The evolution from standalone dictionary ASIS®
to interactive public web-dictionary trishin.net

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Abstract

The article presents the largest Russian dictionary of synonyms (similar meaning words), whose author is Trishin V.N. since 1992. The appraises of assets of such large-scale concerns as AvtoVAZ, Norilsky Nikel, SurgutNefteGaz etc, that Trishin made alone with the aid of ASIS® and data entries from some assistants, may indeed be treated as the Data Intensive Domain. Later when the tasks of adequate appraisal of large-scale enterprise assets suddenly lost their topicality, development of the Unabridged dictionary of Russian synonyms acquired its own meaning. In 2016 Yu.V Kuyanov. has implemented the network version of the dictionary trishin.net as narrated in this joint article. In the online version the highest speed of response to interactive user requests is achieved. This is an attempt to continue V.I. Dahl's dictionary on the modern living uncensored language basis with words from virtually all branches of knowledge added. This dictionary catalog is partly a glossary, since it includes almost all definitions from glossaries and specialized dictionaries, and they are related by synonymous ties. Sayings, proverbs, eloquent expressions, etc. are also included in the dictionary.

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1 Background of ASIS® system and its vocabulary

Appraiser and auditor help system ASIS® (Appraiser Support Info System) is designed to handle large volumes of information and allows you to solve various problems in the analysis, appraisal and audit of large property complexes, increasing appraiser productivity ten times compared with traditional methods of work.

ASIS® system is written in Visual FoxPro language and includes elements of artificial intelligence. It implements almost all existing techniques and basic calculation data for evaluation of both movable and immovable property objects using cost approach. Problems solved in the framework of this system, were described in 11 articles, the first of which was published back in 1995 [1], and the most complete technical realization of these tasks can be seen in the article [2].

ASIS® system is protected by the copyright law (certificate of state registration number 960056, 1996, developers: candidate of Phys. and Math. Sciences V.N. Trishin and candidate of Tech. Sciences M.V. Shatrov). Work on ASIS® system started back in 1990 at "Informelectro" Institute within the framework of the contract № 1 between the Ministry of Property and "Informelectro" (where V.N. Trishin worked as "Expert systems" Department supervisor) to establish a Database of privatized enterprises of Russia, together with the State Statistics Committee of the RSFSR [3].

According to the program of privatization (1991), developed by the Ministry of Property chief executive officer M.D. Maley (previously - Director of "Informelectro" Institute), privatization of enterprises should have been carried out similarly to privatization in Eastern Europe through the use of personal privatization checks and at a fair, objective cost. When a team of "young reformers" took over management of the Ministry of Property in November 1991, state funding of "Informelectro" work for the Ministry of Property had been discontinued. They introduced voucher privatization course: enterprises could be privatized at 2-3 times undercharged prices and preferential state credits for "inside" privatisers were issued.

In 1992, the developers of ASIS® system V.N. Trishin and M.V. Shatrov took jobs with "Ernst and Young" company, where they have been practicing enterprise appraisal and finalizing the software. As part of this work they created software for automatic translation from Russian into English of fixed asset (buildings, machinery and equipment, transport, etc.) inventory records, which could be useful to foreign appraisers; as well as synonymous dictionary of technical terms for better identification of appraised objects (for this purpose not only the words themselves but also their stems together with codes of 19 reference words, which influence conjugation of verbs, declension of nouns, adjectives and so on, in Russian language, were used). In the future, this dictionary has been isolated into a separate complex, in the late 90-ies its lexical database has been significantly expanded using Visual FoxPro, and since 2000 the dictionary was placed on the Internet in an unencrypted form. Lexical database of the dictionary of about 324,000 records has been "borrowed" with misspellings by many anonymous authors of various "comprehensive" dictionaries. Therefore, since 2010 public access synonymic relations of the dictionary became encrypted. The dictionary is protected by copyright law (rightholder V.N. Trishin, certificate of state registration number 2013616013, 2013). Currently, this version of the dictionary is used by V.N. Trishin as a working tool for lexical database and synonymous relations replenishment. At the same time electronic "shortened" version 7.0 comprising 526,000

words and phrases with 1,949,000 encrypted synonymic relations is posted on the website trishin.ru as a demo version.

As of April 2016 the complete version of the dictionary catalog comprised more than 580,000 words and 2,129,000 synonymic relations. Dictionary update is in progress, and this work should be mainly completed in 2017 at about 610,000 records.

In 2011-2013 candidate of Tech. Sciences S.K. Ivanov implemented and posted on the website trishin.ru the electronic version of the dictionary comprising 480,000 words with encrypted synonymic relations in a more advanced software shell (written in C# in Microsoft Visual Studio 2008 development framework) with interface and user guide in 4 foreign languages. The system allows you to perform almost any query, including those asked in Russian TV show "Pole Chudes". This version of the program could be an electronic dictionary of the Russian language for foreigners, however the letter describing its advantages had been sent to the Presidential Council on the Russian language (and the expansion of the influence of the Russian language abroad is one of the tasks of the Council) and was not yet replied to. Therefore, the work on this version of the dictionary has been suspended.

2 What is a synonym and a synonymous relationship

If someone tells you:
"You misspelled a word!" – respond them:
"It always looks so in my spelling" (Kozma Prutkov).

"Synonyms (from the Greek synonymos – same name) are the words sounding different, but identical or similar in meaning, as well as syntactic and grammatical constructions with matching sense. There are complete ("языкознание" — "языковедение") and partial synonyms ("road" - "way", "дорога" — "путь") (Modern Encyclopedia, 2000).

Please note that degree of sense similarity is a qualitative category, that's why opinions whether the actual words (phrases) are synonymous or not, may differ.

Taking into account, first of all, that dictionary catalog of V.N.Trishin is meant for applied use in computer text processing, we use a more general term "synonymous relation", namely, if one word (phrase) in a sentence can be replaced by another, while at least one meaning of the phrase is saved, we can say that these words (phrases) are linked synonymously. Therefore, for example, the names of 5656 minerals (Abelson, Abernathy, Abikh, etc.) are synonymously associated with the term "mineral" in the dictionary. This makes it possible to search for a particular word in the dictionary through a generalized concept, especially when the user has forgotten the name of the needed word, for example, the query (in the full version 7.1) for the word "fish" will give an alphabetical list of 873 names of various fish, for the word "plant"- 4845, for "song"- 168, for "singer"- 122, for "bard"- 48, for "musician"- 164, for "poet"- 88, for "graphomaniac"- 42, for "girl"- 138, for "explosives"- 234, for "enzyme" - 576, etc. That is, the dictionary is a guide in practically all fields of knowledge. This dictionary catalog is partly defining, since almost all interpretations from defining (and specialized) dictionaries are available in it, and they are synonymously related with the words being defined. Word-combinations (interpretations, proverbs, sayings, etc.) make about 19 percent of the dictionary.

The proposed dictionary has several features.

1. No separation of homonyms, which leads to the fact that in one group of synonyms for the word, say "стан " there are words "лагерь", "блюминг" and "талия". For an educated native speaker it is not difficult, but for a foreigner who wants to delve into Russian language, the lack of separation of homonyms would certainly be problematic. This somewhat limits the possibility of using the current version of the dictionary in computer (automatic) processing of Russian texts.

For the same word "стан" it would be correct to have multiple entries, for example,

Стан 1 => блюминг, трубопрокатник, листопрокатник, ...

Стан 2 => становище, стойбище, станица, бивуак, лагерь, ...

Стан 3 => торс, талия, поясница, ...

In future versions of the dictionary, perhaps, such a division would be provided, and the dictionary will consist of synonymous groups associated with some "concepts", which will be given either a definition from glossaries, or a so-called "entry point", a word chosen from the group of synonyms that most closely (strictly) defines the concept that combines the synonyms.

2. Lack of separation of synonymous and genus-species relations. Genus-species (whole-single) relationship is, generally speaking, a subject of thesauri. Synonymous relation is an equivalence relation, which breaks all the words into equivalence classes. And genus-species relationship is relationship of partial nature. Ideally there should be a tab for synonyms, for parent and child terms. This division is also planned to be carried out in the dictionary program after the completion of its update.

3 Standalone tools

A "working tool" for developing a dictionary catalog is version 7.1 of the dictionary written in Visual FoxPro. At updating the dictionary base with a new word (phrase) you want to select the part of speech and the reference word from 19 words proposed by the system, according to which the entered word declines (conjugates). Thus, it is possible to embed the dictionary database to the various search engines and analyzers of Russian texts. In ASIS® system it allowed to organize semi-automatic search of similar meaning items among the appraised inventory units of large enterprises in the analogue databases of machinery and equipment of ASIS® system with subsequent automatic appraisal of these units, as well as the assignment of codes to the inventory units according to the state classifier of fixed assets (OKOF). In large enterprises there may be several hundreds of thousands (or even millions) of appraised inventory units, while ASIS® system analogue database has about 200,000 and the classifier OKOF includes over 11,000 groups of machinery and equipment, transport and so on. And without synonymous dictionary, coding of inventory unit names, analogues, group names in OKOF classifier, cost approach appraisal of the property complex of a large enterprise would constitute a very labor-intensive task. And the system ASIS® «understands», for example, that "pitch boiler" from the appraised equipment is perhaps the pot for boiling asphalt from the base of analogues.

If for a new introduced word (phrase) there have already been words (phrases) that have been recognized as "synonyms" by Trishin or different authors of synonymous (or specialized) dictionaries, these words (phrases) were linked by a synonymous relationship. Otherwise a missing synonym would have been introduced into the dictionary with subsequent organization of synonymous relations. All these operations took a few seconds of practical work of the dictionary author.

In addition, when creating the dictionary several utilities were used:

A) Backlinks allocation software for new synonymous relations;

B) Software to search and delete "doubled" synonyms in the dictionary base (in certain situations, vocabulary program sometimes missed "doubling");

C) Synonymous relations encryption software;

D) Software for selection of words that are missing in the dictionary in any text (typically from the Internet). The found "new" word in the selected text would be analyzed on the basis of other sources, and Trishin would take a decision whether to include the word in the dictionary or not. As a rule, candidate words from the analyzed texts were rejected because they were misspellings of the words already known from the dictionary.

4 Sources of replenishment of word and synonymous relations database

In compiling the dictionary various published dictionaries were used, including spelling, synonymic, idiomatic synonymic, defining, starting with the "Dictionary of Russian Language of the XVIII century" and "Explanatory Dictionary of Russian Language" by V.I. Dahl (completely included in 7.1 dictionary version), (i.e. approximately for the last three hundred years), church Slavonic words, foreign words, unusual words dictionaries, "Dictionary based on the materials of press and literature of the 90-ies of the XX century", slang dictionaries (except obviously non-normative lexicon), as well as specialized dictionaries in almost all fields of knowledge. In addition, newspapers, magazines, Internet, dictionaries of Yandex and Google search engines were actively used to update vocabulary, namely by analyzing the results of their automatic word prompters (checked according to other sources), because even in the largest printed dictionaries tens of thousands of modern words widely distributed in everyday life and press are missing, for example: паранормальщина, элитарщина, аномальщина, слововыражение, покалечение, примаскированный, доследственный, спецлаборатория, промпроизводство, медсправка, педколледж, зоопарикмахер, внеофисный, предшкольный, межкорпоративный, штрафплощадка, видеопоиск, рассинхронизировать, трудносоединимый, Единая Россия, ЕдРо and so on.

The mechanism of cross-references, implemented in the dictionary, dramatically increases the number of synonyms for words. Here is an example. In slang dictionaries one of the synonyms to the word "оттянувшийся" is usually the word "отдохнувший", but there is no separate dictionary entry for the word "отдохнувший" in slang dictionaries. Moreover, none of synonymous dictionaries included the word "оттянувшийся" as a synonym to "отдохнувший". Other examples: «схлестнувшийся» — повздоривший, «сдавший» — «выдавший»,

«сдвинутый» — «ненормальный», «содравший» — «укравший», «убойный» — «замечательный» etc. The words «ассистент», «помощник», «десница» are defined in the dictionary as the phrase «правая рука». However, any dictionary has not the word «правая рука» in it. Electronic (online) dictionary catalog sets all possible parallels: not only the words and expressions of modern language, but also obsolete words, vernacular, slang, regional, professional speech and words, etc. can be synonymous in the dictionary.

English-Russian dictionaries of various subjects (scientific, programming, financial, medical, automotive, physical, chemical, sports, law, construction, biological, etc.) have been substantially used for the replenishment of synonymous relations, namely different translations of English words from word groups of these dictionaries were usually considered as synonymously related.

5 Historical parallels

Vladimir Dal graduated from St. Petersburg Sea Cadet Corps and worked as an officer in the Navy for a few years, then graduated from the Medical Faculty of Dorpat University and worked for 10 years as an army surgeon, then as a high official - the actual state councilor (Major-General according to the military table of ranks); for many years ethnography and linguistics were his hobby. For 53 out of 71 years he had been collecting Russian words, expressions, proverbs, tales and songs. He offered these materials to the Imperial Academy of Sciences for publication, but the Academy refused him any support. Himself, as a "self-taught" linguist he had to compile the collected material and publish the "Explanatory Dictionary of Russian language" (1863-66 years), which is today known to every educated Russian person. While the names of Dahl's contemporaries, top scientists-lexicographers of the time, Academicians V.A. Polenov, A.K. Vostokov, M.E. Lobanov, Y.I. Berednikov, J.S. Kochetov, are unfortunately not likely to be recalled by every modern scholar, with all due respect to their works. In Dahl's dictionary there are around 200,000 words, and this dictionary is sometimes called Russian Bible, while the Bible itself has about 13,000 words.

V.I. Dahl wrote about the isolation of the written language from the living Russian language: "Living vernacular language keeps in itself the spirit of lively freshness that gives language durability, strength, clarity, integrity and beauty. That's why it should serve as a source and a treasury for the development of educated Russian speech".

V.I. Dahl also wrote about the complexity of word order selection in the dictionary - alphabetical or word-root? In alphabetical method, as he wrote, "I cannot find the word, which I do not have; I cannot see a row of the closest (akin) words, to get comfortable with the basic meaning of the words with this root; I cannot find the needed expressions under a common, generic term, and look back at the laws and order of word derivation to comprehend my speech ... - all is spread out apart; basically, it is not a dictionary ... it is a list, a collection of words ... without connection and meaning, intended for a very limited use ...", "The second method, word-root, is very difficult in practice, because the knowledge of roots itself makes a science, and requires examination of all akin languages, not excluding obsolete. In addition, this method is based on a sandy foundation, where you can hardly avoid far-fetched conclusions. Moreover, word search by word-root assumes that author and reader share the same views and beliefs about attributing particular words to particular roots... Therefore, a distinctive, voluminous guide is needed, and you have to look for every word twice, which is bothering and tiring."

Dahl grouped words with related sense by families and instructed where to find every needed word in alphabetical order.

In the given online dictionary, as well as in its electronic form, a developed query system allows to easily find the desired word, compared to paper dictionaries, and even helps to carry out different types of philological research.

This dictionary-reference book is an attempt to continue V.I. Dahl's dictionary on the basis of modern living uncensored language (except obscene lexics) with the inclusion of the words and phrases from a variety of disciplines, from Astronomy to Japanese painting. So it is a merged dictionary of the Russian language, the need for which had been mentioned by A.S. Shishkov and V.V. Vinogradov [6].

The dictionary did not evoke any response from the representatives of the "official" lexicographical science, printing articles based on the dictionary [6] was denied in 2 journals of the RAS for absurd reasons. This is not surprising, because Russian "unnatural" sciences are often greatly clannish and the value of scientific work is determined by its specific use for some scientific clan; and if the author of such work does not belong to any clan, his scientific work itself is usually hushed up, refer to [4].

Electronic versions of the dictionary are described in the articles [5-7].

6 The idea of a web-dictionary

In March 2015 the authors came to the conclusion about the necessity to develop a web-dictionary. By this time, online dictionaries by anonymous authors, who violated copyright and "borrowed" the available word base of unencrypted Autonomous dictionary ASIS® 6.0, 2010 or earlier (see above), appeared on the Internet. The fear that the dictionary database available on the Internet may be even more vulnerable to unauthorized copying, persisted for a long time.

But then it became clear that the author of the dictionary has an undoubted advantage, every day working on his product and knowing where and how to find the words and word-combinations that are missing in the dictionary. In addition, the full version of the dictionary may not be placed on the Internet without checking reliability of its protection, until the time comes. After all, even a decade old version of the dictionary catalog has no analogues on the Internet in its composition and the number of synonymous relations.

The authors had to choose the appropriate hardware and take full advantage of it.

It was important from the outset to provide sufficiently rapid, convenient and reliable technology for updating the dictionary database on the server, as it may be required at any time.

7 Basic principles of implementation

The first thing a server software developer needs, is free, not limited by any provider add-ons access to server file memory. A common solution to this is providing developer with admin

rights. Setting up FTP to connect the developer's computer with its allocated server resource is the optimal solution, allowing the developer to carry out most of the work "home-based".

The second thing you need is active PHP on the server, desirably not subject to frequent updates, which may sometimes force making changes to developer's reliably running server software.

And the third is DBMS compatible with the server's PHP, which is MySQL in our case.

The fundamental point is not to compel Trishin to give up out-dated standalone instruments, which he mastered during many years of work. At each iteration of the dictionary two large spreadsheets serve as input data for the server software developer. These are two files in DBF format, which are the result of Trishin's standalone tools' final work.

A major shortcoming of FoxPro, successfully corrected in MySQL, is inability to use variable-length text fields, which led to curiosities in the process of dictionary development. For example, the word of the Russian language

тетрагидропиранилциклопентилтетрагидропиридопиридиновые

(tetrahydropyranylcyclopentiltetrahydropyridopyridinovyye) required 55 letters for its entry in the word table, rather than 50 as envisaged in the long used version of the Autonomous dictionary.

The situation was further aggravated when the dictionary database was supplemented by idioms, definitions, etc. used as synonyms.

According to the results of a separate study their share does not exceed 19.0%, but most of them are less than 50 letters. With this in mind, word field of the standalone dictionary had to be extended to 200. In MySQL DBMS it is a variable length field, and its value does not need to be supplemented by "trailing" spaces.

Thus, the set of FTP client program on the developer's computer, PHP and MySQL on a rented server are all the tools a server software developer needs. The author of software complex also used his knowledge and professional experience in the application of object-oriented high-level JAVA language and its extensive and well-described object library. Knowledge of HTML, CSS and JavaScript was also required, as PHP Interpreter on the server sends codes in these languages to the client computer.

It is important that relational database of word tables and synonymous relations on the server is properly arranged to speed up SQL queries and receive multiple results in a non-random manner. Carrying out arranging at the request of every dictionary user would lead to a significant slowdown in response to his/her (their) interactive queries.

8 Creating of conversion technology from FoxPro to MySQL

Database records and complete update of tables by the developer are carried out only in rare update sessions.

To update the table, a set of data associated software is used. It starts with reading tables, received in DBF format and converting them to internal text. At the same stage, tables to convert numeric word identifiers to sequential numbers starting from zero (without gaps) are built-up.

The next stage is arranging of the word table in alphabetical order using special ordering algorithm. At arranging uppercase (capital) letters are not distinguished from lowercase, letter "ё" is not distinguished from "e". Only in the case of equality of words of equal length, it appears in its place (immediately after the letter "e"). Spacing and hyphens are removed before comparison. Latin letters and other signs are arranged after Russian letters. Arranging of a half-a-million record table is performed not so quickly, in case the computer runs i7 Intel's microprocessor performing it takes up to 2,5 hours.

An important step is to adjust the table of synonymous relations against previously created auxiliary table. This removes strings with non-existent identifiers. If recognized, strings of a "self synonym" type are also removed. Missing feedback links are inserted. New connected words are just numbers of word-lines starting from 0 in a row with a single step. This work takes i7 microprocessor a little less than two hours to complete.

The longest stage is arranging binary synonymous relations table (about five hours for the i7 microprocessor). It figures, because the length of the table is almost four times bigger. However, the sorting algorithm is simpler. The program sorts (arranges) the table of synonymous relations in ascending order of the left numeric identifier values. In case the compared values are equal, sorting of the right numeric identifier values is performed. Before the sorting all numeric identifiers are recoded in accordance with the new ranking, found while arranging the table.

Further steps are performed quickly. The result is computer programs in PHP, which are then uploaded into a working directory on the server and sequentially executed in HTTP. These programs sequentially upload new tables in parts instead of the old removed tables.

Partitioning of database uploading programs takes place due to limitations of old servers on memory and performance, which caused dead ends at processing of long uploading programs.

9 trishin.net user interface

According to the authors, the interface of any user of the Unabridged Russian dictionary catalog of synonyms (words similar in meaning) on trishin.net website, should be as simple and straightforward as it can be. At the same time, sufficiently reliable protection from a systematic attempt to obtain the dictionary copy in a computer readable form should be provided.

That is why for the purpose of complicating the task of "copiers", query search results are displayed on the screen not as texts, but as drop-down lists, which cannot be copied using copy-paste technique. To make a new database query, there's nothing left to do but manually enter the word selected from the list into the text box.

Thus, when you load trishin.net web page for the first time, a brief explanation form is displayed on the screen. The form has an empty field to enter a word fragment and search its extension after you mouse click "Find" button. "Find" button further initiates performing of database search for any given query.

Queries may vary depending on selection of one of four options represented by small circles, which can be ticked by placing cursor inside of the circle and clicking left mouse button. After clicking option selector status is respectively modified and saved for all subsequent dictionary queries until the next switch.

Each search ("Find" button) starts from expansion of template located in the text field of the form, depending on the option selector status. Once database query is performed, which takes

server less than a second, the screen is updated with the saved text box and option selector statuses, but the output of words found in a drop-down list. The first word in the list is considered to be selected by default. In the future, another word from the list may be ticked (selected) with the cursor. The form reports the number of words in the list, such as "250 words found". At that all 250 words are present in the drop-down list.

The number of synonyms found for the selected word is specified, and all the synonyms for the selected word are listed in the right drop-down list. The first word in the list is selected by default just as in the left list, but this selection can be changed by mouse-click before re-searching. To the right of the selected synonym the number of synonyms for this synonym is specified. To get a list of synonym's synonyms enter the synonym's synonym in the text box and repeat search.

If the page reports "no synonyms found", don't be surprised. So it is.

So this is how the interface of any user of the Unabridged Russian dictionary catalog of synonyms (words similar in meaning) on trishin.net website is briefly arranged.

10 Concluding remarks

This dictionary catalog shows in practice that by the number of words Russian language belongs to the most developed languages of the world, and by the scale and density of synonyms space (as well as rhymes, intonations), according to the authors, it is second to none.

Embedding dictionary guide in the search engines can significantly improve the quality of information retrieval.

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Annex. Possible variants of commercial realization of the dictionary catalog.

1) Rewriting of the existing electronic versions of the dictionary catalog to more modern encrypted (both for words and synonymous relations) Windows-based versions with improved design, fast and easy installation of the dictionary, documentation, etc. for commercial distribution both in online stores and on CDs.

2) Creating a complete analogue of the dictionary for Mac OS platform.

3) Creating the Internet version of the dictionary with all the search capabilities of the version in Fox Pro. This version of the dictionary can be offered for use in the Internet search engine to advertise search engine itself, as well as to improve the quality of information retrieval and as word prompter. For comparison, Yandex search engine uses Synonyms Dictionary by N. Abramov comprising 20,000 words, see

http://slovari.yandex.ru/~ книги/Словарь%20синонимов/

Also this online program might be interesting to any other company with a large number of customers as an advertisement on their website (Evroset, Svyaznoy etc.).

4) Creating dictionary versions for iOS and Android mobile devices (primarily tablets) and their commercial distribution.

Reference.

A total of 7.2 million tablets worth a total of 81.4 billion rubles have been sold in Russia (by 2014), http://www.vladtime.ru/computers/353267-obem-prodazh-planshetov-v-rf-za-2013-god-vyros-na-125.html.

The number of smartphones sold in Russia in 2013 reached 19.7 million – which is 54.2% more than in 2012, see http://www.vestifinance.ru/articles/41276

5) According to the Executive order of the President of the Russian Federation V.V. Putin of 09.06.2014 the Presidential Council of the Russian language was established. The new body formed of both scientists and media executives, is intended to "protect" the language and promote it abroad.

According to the document, the Council is an advisory body under the President of Russia. Its task is improving the government policy "in the field of development, protection and support of

the Russian language", as well as coordination of the work of state bodies, scientific and cultural organizations.

In addition, the Council should engage in "strengthening the positions of the Russian language in the world, expansion of its geography and scope, support of Russian communities abroad."

Work on the dictionary is in line with this resolution.

In order to facilitate the software for foreign users (learning Russian language) in the next version 8.4 of the electronic dictionary in C# it is planned to further rewrite software interface and built-in user manual in 7-9 languages (English, French, German, Spanish, etc.) so that depending on the language set on PC by default, the same language would be chosen for the interface and built-in manual of dictionary catalog.

6) Dictionary catalog is useful and necessary in the implementation of the smart search of information in various corporate systems (the structure of its word database in Fox Pro language, which includes words as well as their stems and codes of one of the 19 reference words specifying all declensions or conjugations of the word, had been developed specifically for such tasks).

7) Software of the dictionary catalog can serve as a good mass advertising product for the company-manufacturer of dictionary's commercial versions if it places adverts of its other knowledge-intensive products into the dictionary software.

8) Completely encrypted dictionary can be placed on the web on a separate server, or using a reliable "cloud" service to protect its contents from copying. Dictionary could be accessed through API (Application Programming Interface), with registration of users and selling of access keys based on pricing model: subscription, quota for the number of queries, etc. This offers the possibility of using the dictionary by software robots, created by service subscribers for a variety of purposes. The dictionary can be integrated with "Anti-plagiarism" system used by the Russian National Library to verify originality of theses texts; the same way it can be integrated with other systems (for professional journals, the media, etc.); another use - integration into the national search engines of different countries (China, India, Brazil, USA, Russia, etc.), which should carry out user query processing not only in the national language, but also in other languages; third variant of use - automatic translation systems with account for synonymy (integrated with search engines, like Google Translate, or with other information products and services); fourth variant of use - support of a variety of applications for mobile devices with network queries to the dictionary as needed. Access to the dictionary via API is a modern and most flexible way for publishing, with a variety of different options to meet the needs of a particular user; flexibility to choose a pricing model depending on user's category and needs is also attractive.

There are also other business ideas.

The author is ready to transfer the exclusive rights for the dictionary catalog to a computer company, ready to take on the production of commercial versions of the dictionary, and distribute them.

Reviews about the dictionary from the author's website.

http://www.trishin.ru/left/dictionary/reviews/