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WORD SENSE DISAMBIGUATION ACCORDING TO THE OBJECT ORIENTED APPROACH BY W. BANYŚ

Research on automatic translation has recently become a very popular field of study for linguists. The process of adjusting data collected from language to meet the machine's potential and efficiency requires the knowledge and use of an accurate and effective methodology. The linguist's task is not only to feed data collected from traditional language dictionaries into the computer's memory, but it is also necessary to take into consideration all the relations that hold among the elements being described, as the aim of automatic translation is to enable the system to carry out an accurate and effective translation of texts. The paper is also an attempt to show how the object oriented approach proposed by W. Banyś resolves the problem of polysemy of words in a natural language which is one of the major problems in computer assisted translation. For the computer assisted translation to be exhaustive and effective, a process of disambiguation of a polysemous word should be carried out thus enabling a correct generation of its equivalents in a target language, which is presented on the basis of the English causative verb *open*.

Research on automatic translation has recently become a very popular field of study for linguists. Automatic translation is a very demanding branch of linguistics requiring a lot of patience and skill on the part of a linguist. The process of adjusting data collected from language to meet the machine's potential and efficiency requires the knowledge and use of an accurate and effective methodology. The linguist's task is particularly sophisticated in that it is not enough to feed data collected from traditional language dictionaries into the computer's memory. As the aim of automatic translation is to enable the system to carry out an accurate and effective translation of texts, it is necessary to take into consideration all the relations that hold among the elements being described.

The notion of *meaning* is crucial in automatic language processing. The aim of the object oriented approach is to collect semantic, lexical, syntactic, and morphological information. The idea is to be able to include in the description of a lexical item all the data which derive from a language, i.e. those which are given directly – explicitly – from traditional/paper dictionaries, as well as those that can be brought out on their basis, in an implicit way. The database supplied by traditional dictionaries is then reorganized and additional information which is implicit is added (e.g., lexical hierarchy and semantic relations).

The main objective of this type of language description is to form a polyvalent, lexical database rather than an electronic dictionary. The description in question here may seemingly appear to be redundant in parts, but on the other hand, all the collected data are necessary to form an operating system to be repeatedly used as well as open for introducing new modifications whenever necessary.

The object oriented approach enables the analysis of lexical items from the point of view of an *object* which occupies central position in this type of description. The *object* is interpreted as identifiable element of a real world, which may be concrete or abstract, and what proves its being real is its coming into existence or disappearance. The distinctive features of the *object* are: its structure – *attributes*, its behavior, its modus operandi – *operators* (M. Ayache, A. Flory, 1996: 8)

Each object is included in a class of objects thus constituting one of its elements. Each class includes objects sharing the same characteristic features. The object, thus, is understood as functional not ontological. The object in question here is described from the point of view of all the operations that apply to it, which is the focal point of the analysis being presented here. The object oriented approach focuses on a functional character of the *object* and the way a language expresses extralinguistic objects. This rule constitutes the only criterion that enables the classification of linguistic items. Only a language enables thus understood analysis of objects.

Each noun – an object – is assigned some operations and attributes which are identifiable in its environment in different situations. This approach differs from the predicative-argumentative theory, which focuses in its description on the function (the predicate) in order to proceed to arguments. Thus, the first step of the analysis based on this approach is to concentrate on the predicate as the following shows:

f – *function, predicate*

x – *arguments* which may fill in the positions opened by the predicate,

f => x

Consider one of the predicates of *to settle*, which apart from the objects belonging to the object class <flat> may also involve objects belonging to such object classes as <natural terrain > and <territory>. If we were to seek for its best-suited arguments we should refer to the object class including such elements as, e.g., *region, state territory*, etc. On the basis of the example presented above, we may observe that the traditional predicative-argumentative theory stands in

opposition to the object oriented approach, which emphasizes in its analysis the attributes and typical operations that a given object may perform or that may be performed on the object, thus:

$x \Rightarrow f$

Consider the lexeme *hospital*, which may be assigned the following attributes: *children's hospital*, *general hospital*, *military hospital*, *infectious disease hospital*, etc.

hospital bed, *hospital medical staff*, *hospital room*, *hospital pharmacy*, etc. and the following operations:

open a hospital, *establish a hospital*, *close a hospital*, *to be sent to hospital*, etc.

In the object oriented approach the emphasis is placed on the question: *what are the predicates* (attributes: adjectives, compounds, and operations: verbs) *which exist in the environment of a given object?* In this way a description of the world is formed, a description accessible through a language. The description of a language in question here focuses on the object, as everything that people observe in the surrounding them world consists of objects which are the smallest elements in human perception of the environment and cognitive process.

The approach to the description of language proposed in the present article is based on the dialectical philosophy which is generally understood as a framework of relations that hold between particular elements of a system, taking into consideration in particular those relations that hold between two elements of a system, as well as their mutual influence on each other, in languages represented by the two units.

In the object oriented approach the object's behavior in a language, i.e. highlighting its lexical environment, is the central point of the analysis. Thus, it may be observed that the traditional conception of the description of lexemes based on merely *listing* of their lexical meanings stands in clear opposition to the approach at hand here.

The object oriented approach is open to making changes in the description of a given lexeme, as well as introducing new pieces of information while analyzing a given object. Another advantage of this approach is the fact that each object is viewed as an element which belongs to other classes (superclasses or subclasses). In consequence, each object exists within some set where it has its meaning. Each object possesses its own group of predicates which are assigned to it according to its position in the class hierarchy; its attributes and operations are automatically assigned depending on which subclass it belongs to. This mechanism is called lexical inheritance system, in which each word inherits the distinguishing features of all its superordinates. As the result of thus conducted analysis a correct translation made by a computer is enabled, at the same time eliminating potential unintentional mistakes on the part of a linguist compiling a dictionary.

The object oriented approach also emphasizes the so called *predicates-operations* which make it possible to conduct additional structuralization of operational information, in the same way supplying the dictionary entry with

more detailed description. The operators at hand here are divided into three subclasses (W. Banyś, 2002: 208):

1. *predicators-constructors* – their role is to form an object class or quite the opposite they show the situation in which a given object class cannot appear: *build a hospital, establish a hospital, close a hospital, demolish a hospital*
2. *predicators-manipulators* – they are connected with all the operations that may be conducted by a given class of objects or on a given class of objects: *treat oneself at a hospital, be on duty at the hospital, leave the hospital*
3. *predicators-accessors* – they supply a linguist with the information connected with the behavior and structure of a class of objects: *hospital admits patients, hospital is situated*

For the analysis to be complete and correct the exhaustive listing of all the operations applying to a given object should be supplied, and thanks to the lexical inheritance mechanism it is possible to add other operations which constitute a part of the description of a superclass (superordinate).

Consider the description of the noun *voie – szlak, route – szlak* placed in the frames of the object oriented approach. The description is presented in Polish, French and English.

Table 1

PL szlak	FR voie
[Morfologia :]	[Morphologie :]
[Kod morfologiczny :]	[Code morphologique :]
[Składnia :]	[Syntaxe :]
[Kod syntaktyczny :]	[Code syntaxique :]
[Klasa obiektów :]	[Classe d'objets :]
[Definicja :] <i>droga naturalna (np. rzeka) lub trakt wytyczony przez chodzenie, jeżdżenie; droga, którą ktoś przebył lub ma przebyć</i>	[Définition :] <i>milieu emprunté pour se déplacer, pour transporter des marchandise</i>
[Synonimy :]	[Synonymes :] <i>route</i>
[Super-klasa 4 :] <i>przestrzeń</i>	[Super-classe 4 :]
[Super-klasa 3 :] <i>część przestrzeni</i>	[Super-classe 3 :] <i>espace</i>
[Super-klasa 2 :] <i>pas ziemi</i>	[Super-classe 2 :] <i>portion de l'espace</i>
[Super-klasa 1 :] <i>droga naturalna</i>	[Super-classe 1 :] <i>milieu</i>
[Domena 1 :] <i>ruch drogowy, droga</i>	[Domaine 1:] <i>circulation, route</i>
[Atrybuty :]	[Attributs :]
<i>kierunek szlaku</i>	<i>direction d'une voie</i>

<i>skrzyżowanie szlaków</i>	<i>croisement de voies</i>
<i>szlak handlowy</i>	<i>voie de commerce</i>
<i>szlak kolejowy</i>	<i>voie ferrée</i>
<i>szlak komunikacyjny</i>	<i>voie de communication</i>
<i>szlak lądowy</i>	<i>voie de terre</i>
<i>szlak leśny</i>	<i>voie forestière</i>
<i>szlak morski</i>	<i>voie maritime</i>
<i>szlak morski</i>	<i>voie de mer</i>
<i>szlak powietrzny</i>	<i>voie aérienne</i>
<i>szlak rzeczny</i>	<i>voie fluviale</i>
<i>szlak wodny</i>	<i>voie d'eau</i>
<i>szlak żeglowny</i>	<i>voie navigable</i>
[Część-całość :]	[Partie-tout:]
[Operacje :]	[Opérations:]
[Operacje : konstruktor :]	[Opérations : constructeur :]
<i>utorować sobie szlak</i>	<i>se frayer une voie</i>
<i>wytyczyć szlak</i>	<i>tracer une voie</i>
<i>zagrodzić szlak</i>	<i>obstruer une voie</i>
<i>zamknąć szlak</i>	<i>boucher une voie</i>
<i>zamknąć szlak wodny</i>	<i>aveugler une voie d'eau</i>
[Operacje : manipulator :]	[Opérations : manipulateur :]
<i>dostrzec szlak</i>	<i>discerner une voie</i>
<i>podążać szlakiem</i>	<i>suivre une voie</i>
<i>uszczelnić szlak wodny</i>	<i>calfater une voie d'eau</i>
<i>wskazać szlak</i>	<i>indiquer une voie</i>
<i>zawrócić ze szlaku</i>	<i>détourner de la voie</i>
<i>zejść ze szlaku</i>	<i>quitter une voie</i>
<i>zgubić szlak</i>	<i>perdre une voie</i>
<i>znaleźć szlak</i>	<i>trouver une voie</i>
[Operacje : akcesor :]	[Opérations : accesseur :]
<i>szlak prowadzi dokądś</i>	<i>voie conduit quelque part</i>
<i>szlak prowadzi dokądś</i>	<i>voie mène quelque part</i>
<i>szlaki się krzyżują</i>	<i>voies se croisent</i>
[Ekstensje :]	[Extensions :]

PL szlak	ENG route
[Morfologia :]	[Morphology :]
[Kod morfologiczny :]	[Morphological code :]
[Składnia :]	[Syntax :]
[Kod syntaktyczny :]	[Syntactic code:]
[Klasa obiektów :]	[Class of objects :]
[Definicja :] <i>droga naturalna (np. rzeka) lub trakt wytyczony przez chodzenie, jeżdżenie; droga, którą ktoś przebył lub ma przebyć</i>	[Definition :] <i>a way to go or send something from one place to another ; a fixed path or course</i>
[Synonimy :]	[Synonyms :] <i>trawl, path, track, way</i>
[Super-klasa 4 :] <i>przestrzeń</i>	[Super-class 4 :]
[Super-klasa 3 :] <i>część przestrzeni</i>	[Super-class 3 :] <i>expanse</i>
[Super-klasa 2 :] <i>pas ziemi</i>	[Super-class 2 :] <i>a piece of land</i>
[Super-klasa 1 :] <i>droga naturalna</i>	[Super-class 1 :] <i>road</i>
[Domena 1 :] <i>ruch drogowy, droga</i>	[Domain 1:] <i>road traffic, road</i>
[Atrybuty :]	[Attributes :]
<i>skrzyżowanie szlaków</i>	<i>route intersection</i>
<i>szlak dojazdowy</i>	<i>access route</i>
<i>szlak górski</i>	<i>mountain route</i>
<i>szlak handlowy</i>	<i>trade route</i>
<i>szlak jedwabny</i>	<i>silk route</i>
<i>szlak kolejowy</i>	<i>train route</i>
<i>szlak komunikacyjny (ciąg)</i>	<i>communications route</i>
<i>szlak lądowy</i>	<i>overland route</i>
<i>szlak leśny</i>	<i>forest route</i>
<i>szlak morski</i>	<i>sea route</i>
<i>szlak nadbrzeżny</i>	<i>coastal route</i>
<i>szlak nawigacyjny</i>	<i>shipping route</i>
<i>szlak okrężny</i>	<i>indirect route</i>
<i>szlak powietrzny</i>	<i>air route</i>
<i>szlak przemytu narkotyków</i>	<i>drug route</i>
<i>szlak rowerowy</i>	<i>cycle route</i>
<i>szlak rzeczny</i>	<i>river route</i>

subclasses (subordinates) organized in sets in the shape of thesaurus constitutes the integral part of the description of meaning, e.g.:

ROUTE

[Super-class 3 :] *expanse*

[Super-class 2 :] *a piece of land*

[Super-class 1 :] *road*

[Domain :] *road traffic, road*

The approach proposed by W. Banyś (2002, 2005) is strongly connected with that proposed by G. Gross in that they both share the same point of view underlying the influence of attributes and operations existing in the lexical item's environment on the structure of a class of objects. However, G. Gross proposes an exhaustive listing of all the uses of a language form singled out on the basis of its relations to operators, whereas the object oriented approach aims at accounting for heuristic rules concerning the functioning of words and enabling generating meanings of a given word in all its possible uses.

Polysemy of words in a natural language is one of the major problems in computer assisted translation. For the computer assisted translation to be exhaustive and effective, a process of disambiguation of a polysemous word should be carried out thus enabling a correct generation of its equivalents in a target language. The approach at hand here aspires to such a description of language which would be easy to render into the language of computer programming. Thus, the object oriented approach makes use of research and accomplishment of modern computer technology providing that the proposed method of the analysis of lexical items based on the object modeling may be easily subjected to translating into object-oriented programming languages applied in computer science.

The following are the elements taken into consideration in the process of word disambiguation (WSD) (W. Banyś, 2005: 59):

- different parts of speech,
- synonyms, antonyms and syntactic-semantic patterns,
- various predicative-argumentative structures including semantic restrictions of arguments implied by predicates,
- selectional lexical restrictions, e.g. different types of abstract nouns belonging to different object classes in one of the languages,
- all the above mentioned information is additionally supplied with the word's equivalents in a target language.

In the process of disambiguating verbs a very precise specification of object classes including the whole set of arguments together with their listing is taken into account. In this way, all the members of a class of objects activated by a given predicate are shown. The focal point in the analysis of verbs as part of the approach at hand here is occupied by the object or the whole class of objects and their characteristics. Thanks to these sets of objects, it is possible to choose

a proper equivalent of a given verb in a target language. Selectional restrictions, such as the following ones: in/animate, non-/human, concrete/abstract, etc., allow us to describe arguments from the point of view of their semantic features connected with the predicate. Sometimes it proves that such a description is not satisfactory and it has to be specified in a greater detail in order to find a correct translation of a given word. If such is the case, the object classes are more restricted and very often assigned to the analysis of only one verb, corresponding to its complexity and the transfer of its meaning to another language, e.g., *take a means of transport (taxi, bus, etc.)* – PL *pojechać czymś*
take somebody's measurements (pulse, temperature, blood pressure) – PL *zmierzyć coś*

It is never known at the beginning of the analysis of a given verb how many object classes will be assigned to it, the factor that influences the number of the object classes is the number of the verb's equivalents in the target language. The analysis of each verb enables us to observe the fact that there are as many meanings of the verb as its equivalents in the target language. Distinguishing different meanings of a given verb proposed by traditional dictionaries has a different nature from the one based on the approach at hand here, which may be observed on the examples supplied by the article. As a result of the analysis proposed in the present article, a contrastive operational description of a verb should be formed, requiring much more attention and effort on the part of a lexicographer than in the case of compiling a traditional monolingual dictionary.

According to W. Banyś (2002, 2005), thanks to the phenomenon of inherent semantic features, words obtain a monosemic character and in their definitions one may find features that they all share, that are common for them. This approach is very helpful in the analysis of a given word as well as in its understanding. Consider the following examples:

SEND – ENG *to make somebody/something to be taken somewhere without going or taking them oneself*

WYŚLAĆ – PL *skierować coś/kogoś dokądś*

It should be pointed out that the number of meanings of a given word distinguished on the basis of the approach at hand here may vary considerably from the one offered by traditional dictionaries. It happens so because computational processing which is employed in the approach in question here depends basically on the translations of the word's meanings and its object classes, which are accessible *through* the word. Thus, the lexicographer's work should be adjusted to meet the needs and aims that are to be reached. On account of this, it is absolutely necessary to specify the syntactic characteristics implied by a given meaning accurately and in great detail. So, in the analysis of each polysemous word (verb, adjective, adverb, etc.) the following procedure should be applied:

1. the definitions of a given lexeme are collected from different traditional dictionaries – the richer the definitions are the easier is the analysis to be carried out based on the object oriented approach,

2. the meaning of the analyzed word is then adapted to the number of its translations and object classes formed,
3. for each of the meanings a syntactic-semantic pattern is proposed, illustrated by examples coming from dictionary definitions exemplifying its particular uses, then we enrich the analysis with context supplied by the web corpus,
4. to complete the description, a table presenting all the distinguished through the analysis syntactic structures in both the languages, i.e. the output and target languages, is formed.

Summing up, it seems worth pointing out that what is of the greatest importance in the object oriented analysis is the meaning of a disambiguated lexeme and its appropriate translations into a target language. In consequence, it seems important to underlie the fact that each use of a polysemous element is determined by its syntax, i.e. its combinatorics.

The starting point in the process of assigning the equivalents of a lexeme in a target language is based on the appropriate specification of the patterns of arguments, which may differ among different uses of a given lexeme (it concerns any change which influences the pattern and translation which must be included in the description).

As it was mentioned previously, the solution to the problem is connected with the characterization of arguments in terms of the semantic features of the predicate by means of selectional restrictions *in/animate*, *non-/human*, *concrete/abstract*, and in the majority of cases even more restricted, depending on their translations into a target language. Thus, lexemes are described in a very strict way, the type of a noun filling the position of an argument is defined in a very precise way as well. The class of objects is named by the use of the so-called classifying noun, e.g., <place>, <an article of furniture>, etc.

A class of objects constitutes a list of words that are semantically homogeneous with reference to their syntactic behavior. As it is emphasized by G. Gross, what is meant here is semantics controlled by syntax. In such a way, object classes make it possible to describe the character of arguments in a very precise way and in accordance with a given predicate. In consequence, it is possible to list all the elements included in a class of objects and next recognize automatically different uses of a given verb or any other predicate.

In our analysis of the verb *open* the number of object classes is estimated on the basis of its semantic nature and its Polish translational equivalents, as it was presented in the previous sections of this article.

Consider the analysis of the verb *open* carried out on the basis of the object oriented approach based on the selected examples from the doctoral thesis by A. Drzazga (2012):

1. *rozsunąć*

X – [ANMhum] – *open* – Y – [CONCR:<a piece of cloth used to covering windows>]

*This will allow enough fabric to be pulled back when you want to **open** your outdoor curtains or drapes.*

*Then she **opened** the curtain ever so slightly.*

2. rozsunąć się

X – [CONCR<a piece of cloth used to covering windows>] – *open*

*The drapes that **opened** and closed electronically were awesome.*

3. otworzyć

A. X – [ANMhum] – *open/open up* – Y – [CONCR:<a place where business is run>;<a structure or building of public utility>;<a public event>;<a paper object containing written or printed information>;<a bank account>;<a hand>;<an object that can be folded and unfolded 1 >;<pores>]

*Sara had recently **opened** an office in Genoa.*

*Philippine consulate had offered to **open up** stalls at the events.*

*President Mitterand formally **opened** the Channel Tunnel.*

*Tottenham stuns Chelsea to **open up** title race.*

*Tony Lloyd, local MP and Labour Party Shadow spokesman on trade and industry, **opened** a careers convention at Loreto Sixth Form College, Moss Side, Manchester, during October.*

*He **opened** the book, and turned the thin pages.*

***Open up** this Bible and read devotions written by teens like you who are dealing with the same stuff.*

*Before Christmas, my wife tried to **open** an account at the local high street bank.*

*You generally need to live in the U.S. to **open up** a bank account at a U.S.*

*When should I **open up** my hand/fingers to let the ball up into the air?*

*And every time I **open up** the umbrella with the kisses, I think of you, (...).*

*Why is it considered bad luck to **open** an umbrella indoors?*

*Tweeze after shower or use a hot towel to **open** pores.*

B. X – [ANM] – *open/open up* – Y – [ANM; CONCR:<a container>]

*Donleavy **opened** his briefcase and placed an envelope on the bed.*

***open up** a package/the boot of a car [OALDOCE]*

C. X – [ANM; CONCR:<an instrument opening or closing something>] – *open* – Y – [CONCR:<a movable barrier that closes or opens>;<a kind of fastening>]

*I **opened** the door of the cab, and got out.*

*What doors has this key **opened**?*

D. X – [CONCR:<a flow of air>] – *open* – Y – [CONCR:<an opening in a structure>]

*It was obvious, on inspection, that a draught had **opened** the door.
The wind **opened** the door (...) and blew cold rain all over the floor.*

E. X – [ANM; ABSTR] – *open/open up* – Y – [CONCR:<a wound>]

*Thinking about the possibility **opened** old wounds.
My cat **opened** her wounds from being declawed.*

F. X – [ANMhum; CONCR:<an armed unit>] – *open* – Y – [CONCR:<fire>;<fusillade>]

*At the same instant the rest of the posse **opened** fire on the thicket.
All the fishermen had rifles, and they now **opened** a general fusillade.*

G. X – [ANMhum; INANM] – *open/open up* – Y – [CONCR:<an area>; ABSTR:<economy>]

*Will prosecution of pirates **open** country to revenge attacks?
Vietnam wants to **open** market to private telecom providers.*

H. X – [ANMhum; CONCR:<computer environment1>] – *open/open up* – Y – [CONCR:<computer environment2>]

*I can't **open** Internet explorer, my computer and folders.
Why can't the Firefox browser **open** some Web sites that IE can?
In this video, I am demonstrating how to **open up** a wps file without programs.*

I. X – [ANM:<heavenly being>] – *open* – Y – [CONCR:<heaven>]

*Jesus Christ has **opened** heaven for you.
God **opened** heaven to Jacob, not only to give him a place of refuge and peace,
but to offer him the blessing of dwelling in intimate friendship with the living God.*

J. X – [ANMhum] – *open/ open up/open out* – Y – [ABSTR:<verbal communication>]

*Mr Lang **opened** the interview by answering questions.
Ministers need to **open up** debate on wave of reform and the latest Development Control articles and jobs on PlanningResource.
He tried to **open out** the conversation. [MED]*

4. *debiutować*

X – [CONCR<shares>] – *open*

*Chinese shares **opened** nearly 8 percent higher on Thursday morning, boosted by an overnight stock trading tax cut.*

*Indian shares **opened** up 0.7 percent on Wednesday and extended gains to 1 percent, helped by firmer Asian markets.*

*Taiwan shares **open** higher.*

*Europe shares **open** lower.*

5. *mieć premierę*

X – [ABSTR<a theatre performance>] – *open*

*What Orson Welles radio play **opened** in the Meridian Room of the Hotel Park Plaza?*

*In 2006, the play **opened** on Broadway, where audiences and critics ate it up.*

*The play **opened** on June 16, 1902, at Chicago's Grand Opera House to critical acclaim.*

*The play **opened** in February 2005.*

The verb *open* belongs to the group of verbs that have causative and inchoative uses. Consider the following pair of sentences represented by Pattern 1 and Pattern 2:

1. I open the curtains. (causative sense)

2. The curtains open. (inchoative sense)

Patterns 1 and 2 are typical examples of the verb *open* having senses in causative and inchoative uses, respectively. Observe the following pair of sentences:

Then she opened the curtain ever so slightly.

The drapes that opened and closed electronically were awesome.

The object class <a piece of cloth used to covering windows> fills the position of the object X in the inchoative use of the verb *open*, while in case of the verb's causative use the class of objects fills the position of the object Y, thus changing its role from the agent to the experiencer of a given situation.

It seems that the most common Polish translational equivalent of the verb *open* is *otworzyć/otwierać*, Patterns 3A – 3J, but this single meaning is represented by a big number of semantic-syntactic patterns in which the positions of both the subject X and the direct object Y are filled by nouns belonging to a wide range of semantic categories, which may be observed on the basis of the selected examples of syntactic-semantic patterns presented above. The meaning of the verb *open* represented by Patterns 3A – 3J is *to cause not to be closed* (PWNO). In many syntactic-semantic patterns it may be observed that the position of the subject X is filled by nouns denoting human beings, by which we mean here personal nouns and pronouns as well as collective nouns (denoting a unit consisting of

a group of people who are gathered together to represent an institution, or which refer to a group of people who have a special relationship with one another, or are brought together for some particular reason). The corpus material has also supplied us with some examples of nouns which are used metonymically, e.g.: *Ireland opened the first commercial monorail in 1988.*

The object classes that were singled out throughout the analysis of the verb *open* range from one-element classes, such as e.g. <a bank account> or <pores>, to such object classes as, e.g. <a place where business is run> or <a structure or building of public utility> which include a large amount of lexical items.

The examples of syntactic-semantic patterns of the verb *open* presented above constitute just a small part of all the patterns ascribed to this verb. In the course of the analysis we have selected as many as twenty different patterns, each of different complexity. The above described sample is an attempt to show how the process of word sense disambiguation is carried out on the basis of verbs. Among the patterns presented in this article there are ones which are pretty simple, i.e., consisting of just one or two object classes in the position of the subject and/or object (Patterns 1, 2, 4, 5), as well as very complex ones where one translational equivalent is ascribed to a number of syntactic-semantic patterns which include restricted object classes filling both the positions of the subject and the object (Pattern 3). But, the most important observation that we hope may be made on the basis of the small fraction of the analysis at hand here is the fact that the proper selection of the elements included in different object classes accompanying the verb constitute the decisive factor in the process of word, here verb, sense disambiguation, thus allowing the lexicographer for the proper selection of its translational equivalents in the target language.

Unfortunately, the description of the selected patterns is limited because of the restrictions on the length of the article.

We hope that the theoretical background supported by the examples will help to understand the process of word sense disambiguation placed in the frames of the object oriented approach.

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