Context, Cognition and Communication Conference

WORKSHOP

Directival Theory of Meaning - a Non-Representational Semi-formal Semantics

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ABSTRACT

Even though they have never achieved mainstream popularity, non-representational semantics continue to be an interesting alternative to the standard truth-conditional approaches. The main idea behind them is that reference is not everything – as sometimes the role a given term plays in cognition can be given priority.

Directival Theory of Meaning is a semantics which originated in the works of Kazimierz Ajdukiewicz in the 1930s. Its main idea is that every term in a language occurs in a set of sentences a user has to confirm. The meaning of the term is then defined as the place the term occupies in the network of these sentences.

The workshop presents the theory in its original form and then proceeds to show some important flaws it has. Next it shows how overcoming these flaws leads to a modern conceptual role semantics which does not have the problems similar contemporary theories have.

MOTIVATION AND DESCRIPTION

The aim of the workshop is to present a new approach to **conceptual role semantics**, namely **Directival Theory of Meaning (DTM)** and to show how, using certain logical tools, some traditional problems of philosophy of language can be solved within the framework of DTM. The basis of the DTM is a theory proposed by Kazimierz Ajdukiewicz in two papers published in 1930's (the English translations were published in 1970s) [1,2]. The main idea behind the directival approach is that the meaning of an expression can be identified solely with the set of rules of confirmation for sentences that contain this expression (i.e., rules that in concrete circumstances oblige competent language users to assert concrete sentences including this expression). The theory differentiates between four types of directives: **axiomatic** (sentences which have to be accepted in any circumstances), **deductive** (sentences which have to be accepted if the user accepted some other sentences), **empirical** (sentences which have to be accepted in certain empirical circumstances) and **imperative** (sentences acceptance of which has to result in a certain motor action of the user).

It is best to present the theory as consisting of **two separate parts** or modules: **empirical** and **syntactic**. The aim of the empirical part is to collect a set of **meaning directives** which function in a given language community. One way of doing this is by observing reactions of language-community to selected verbal and non-verbal behaviour of other members. The theory predicts that for every term in the language there exist a number of sentences a user has to affirm in a certain situation if they are to be taken seriously, that is if any actual belief is to be ascribed to them. A good example of this is the Modus Ponens rule – if the user accepts both a conditional and its antecedent but fails to accept the conclusion they will not be said to "believe that the conclusion does not follow" but rather that they do not understand the logic or the language they speak. The result of this part is a gathered list of meaning directives suitable for every simple expression in the language.

The other part of the theory is purely formal and consists of a syntactical decomposition of the collected meaning directives into its constituents. The original theory stored the decomposed data in a simple two-dimensional table format. This construction enables us to define meaning of a given term topologically – as the **set of places the term occupies in the decomposition table**. The table enables the theory to define some of the key notions competing theories struggle with: **meaning** (as the topological distribution of the term in the table), **synonymy** (as simultaneous replaceability of terms within the table), **translation** (as the identity of topological distribution of terms in their respective tables) and **nonsense** (as the term without any meaning directives).

Two more problems which find their solutions on the ground of DTM are worth explicit mentioning. One of the most significant challenges that should be addressed by every holistic theory of meaning is explaining **compositionality of meaning** [6], i.e., the problem of how the meaning of a compound expression depends on the meanings of its constituents. Compositionality of meaning guarantees that within a "finitely based" language we can potentially produce infinitely many meaningful expressions. There are several attempts of solving this problem by means of logical apparatus (a classic example can be found in [9], newer in [10]). During the workshop we will present and compare the most relevant of them. However, according to the modified version of DTM, compositionality of meaning **ceases to be a problem of theory of meaning** and is relegated to **theory of syntax**. During the workshop this idea will be extended and compared with alternative approaches.

Another problem which is faced by DTM and, in particular, all empirical directives is as follows: how to generically describe the class of all possible situations in which a given expression should be asserted. Yet, if we identify every such situation with the whole of stimuli acting upon a subject (**holistic stimulus**) in a given moment, such a class might consist of infinitely many situations which insignificantly differ from each other. However, if an empirical directive is to be finite, the whole class needs to be captured by one generic description. We will show several ways of addressing this problem by means of formal tools such as **fuzzy sets** or **topological semantics for modal logic**.

Although initially appreciated by Carnap and Quine, the original version of the theory has never been further developed. The main reasons for this are some of the flaws of the original theory which were found shortly after its initial presentation, especially a paradox pointed out by Alfred Tarski (explained in [8]). Tarski considered an extremely simple language of first order logic (with identity) and enriched it with two directives: A≠B and B≠A, where A and B are non-logical constants occurring only in these two directives. He then showed that the definitions of the DTM cause the terms to be synonymous although they clearly cannot refer to the same object. This contrasts with the assumption that the identity of reference follows from the identity of meaning.

It is obvious, that from the contemporary perspective the threat presented by Tarski does not look as seriously as it might have looked for the original creator. Tarski's example can be simply understood as an early version of the discovery that the meaning of an expression does not have to determine its reference. It seems that the biggest problem of the DTM was that it was too far ahead of its time.

But, putting these historical considerations aside – what are the advantages of the DTM for the contemporary philosophers and linguists? There are at least three main reasons for which the theory can attract the interest of the CCC Conference attendants.

First of all, the theory revitalizes the idea of **functional role semantics** – the type of theories which, although interesting and distinct from the dominating paradigm of **truth-conditional semantics**, lost their traction and which are not being actively developed. One of the aims of our workshop is showing how the modified version of DTM sidesteps or solves the problems we believe led to the waning of popularity of these types of theories. For example – functional role semantics have been often accused of relying on the traditional **analytic/synthetic distinction** criticized by Quine [7]. In the workshop we will show that the modernized version of DTM circumvents this problem. Familiarizing the participants with the main ideas of functional semantics and showing the reasons they fell out of favour can be considered to be an additional benefit of the workshop.

The second reason why the modernized DTM should prove to be interesting for the contemporary philosophers and linguists is that this theory can be understood as a missing link between two types of contemporary approaches to language: **distributional semantics** encompassing theories which base the meaning of a term upon the distribution of this term within a chosen linguistic corpus (see [11]), and **embodied semantics** forming a group of theories which construe meaning from some sort of empirical data (i.e., sense data or neuronal correlates of sense data) (see [5]). Distributional approaches are very good at modelling the meanings of abstract notions and at showing how inferential relations contribute to the meanings of terms but at the same time they are known to be notoriously bad at showing the **grounding of the terms**. Embodied approaches explain how the meanings of the terms **relates to sensory states** of a language user but has well-known major problems with explaining the meaning of abstract terms. The DTM can be understood as a fusion of these approaches since, from the moment the directives are put into the language table it treats both empirical and purely linguistic directives in the same way: as **formal determinants of the topological structure of the table**.

Finally, the way DTM works and predicts linguistic behaviour of language users can be demonstrated by analyzing simple, artificial languages whose set of simple expressions as well directives of all types can be easily enumerated. During our workshop we would like to use **the language of Allen's Interval Algebra** containing the names for all possible binary relations between intervals on an axis as our exemplary artificial language to which DTM can be applied. The choice of this particular language is motivated by two factors. First, the attendants of the workshop previously unfamiliar with the language can be easily taught how to use it. Second, certain linguistic behaviours of people using the language of Allen's Interval Algebra have already been studied, particularly in the context of the so-called **3-term-series problems** [12]. The results of this research can thus be utilized as a

comparative material for similar experiments conducted during the workshop and involving the participants.

TENTATIVE OUTLINE

Slot 1: Historical version and problems of DTM

For the sake of clarity, it is best to start with the original formulation of the theory presented by Ajdukiewicz. This enables us to point out main problems of the theory and explain the reasons for some of the solutions we introduce later.

Slot 2: Solutions to the problems and a new formulation of DTM

Solutions to crucial problems of the theory are introduced. Among these we will find: solutions to 'Tarski's problem', compositionality of meaning for the theory, the problem of holistic stimuli equivalence classes, solution to the Fodor-Lepore problem. A new version of the theory, which encompasses the solutions presented at the preceding session, is introduced and explained. Specifically - the construction of meaning directives and language matrices is presented in detail.

Slot 3: Comparison to similar existing approaches

The theory is compared similar existing approaches: conceptual role semantics, inferential semantics and newer distributional approaches.

Slot 4: Application: simple artificial language example

A simple artificial language of Allen's Interval Algebra is introduced and explained. Using this language as a running example we show how DTM works and how well it predicts linguistic behaviours of users of this language (recruited from the audience).

REFERENCES

Basic literature (extensively covers most topics discussed during the workshop in an accessible way):

[1] Ajdukiewicz, K., *Language and Meaning* [In:] J. Giedymin (Ed.), *The Scientific World-Perspective and Other Essays, 1931-1963*, pp. 35–66, Springer 1978.

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[5] Price, H., Blackburn, S., Brandom, R., Horwich, P., Williams, W., *Expressivism, pragmatism and representationalism*, Burlington, VT : Ashgate Publishing Company 2013.

Supplementary literature (more detailed and advanced studies on selected problems of the workshop):

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