (position before noun - adjective position). The French like watching TV (the position after the article is the position of the noun).

Transformational method.

It differs from the distributive in the following features: a) emphasizes paradigmatic relations in the language; b) is dynamic in nature, that is, it shows the connection between forms, the formation of one form from another (derivation); c) allows you to differentiate semantic similarities and differences where the distributive method turns out to be insufficient. For example, the Jack's invitation syntagma has two meanings that can be refined by turning it into a verb syntagma: smb has invited Jack or Jack has invited smb. Transformations show the relationship of various designs and forms with each other. They allow you to identify ways to create synonymous means of expression. (The president has arrived and The president's arrival).

The transformational method is used in both morphology and syntax. Transformations include changes in the morphological category of a word (for example, the formation of a personal form from an infinitive), translation of a word from one part of speech to another, changes in the syntactic function of a word or the structure of a sentence (for example, transfer of an asset to a liability).

Oppositive component method.

The meaning of the grammatical form, like any linguistic element, manifests itself in opposition to any other form. The juxtaposition of grammatical forms out of context gives an idea of their basic paradigmatic meanings. For example, about the He plays and He played forms, every English

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speaking person will say that the first form denotes an action related to the moment of speech, and the second - to the past. These will be the primary paradigmatic meanings of these forms. However, opposing the He plays form to the I play form, the –s inflection expresses 3 l. units h Each grammatical form includes as many semes as in how many oppositions it manifests itself.Context-situational method.

When the grammatical form is actualized, one of its meanings is realized in speech, if the form is polysemantic; in addition, in the context, it can acquire additional shades of meaning, since potential semes are actualized, reflecting possible signs of the designated phenomenon. For example, Present Continuous, along with the expression of a prolonged action taking place at the moment of speech, also expresses the future tense (He is taking his examination on Friday), and in combination with an inanimate noun as a subject, the verb to go expresses the greater likelihood or inevitability of the action The sea air is going to do you good.

Quantitative methods.

They are especially important when studying the functioning of grammatical forms. With their help, the frequency of forms is determined, which can reflect the significance of this category in the language system. Quantitative analysis is important for the study of grammatical norms, as well as for the analysis of the structure of the text.

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