Annotating a Russian corpus of conceptual metaphor: a bottom-up approach

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Abstract

This work presents the tentative version of the protocol designed for annotation of a Russian metaphor corpus using the rapid annotation tool BRAT.

The first part of the article is devoted to the procedure of "shallow" annotation in which metaphor-related words are identified according to a slightly modified version of the MIPVU procedure. The paper presents the results of two reliability tests and the measures of inter-annotator agreement obtained in them. Further on, the article gives a brief account of the linguistic problems that were encountered in adapting MIPVU to Russian. The rest of the first part describes the classes of metaphor-related words and the rules of their annotation with BRAT. The examples of annotation show how the visualization functionalities of BRAT allow the researcher to describe the multifaceted nature of metaphor related words and the complexity of their relations.

The second part of the paper speaks about the annotation of conceptual metaphors (the "deep" annotation), where formulations of conceptual metaphors are inferred from the basic and contextual meanings of metaphor-related words from the "shallow" annotation, which is expected to make the metaphor formulation process more controllable.

1 Introduction

The manually annotated Russian-language metaphor corpus is an ongoing project in its initial stage, in which a group of native Russian experts aims to annotate a corpus of contemporary Russian texts.

The annotation is performed at the two levels:

1) shallow annotation – identification of metaphor-related words according to a slightly modified version of MIPVU, the procedure for linguistic metaphor identification (Steen et al., 2010);

2) deep annotation – identification of cross-domain mappings and formulation of conceptual metaphors on the basis of basic and contextual meanings of metaphor-related words.

The annotations are visualized with the BRAT annotation tool (http://brat.nlplab.org/, Stenetorp et al., 2012).

2. Shallow annotation

The shallow annotation, based on the MIPVU procedure for linguistic metaphor identification (Steen et al., 2010), consists in indentifying and annotating all metaphor-related words in the corpus.

2.1 MIPVU procedure

In MIPVU, **metaphor-related words** are the words whose contextual meanings are opposed to their basic meanings.

The **basic meaning** of a word is:

a)   more concrete; what it evokes is easier to imagine, see, hear, feel, smell and taste;

b)   related to bodily action;

c)   more precise (as opposed to vague) (ibid.).

Reliability Test 1: 4 texts, 3 annotators	Reliability Test 2: 4 texts, 3 annotators	Fleiss' kappa: accepted reliable minimum	VU Amsterdam Metaphor Corpus: 4 texts, 4 annotators	VU Amsterdam Metaphor Corpus: 3 texts, 4 annotators
0.68	0.90	0.7	0.85-0.86	0.88

Table 1. Inter-annotator agreement (Fleiss' kappa) in Reliability Tests 1 and 2

The **contextual meaning** of a word is the meaning observed in a given context.

Annotators establish the basic and the contextual meaning for each word in the corpus using dictionary definitions from (Dictionary of the Russian Language, 1981-1984) which is the primary dictionary, and (Dictionary of the Russian Language, 1999) as a subsidiary dictionary.

According to MIPVU, a lexical unit is annotated as a **metaphor-related word** if its contextual meaning contrasts with its basic meaning (by the basis of concreteness, body-relatedness and preciseness, as described above), and the contextual and the basic meanings can be understood in comparison with each other: **CM⇔BM**.

A lexical unit is not a metaphor-related word if its contextual meaning is the same as its basic meaning, or if the contrast by the basis of concreteness, body-relatedness and preciseness is not conspicuous enough: **CM=BM**.

MIPVU does not take into account the historical aspect, i.e. it does not differentiate between older and newer meanings or look into the etymology of words, and treats all meanings from the standpoint of an average contemporary user of the language (Steen et al., 2010).

In BRAT annotation tool, the contextual and the basic meanings of metaphor-related words are recorded in a special text field which is displayed when a viewer hovers the computer mouse over a word.

2.2. Reliability Tests

We have performed two Reliability Tests in order to 1) to check the transferability and applicability of MIPVU, which was originally designed for English, to Russian-language material and 2) to assess the reliability of MIPVU on Russian-language material by measuring the rate of inter-annotator agreement.

The Reliability Tests had the following setup:

– 3 annotators (PhDs and current PhD students with prior experience in conceptual metaphor studies);

– a collection of 4 text excerpts (500-600 words each), representing the 4 genres: fiction, transcribed spoken, popular science/academic, and news texts;

– POS-tagged files from the National Russian Corpus (http://ruscorpora.ru/) in xhtml-format;

– 2 dictionaries used to define the word meanings: (Dictionary of the Russian Language, 1981-1984, Dictionary of the Russian Language, 1999).

The inter-annotator agreement was measured by Fleiss' kappa (Artstein and Poesio, 2008) using binary classification, i.e. 1 for any metaphor-related word and 0 for otherwise. The measure of Fleiss' kappa in Reliability Tests 1 and 2 is presented in Table 1 in comparison with the similar tests done for VUAMC, the VU Amsterdam Metaphor Corpus (Steen et al., 2010).

In the first Reliability Test, the annotators were instructed to follow the basic rules of MIPVU, as described in 2.1. As seen from Table 1, the resultant agreement was below both the inter-annotator agreement observed on VUAMC and the minimum threshold accepted for Fleiss' kappa.

Following Reliability Test 1, we analyzed the cases of disagreement between the annotators, and the reports from the annotators about the difficulties they experienced when applying MIPVU.

After that we designed the new version of the MIPVU rules which attempted to address those problems (see 2.3).

The second Reliability Test, which was run on a new collection, was annotated according to the revised rules. As a result, the inter-annotator agreement significantly improved, exceeding the statistical threshold for Fleiss' kappa and

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outperforming the agreement measures reported for VUAMC (see Table 1).

2.3. MIPVU rules: revised and extended

The analysis of the cases of disagreement and the annotators' problem reports has identified 3 major groups of difficulties. Two of them concerned the application of the MIPVU procedure in general, and one group of problems was specific for using MIPVU with Russian dictionaries on Russian texts.

The first major problem had to do with defining the basic meanings of words; the annotators reported significant difficulties in singling out one basic meaning from all the available meanings, as required by MIPVU. The solution for this problem suggests defining a group of basic meanings rather than one basic meaning, each of which shares the feature of concreteness, body-relatedness and preciseness. We have also listed the basic meanings of all major Russian prepositions, as prepositions are reported to account for 38.5-46.9% of metaphor-related words in a corpus (Steen et al., 2010) and therefore are essential for inter-annotator agreement.

The second issue concerned the treatment of idioms and proper names, for which MIPVU does not offer a comprehensive solution. In our version of annotation, we introduced special tags for these classes – Set Expression and Proper Name (see 2.4.6, 2.4.7).

The most numerous group of problems dealt with using Russian dictionaries and adjusting MIPVU to the specific morphological, grammatical, etc. features of Russian, such as:

- In the dictionaries, word meanings are often defined through the meanings of words that have the same morphological root, but belong to a different part of speech (deverbal nouns, adjectival participles and adverbs, adverbs formed on the basis of adverbial participles).

- Some of the meanings of imperfecitve verbs are defined on the basis of their perfective counterparts. Some of the meanings of passive verbs are defined on the basis of their active counterparts.

- Homonymous grammatical forms belonging to different parts of speech are listed in one dictionary entry.

- Agglutinative and abbreviated compound words (consisting of more than one stem) require separate analysis of each of their stems.

- Specialist terms and slang words are not listed in general dictionaries.

- The best candidate for the basic meaning may be a stylistically marked meaning of a word.

The solutions we offered to address these linguistic issues of MIPVU adaptation to Russian are described in detail in (Badryzlova et al., 2013).

2.4. Classes of metaphor-related words in the shallow annotation

Depending on the type of relation between the contextual meaning and the basic meaning, the shallow annotation of the Russian metaphor corpus distinguishes the following classes of metaphor-related words that were present in the original MIPVU procedure (Steen et al., 2010): Indirect Metaphor, borderline cases, or WIDLII (When in Doubt, Leave It In), Implicit Metaphors, Direct Metaphors, Metaphor Flags (mFlag), Personification, and lexical units discarded for metaphor analysis (DFMA). Additionally, we annotate the classes of Set Expression and Proper Name.

Importantly, the functionalities provided by BRAT annotation tool allow assigning multiple tags to a lexical unit; for example, a word or a phrase can take the tags of Indirect Metaphor and Personifier/Personified at the same time (e.g. see the word "*liniya*" in Fig. 3); metaphor-related annotations can overlap, thus displaying the multi-faceted nature of metaphor-related words and the complexity of their relations.

2.4.1   Indirect Metaphor

Indirect Metaphor is observed when the contextual meaning of a lexical unit contrasts with its basic meaning: **CM ⇔ BM** (Steen et al., 2010).

Figure 1: *В последнее время все чаще выпускают полноприводные машины, в которых раздаточная коробка вообще не предусмотрена.* [Recently, all-wheel drive vehicles have been produced ("released") which feature no transfer case at all.]
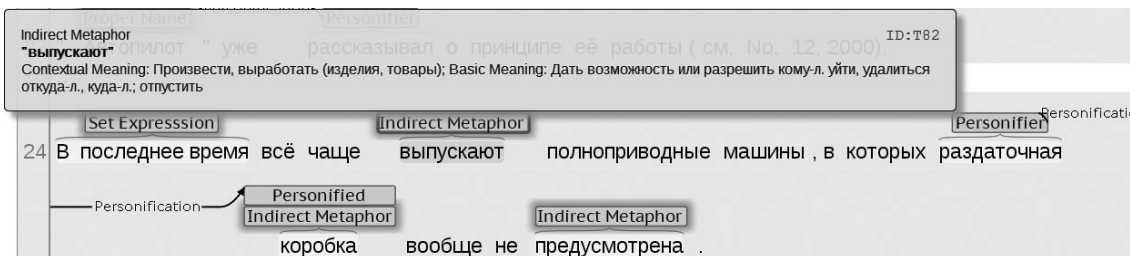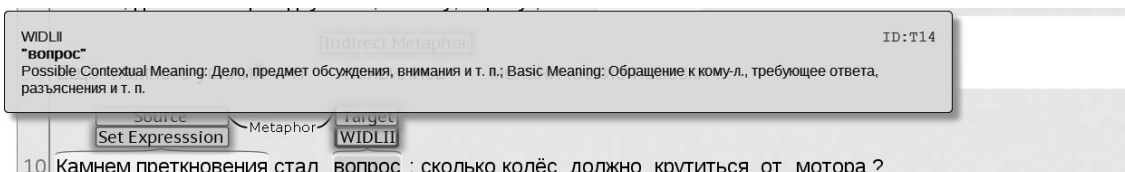
Figure 1. Indirect Metaphor

Figure 2. A WIDLII case

The verb *"vypuskat'"* in Figure 1 is an Indirect Metaphor because CM ⇔ BM:

Contextual Meaning "*vypuskat'*"		Basic Meaning "*vypuskat'*"
Произвести, выработать (изделия, товары) [To produce, to turn out (products, goods)]	⇔	Дать возможность или разрешить кому-л. уйти, удалиться откуда-л., куда-л.; отпустить [To allow or permit smb to leave or go out; to release smb

(The fields above the sentence lines in Figures 1-6 contain the definitions of the contextual and the basic meanings. The definitions are given according to (Dictionary of the Russian Language, 1981-1984).

2.4.2 Borderline cases (WIDLII – When In Doubt, Leave It In)

We state a WIDLII case when it is not quite clear whether the contextual and the basic are identical or not, i.e. whether CM ⇔ BM or CM = BM (Steen et al., 2010).

Figure 2: *Камнем преткновения стал вопрос: сколько же колес должно крутиться от мотора?* [The following question has become the stumbling block: how many wheels should be rotated by the engine?]

The noun "*vopros*" in Figure 2 is a WIDLII case because it simultaneously displays a dual relation between the contextual and the basic meaning: CM ⇔ BM, and CM = BM:

Contextual Meaning "*vorpos*"		Basic Meaning "*vopros*"
Дело, предмет обсуждения, внимания и т. п. [The matter or the subject of a discussion, consideration, etc.]	⇔	Обращение к кому-л., требующее ответа, разъяснения и т. п. [An utterance requiring response, explanation, etc.]

and

Contextual Meaning "*vopros*"		Basic Meaning "*vopros*"
Обращение к кому-л., требующее ответа, разъяснения и т. п. [An utterance requiring response, explanation, etc.]	=	Обращение к кому-л., требующее ответа, разъяснения и т. п. [An utterance requiring response, explanation, etc.]

2.4.3 Implicit Metaphor

Implicit Metaphors are anaphoric pronouns that are coreferential with a metaphor-related antecedent (Steen et al., 2010). In the shallow annotation proposed in this paper, the Implicit Metaphor and its metaphoric antecedent are connected by the relation "Coreference".

Figure 3: *Однако вопреки расчетам террористов наша линия на политическое урегулирование в Чечне, опирающаяся на поддержку чеченского народа, остается неизменной. Мы высоко ценим то понимание,*
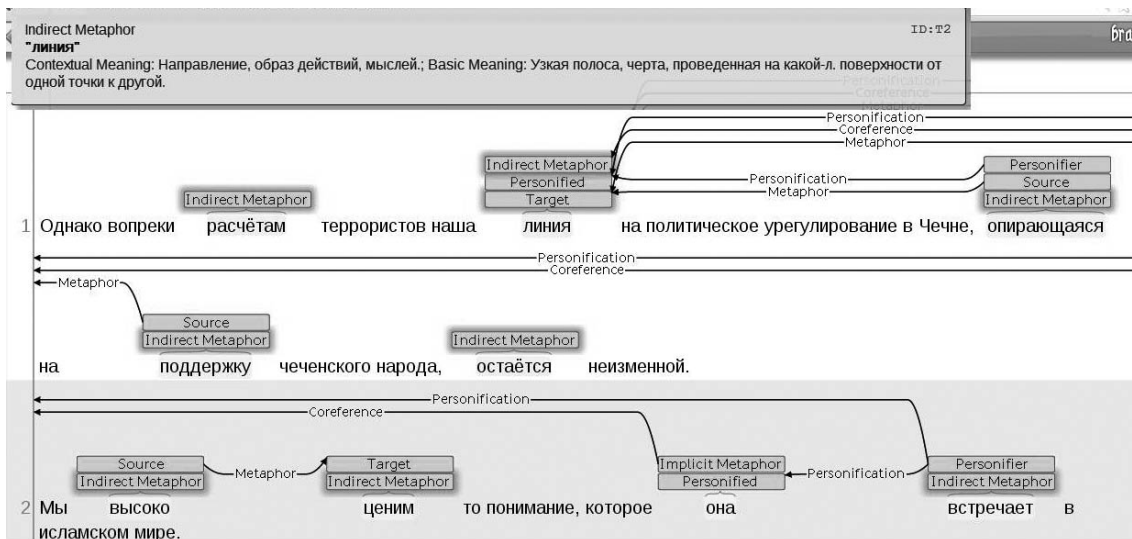
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Figure 3. Implicit Metaphor, Personification

которая она встречает в исламском мире. [However, despite the expectations of the terrorists, our line on political settlement in Chechnya, which leans on the support of the Chechen people, has stayed unchanged. We highly appreciate the understanding she (it) meets in the Islamic world.]

The pronoun "*ona*" [she (it)]) in Figure 3 is an anaphor of the Indirect Metaphor "*liniya*" [line], as:

Contextual Meaning "*liniya*"		Basic Meaning "*liniya*"
Узкая полоса, черта, проведенная на какой-л. поверхности от одной точки к другой. [Thin mark drawn on a surface from one point to another].	⇔	Направление, образ действий, мыслей. [Direction or manner of action or thought].

Therefore, "*ona*" is a case of Implicit Metaphor.

2.4.4   Personification

We have elaborated the structure of Personification that was suggested by the original MIPVU procedure. The visualization functionalities of BRAT annotation tool have enabled us to regard personification as a relation between the two entities: the source of personification and the target of personification.

The source of personification (Personifier) is a lexical unit whose basic meaning implies the presence of an animate agent.

The target of personification (Personified) is a lexical unit denoting inanimate subjects, phenomena, or abstract notions onto which the features of an animate agent from the Personifier are mapped.

The Personifier and the Personified are connected by the relation of "Personification".

Figure 3: *Однако вопреки расчетам террористов наша линия на политическое урегулирование в Чечне, опирающаяся на поддержку чеченского народа, остается неизменной. Мы высоко ценим то понимание, которая она встречает в исламском мире.* [However, despite the expectations of the terrorists, our line on political settlement in Chechnya, which leans on the support of the Chechen people, has stayed unchanged. We highly appreciate the understanding she (it) meets in the Islamic world.]

In this sentence, already discussed above, the verb "*vstrechat*" [to meet] (which has been tagged as Indirect Metaphor) is also the source of personification (Personifier), as its basic meaning implies an animate agent:

Contextual Meaning "*vstrechat*"		Basic Meaning "*vstrechat*"
Увидеть идущего навстречу, сойтись	⇔	Получить, испытать,

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60 секунду.../" меня   волнует   наводнение в Чехии "...
61 Арбенина .   DFMA   ID:T176
       "покажу"
       Possible Contextual Meaning: Проучить кого-л., сделать нагоняй кому-л. за что-л.; Basic Meaning: Дать увидеть, представить для
62 Что- что ?   разглядывания, рассматривания
63 Смирнова .

       DFMA

64 Я вам покажу.

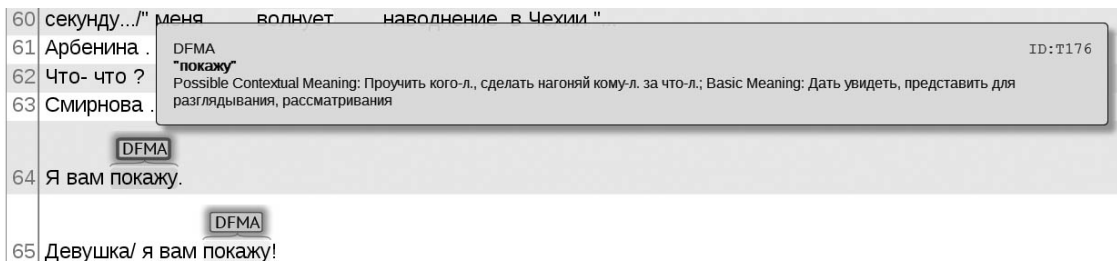   DFMA

65 Девушка/ я вам покажу!

Figure 4. DFMA

с ним; Выйдя навстречу прибывающему (прибывающим), принять, приветствовать их. [To see a person walking towards you, and to approach him/her; to walk towards arriving visitor(s) while greeting and welcoming them].

оказавшись в каком-л. положении, при каком-л. действии и т. п. [To receive or experience smth while being in a certain situation, in the course of a certain action, etc.].

The target of personification (Personified) is the anaphoric pronoun "*ona*" [she] and, consequently, its metaphorical antecedent, the noun "*liniya*" [line].

2.4.5 DFMA (Discarded for Metaphor Analysis)

The tag DFMA is used in MIPVU and in our shallow annotation when the incompleteness of the context does not allow the annotator to establish the contextual meaning (Steen et al., 2010). Such cases are commonly observed either in incomplete, or syntactically, lexically or stylistically incorrect utterances that are characteristic of spoken language.

Figure 4 presents an excerpt from a TV talk show in which two female hosts interview a female rock singer: *"Смирнова. Мы/ старые тётеньки / нам нравятся ваши песни / но вот это на нас решительно не действует. Поэтому весь этот напор / и эффектное" я / космополит !"/" меня волнует.../ как вы там сказали ... секунду.../" меня волнует наводнение в Чехии "... Арбенина. Что-что? Смирнова. Я вам покажу. Девушка/ я вам покажу!* [Host. We / old ladies / we like your songs / but these things

have absolutely no effect on us / And all that drive / and the pretentious "I am / a cosmopolitan!" / "I am concerned about…" / how did you put it… just a second… / "I am concerned about the flooding in the Czech Republic"… Guest. Come again? Host. I will <u>show</u> you. Young lady, I will <u>show</u> you!]

The contextual meaning of the verb "*pokazat'*" [to show] is not apparent from the context. It is possible that the host indeed intends to demonstrate a certain object to the guest; then the contextual meaning will be identical to the basic meaning:

Contextual Meaning "*pokazat'*"		Basic Meaning "*pokazat'*"
Дать увидеть, представить для разглядывания, рассматривания [To allow smb to see smth, to present smth for display]	=	Дать увидеть, представить для разглядывания, рассматривания [To allow smb to see smth, to present smth for display]

However, it is also possible that the host's purport was somewhat different, for example:

Contextual Meaning "*pokazat'*"		Basic Meaning "*pokazat'*"
Проучить кого-л., сделать нагоняй кому-л. за что-л. [To call smb to task, to tell smb off]	⇔	Дать увидеть, представить для разглядывания, рассматривания [To allow smb to see smth, to present smth for display]

After all, in the absence of the extra-linguistic context, the available linguistic context does not appear sufficient for making a judgment about the speaker's actual intention, so the case of "*pokazat'*" is discarded for metaphor analysis.
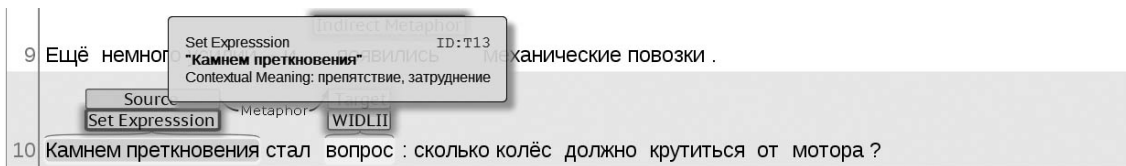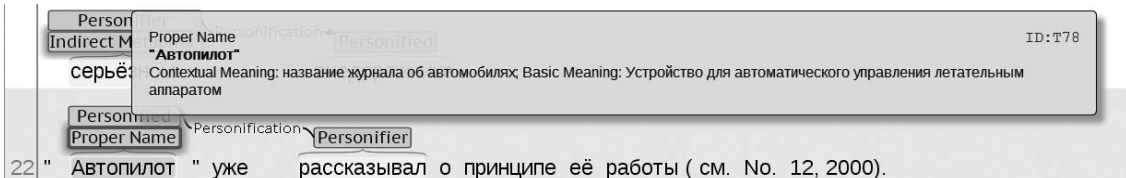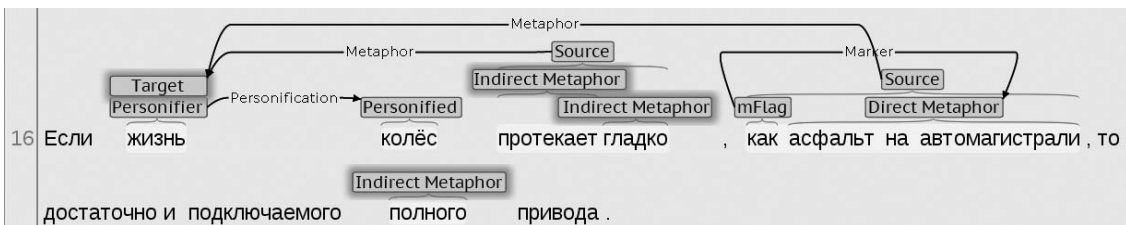
Figure 5. Set Expression

Figure 6. Proper Name

Figure 7. Direct Metaphor, mFlag

2.4.6 Set Expression

This class, initially not present in the original version of MIPVU, was introduced by us into the shallow annotation as a solution to insufficient guidelines on treatment of idiomatic expressions in MIPVU (see 2.3).

The class of Set Expressions includes idioms and multi-word units as they are listed in the dictionary. Set Expressions present a special case for metaphor analysis as semantically inseparable units with various degree of internal semantic motivation. The dictionary definition of a Set Expression in annotation is recorded as its contextual meaning.

Figure 5: *Камнем преткновения стал вопрос: сколько же колес должно крутиться от мотора?* [The following question has become the stumbling block: how many wheels should be rotated by the engine?]

The phrase "*kamen' pretknoveniya*" [stumbling block] in Figure 5 is a Set Expression whose contextual meaning is: *Препятствие, затруднение* [Hindrance, complication].

2.4.7 Proper Name

The class of Proper Names, which was not present in the original version of MIPVU, was added to our tagset in order to offer a solution to the treatment of proper names in the shallow annotation.

Proper names that have common nouns, adjectives etc. among their constituents are similar to Indirect Metaphors in that the contextual meaning contrasts the basic meaning; the difference is that the contextual meanings of proper names are normally not listed in dictionaries.

In Figure 6, the noun "*avtopilot*" is the title of an automotive magazine, which is its contextual meaning. At the same time, the basic meaning of the corresponding common noun is that of a technical device:

Contextual Meaning "*avtopilot*"		Basic Meaning "*avtopilot*"
Название журнала об автомобилях [Title of an automotive magazine]	⇔	Устройство для автоматического управления летательным аппаратом [Device for automatic control of an aircraft]

2.4.8 Direct Metaphor

According to MIPVU, the contextual meaning of a Direct Metaphor is identical to its basic meaning (CM = BM), and they belong to a distinctly different conceptual domain than their immediate context (Steen et al., 2010). Direct Metaphors in our annotation scheme lie on the borderline of the shallow and the deep annotation, acting as a source of cross-domain mapping.

Direct Metaphors may be introduced into the context either by means of signalling devices (metaphor flags, mFlags), or immediately, without any signalling devices (Steen et al, 2010).

Figure 7: *Если жизнь колес протекает гладко, как асфальт на автомагистрали, то достаточно и подключаемого полного привода.* [If the life of the wheels flows smoothly like asphalt on a motorway, a part-time 4-wheel-drive system will do.].

The phrase "*kak asfalt na avtomagistrali*" [like asphalt on a motorway] is a Direct Metaphor signalled by the Metaphor Flag (mFlag) "*kak*" [like]. The Metaphor Flag and the Direct Metaphor it introduces are connected by the relation "Marker".

3. Deep annotation

By deep annotation in our corpus we mean the annotation of conceptual metaphors.

We think that the coverage of conceptual metaphor identification in a corpus and the objectivity of metaphor formulation can increase to some extent if these procedures rely on the shallow annotation of metaphor-related words.

In a typical study of conceptual metaphor in discourse, annotators would a) go through a text and mark conceptual mappings, sources and targets when they feel there is a shift from one conceptual domain to another; b) assign the identified conceptual structure to a metaphor from a previously formulated list and label the Source and the Target; or they would formulate a new metaphor, Source, and Target, if they were not found in the list (e.g. Chudinov, 2001).

When we take shallow annotation as the basis for conceptual metaphor identification, a substantial component of linguistic intuition remains, as step (a) basically does not change. However, the coverage is likely to increase, because annotators would examine each metaphor-related word in the shallow annotation and assess their potential for triggering a conceptual mapping, which arises from the nature and extent of the contrast between the basic and the contextual meanings.

The objectivity of assigning conceptual metaphors to the mappings may also be expected to increase, because definitions of metaphors would be based on the dictionary definitions of the basic and the contextual meanings of metaphor-related words (MRWs). In our annotation, the inferred conceptual metaphors are recorded in the field "Possible Inferences" of the "Target" tag.

We have described several most frequent scenarios of formulating MRW-based conceptual metaphors:

1) if the Target is a non-metaphor-related word, the definition of the Target will be expressed by the contextual meaning of the non-metaphor-related word;

2) if the Target is an Indirect Metaphor, the definition of the Target will be expressed by the contextual meaning of the Indirect Metaphor;

3) if the Source is an Indirect Metaphor, the definition of the Source will be expressed by the basic meaning of the Indirect Metaphor;

4) if either the Source or the Target is a Proper Name, the definition of the Source or the Target will be expressed by the contextual meaning of the Proper Name;

5) if either the Source or the Target is a Set Expression, the definition of the Source or the Target will be expressed by the contextual meaning of the Set Expression;

6) if the Source is a Direct Metaphor, the definition of the Source will be expressed by the Direct Metaphor itself.

For example, the noun "*liniya*" [line] in Figure 3, which in itself is an Indirect Metaphor with the contextual meaning of "Direction or manner of action or thought" is the Target for mappings from the two Sources. The first is a participle of the verb "*operet'sya*" [to lean on smth], which is tagged as an Indirect Metaphor, as:

Contextual Meaning "*operet'sya*"		Basic Meaning "*operet'sya*"
Найти себе поддержку в ком-,	⇔	Прислониться к кому-, чему-л.,

Source implMap   ID:T102   вискомуфта.
"одной ногой стоит в могиле"
Target Implicit: Выходить из употребления; Possible Implications: Выходить из употребления - это быть близким к смерти

Personifier
Personified ←Personification→ Source implMap
                                           Set Expresssion

28 | Но классическая вискомуфта уже одной ногой стоит в могиле .
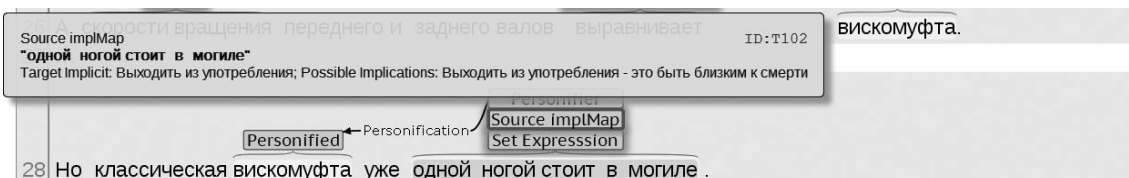
Figure 8. Explicit Source, Implicit Target and mapping

Source implMap   ID:T145
"реанимация"
Target Implicit: Политика Путина в начале 2000-х годов; Possible Implications: Политика Путина в начале 2000-х годов - это реанимация России => Россия в начале 2000-х годов - это человек, находящийся в состоянии клинической смерти

Source implMap
Direct Metaphor

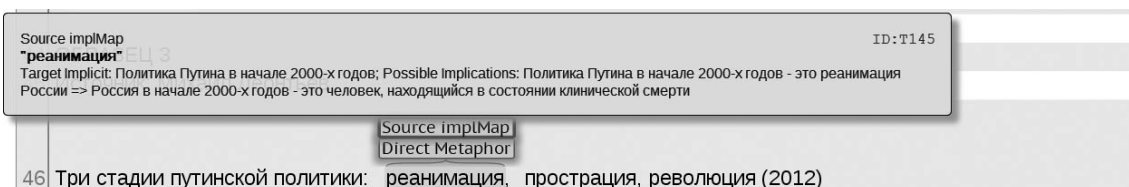46 | Три стадии путинской политики: реанимация, прострация, революция (2012)

Figure 9. First- and second-order inferences

чем-л., воспользоваться кем-, чем-л. в качестве опоры, поддержки. [To find help in smb/smth, to use smb/smth as support]

налечь на кого-, что-л., перенося на него часть тяжести своего тела. [To lean against smb/smth, transferring part of your body weight onto that object]

The second Source is the noun "*podderzhka*" [support], which is also an Indirect Metaphor:

Contextual Meaning "*podderzhka*"		**Basic Meaning "*podderzhka*"**
Помощь, содействие. [help, assistance]	⇔	То, что поддерживает, служит опорой чему-л. [Smth that supports or holds the weight of smth]

The following conceptual metaphor can be inferred from these mappings and from the underlying meanings of metaphor-related words: "Direction/manner of action/thought is something that uses support to lean on or to hold its weight".

In some cases, not all the components of a conceptual metaphor may be present explicitly in the text; this happens when only the Source is expressed explicitly, while the Target and the mapping are implicit. The Implicit Target may be inferred either from the contextual meanings of the metaphor-related word(s) that express the Source, or from the topical framework of the context.

We use the tag "Source implMap" to annotate the Source of Implicit Mapping. We also record the Implicit Target in a special text field of the "Source implMap" tag, as in Figures 8-9.

Figure 8: *Но классическая вискомуфта уже одной ногой стоит в могиле.* [But the classic viscous coupling is standing with one foot in the grave]. "*Odnoy nogoy stoit v mogile*" [is standing with one foot in the grave] is a Set Expression whose contextual meaning is "To be nearing one's death". In the given context which speaks about the evolution of automotive technology, this phrase means "To come into disuse", which constitutes the Implicit Target (the Implicit Target is inferred from the topic of the context). The possible inference from the mapping of the explicit Source onto the Implicit Target may be worded as the following: "Coming into disuse is approaching one's death".

When making inferences from Source/Target mappings we have often observed that the first-order inferences that follow immediately from the metaphor-related words of the shallow level may logically entail further, second-order inferences which are also recorded in the field "Possible Inferences".

Figure 9: *(Заголовок статьи) Три стадии путинской политики: реанимация, прострация, революция.* [(Editorial headline) The three stages of Putin's policy: life support, prostration, revolution.]

"*Reanimatsiya*" [life support] is a Direct Metaphor with the basic meaning of "Actions intended to bring a person back to life from clinical death". At the same time, "*reanimatsiya*" is the Source of an Implicit Mapping, whose Implicit Target is expressed by the topic of the text, where

"life support" refers to Putin's policy during his first presidential term in 2000-2004. The possible first-order inference from this mapping is: "Putin's policy in the early 2000s is life support to Russia". The possible second-order inference is: "Russia during the early 2000s is a person in the state of clinical death".

4   Conclusion

The work presented in this paper has shown that:

1) Introducing the classes of Set Expression and Proper Name has proved to be a viable solution for the insufficiency of instructions for idioms and proper names in the original version of MIPVU.

2) The visualization functionalities of BRAT annotation tool allow elaborating and expanding the structure of Implicit Metaphor (relation "Coreference" to connect the antecedent and the anaphor); of Personification (source of personification (Personifier) connected with the target of personification (Personified) by the relation "Personification"); and of Direct Metaphor (Direct Metaphor connected with Metaphor Flag by the relation "Marker"). Cross-domain mappings can be annotated as relations between the Source and the Target.

3) BRAT annotation tool enables recording and storing the basic and the contextual meanings of metaphor-related words and the conceptual metaphors inferred from them. Implicit conceptual mappings can be annotated, where only the Source is expressed explicitly.

4) Using multiple overlapping tags and relations visualized through BRAT helps reveal the complexity of the metaphoric structure of a text.

5) The attempt to identify and formulate conceptual metaphors on the basis of the basic and contextual meanings of the underlying metaphor-related words tends to lead to increased coverage and more controlled metaphor formulation.

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