Universal Scheme of Evolution and Search Engine Forecast

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Abstract

The major processing tools for Internet information are Search Engines (SE). Today's level of SE development does not allow using the collected informational potential of the Internet in full. As a direction of SE development, it is suggested to add the Universal Scheme of Evolution approach to technology of SE. It will allow:

- To describe evolution of any object
- To search information and to create a content (information, data) more objectively
- To present the unity of the world and unity of its trends of evolution more distinctively

Actually, the approach «Search Engine + USE-USESoft» would provide new quality for information search on the Internet.

Keywords: search engine, Internet, ranking, disadvantage, evolution, tag, latent links, trends of evolution, Universal Scheme of Evolution (USE).

Search Engine role in the Internet

Acquaintance with the Internet, as a rule, begins from the search engine. As the phrase goes, there are no other ways at all...

Information search is a process of revealing the specified subject, which satisfies to in advance certain condition of search (inquiry) to the type of information (the facts, the data, etc.).

About importance of information search tells such a fact - in 1957 J.Liklaider[1] has analyzed his working day. It has appeared that 85% of time was spent for information gathering, sorting and analysis, for calculations and graphs. And only after the information has been collected and materials are prepared, he was capable to make more or less correct decision. Therefore, the development (improvement) of work of search engines is one of priority problems of today's Internet.

Functioning of Search Engine

Functioning of majority of search engines could be described by four stages:

- Search engine collects (gathers) and indexes the information, and saves it into data base;
- Search engine parsers found words into main morphemes;

When User addresses to search engine with an inquiry (with a set of key words), it starts the third and fourth stages:

- The search engine chooses all documents containing a set of key words out from data base, and then

[1] John Licklider - American computer scientist, considered one of the most important figures in computer science and general computing history, http://en.wikipedia.org/wiki/J.C.R._Licklider

- The search engine presents documents from Internet pages, which have the highest search rank, the highest accuracy of a set of key words, the last updating, etc.

Such multi-parametric selection is called the ranking of search results. These ranking mechanisms distinguish search systems one from another. Today each search system tries to offer its specific mechanisms of information (documents) ranking to occupy the leading position in the search market.

Search Engines problems

Probably, it's not a mistaken suggestion that the huge part of Internet users is interested in history (changes through time, evolution) of things they "touch" at their work or in daily life. This suggestion coordinates properly with the fact that articles in encyclopedias are being started by the history chapter. In scientific publications the historical introduction is standard part.
It's not a surprise at all, because:
"Evolution is a general condition to which all theories, all hypotheses, as systems must bow and which they must satisfy henceforth if they are to be thinkable and true. Evolution is a light illuminating all facts, a curve that all lines must follow."

Teilhard de Chardin. The Phenomenon of Man

Internet Encyclopedias describe history (evolution) too. For example, Wikipedia articles, as a rule, include the history chapter or something similar.[2]

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- 1.2 Transport applications

2 History

As a rule, at inquiry the information from the Internet, the list of links concerning history (evolution) is being provided at the first lines:

How Steam Engines Work

by Marshall Brain

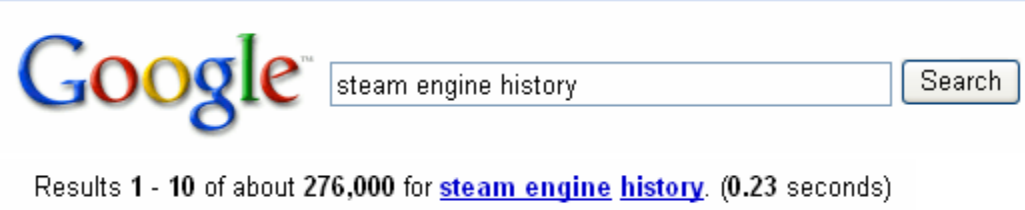
Steam engines were the first engine type to see widespread use. They were first invented by Thomas Newcomen in 1705, and James Watt (who we remember each time we talk about "60-watt light bulbs" and the such) made big improvements to steam engines in 1769.

Steam Engine History
The history of **steam engines** - Thomas Savery patented the first crude **steam engine** - Thomas Newcomen invented the atmospheric **steam engine** that was improved **...**
inventors.about.com/library/inventors/bl**steamengine**.htm - 26k - Cached - Similar pages

Steam Engine Library
Online texts of historical documents relating to the history of the **steam engine**.
www.history.rochester.edu/**steam**/ - 12k - Cached - Similar pages
by B Thompson - 1923 - Cited by 2 - Related articles

[2] **Steam engine** http://en.wikipedia.org/wiki/Steam_engine

If someone will make inquiry, for example, for «steam engine history», the list of references will be given out, but, I would specially emphasize - without order in chronology or in format of facts' description.



I mean the following – practically any web-page describes chronology of steam engine in own specific manner and by means of own specific set of facts. Below 3 top-ranked web-pages are presented:

Steam Engine History
The **history** of **steam** engines - Thomas Savery patented the first crude **steam engine** - Thomas Newcomen invented the atmospheric **steam engine** that was improved **...**
inventors.about.com/library/inventors/bl**steamengine**.htm - 26k - Cached - Similar pages

The History of Steam Engines - Inventors: Thomas Savery, Thomas Newcomen, James Watt

Steam Engine History
Brief **History** of the **Steam Engine**. Summary by Carl Lira. One of the most significant industrial challenges of the 1700's was the removal of water from mines **...**
www.egr.msu.edu/~lira/supp/**steam**/ - 12k - Cached - Similar pages

Brief History of the Steam Engine Summary by Carl Lira

One of the most significant industrial challenges of the 1700's was the removal of water from mines. Steam was used to pump…

Steam Engines
Dickinson's A Short **History** of the **Steam Engine** seeks to prove that the **steam engine**, although seemingly out of date, is very important to industry and **...**
www.udayton.edu/~hume/**Steam**/**steam**.htm - 29k - Cached - Similar pages

The Steam Engine

"The wonderful progress of the present century is, in a very great degree, due to the invention and improvement of the steam engine, and to the ingenious application of its power to kinds of work that formerly taxed the physical energies of the human race."

~Robert H. Thurston

Lines of Search Engines development

From developers' points of view

Douglas Merrill, Google Vice President (technology) – "… we want to develop the search engine, which could provide:

- The content creation,
- The tagging all existed information for all languages of the globe, and

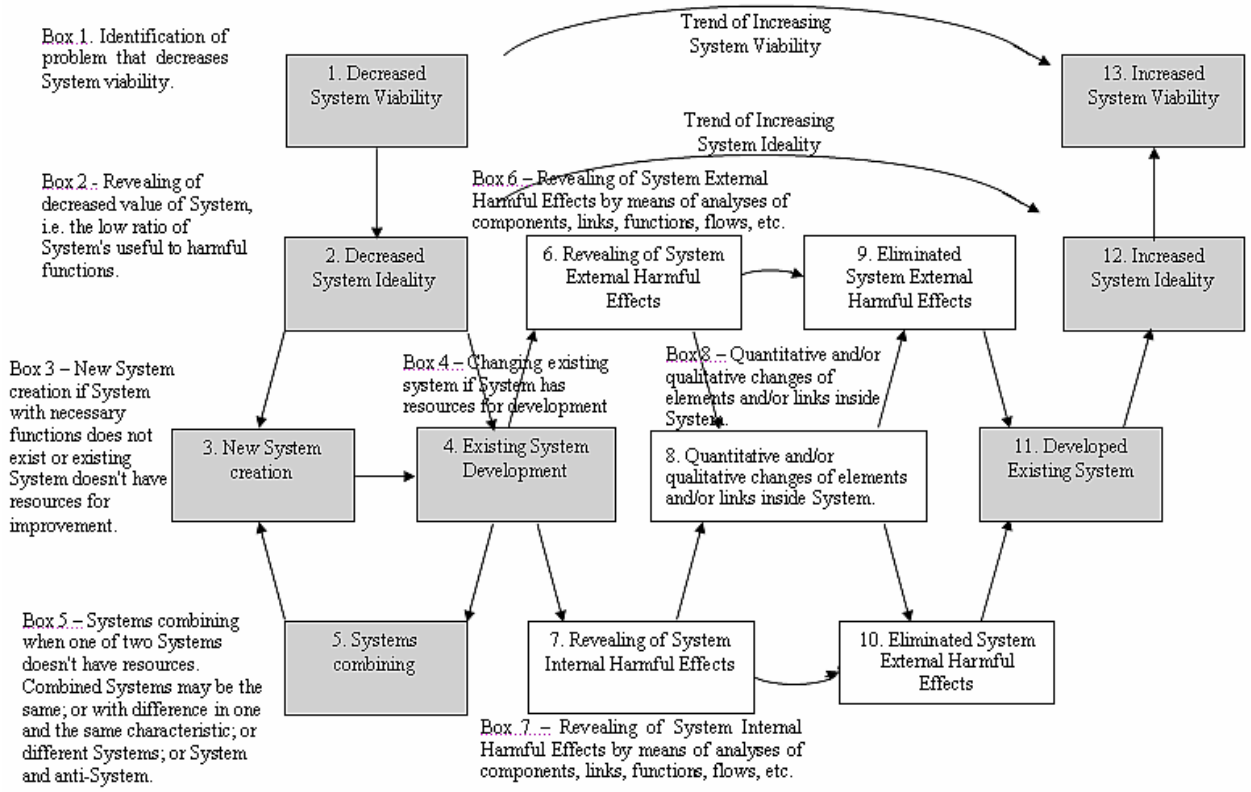
- The connection with automatic algorithms, which can discover the latent links between different things (objects).

Generally speaking, we want to create mix of UGC, classification and tagging by community and Artificial Intelligence; it would help people work more effectively."

From Universal Scheme of Evolution point of view

The Trends of Engineering Systems' evolution, which are well-known in TRIZ and in inventors' activity, could be used as a pattern for evolution description. Or more precisely, both trends and their structure, in the form of the Universal Scheme of Evolution (USE) and the computer program USESoft, which was developed the USE basis.[3]

Universal Scheme of Evolution



The directions of creation of search engine, which were emphasized by D.Merill, wonderfully correspond to features of USE-USESoft approach:

- Search engine accompanied by USE-USESoft will generate content (information about object) in accordance with User' request;
- Search engine accompanied by USE-USESoft will create tags for information, which concerns objects – it will be ready descriptions (standard characteristics) of evolution phases from Universal Scheme;

[3] Universal Scheme of Evolution – Theory and Practice http://www.triz-journal.com/archives/2004/06/04.pdf; USE-USESoft Presentation http://triz-evolution.narod.ru/USE_USESoft_Presentation_80825.pdf

- USE-USESoft contains the latent links between any things (objects) in form of USE structure. During processing of request the USE, i.e. its boxes + links, will be filled by information about specific object and it will be presented to User.

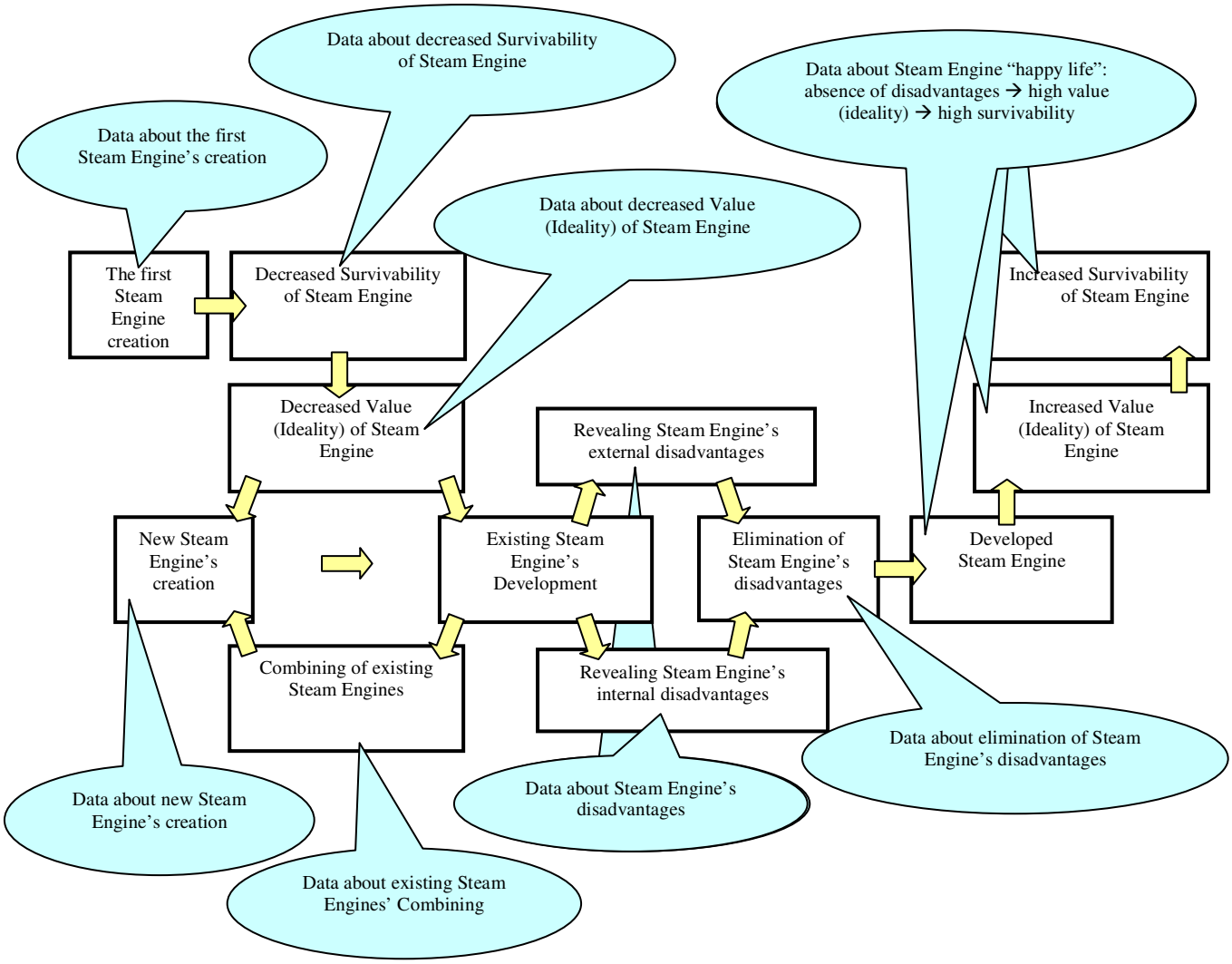
Actually, the USE-USESoft approach will be addition for Search Engine, i.e. it will be the pattern (or form) for processing and providing information about object. Before searching procedure the needed web-page doesn't exist, it will be created "on the fly" in accordance with User's request.

How search could be organized in the nearest future…
Open Google, which includes button **Evolution of Object** and make a request: Please, provide me information about steam engine's history (evolution). Then print name "Steam Engine" into text box and click the button…

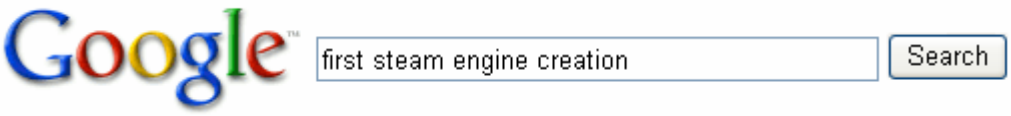
1. Google calls to its internal Universal Scheme of Evolution.
2. In hidden mode Google enters name "Steam Engine" into USE and gets Steam Engine's evolutionary descriptions (characteristics) from all 13 boxes.
3. Google uses descriptions (characteristics) from box # 1 "Decreased Steam Engine Viability" for tags (low viability, steam engine, problems, disadvantages, competitors, decrease and so forth[4]) generating and then uses these tags for immediate new search. The found pages are ranked and saved in search database…
4. Google uses descriptions (characteristics) from box # 2 "Decreased Steam Engine Ideality" for tags (low value, steam engine, low efficiency, disadvantages, harmful functions and so forth) generating and then uses these tags for new immediate search. The found pages are ranked and saved in search database…
5. Google uses descriptions (characteristics) from box # 3 "New Steam Engine Development/Creation/Design" for tags (new steam engine, development/creation/design and so forth) generating and then uses these tags for immediate new search. The found pages are ranked and saved in search database…
6. Google uses descriptions (characteristics) from box # 5 "Steam Engines Combining" for tags (steam engines, combining and so forth) generating and then uses these tags for immediate new search. The found pages are ranked and saved in search database…

[4] It's a first attempt to describe tags. This work will be continued to find the most adequate list of tags for box #1 and for the rest ones.

The processing of boxes 4 “Existing Steam Engine Development”, 6 and 7 “Revealing of Steam Engine’s Harmful Effects”, and 8 “Quantitative and/or qualitative changes of elements and/or links inside Steam Engine isn't described – it’s analogical one.
After all boxes' processing and gathering information through all cycle, Google provides User the information (data) about Steam Engine evolution in accordance with order of boxes in Universal Scheme of Evolution:



In such a form User has a very consistent description of evolution of Steam Engine. Let’s check it for box # 1 “The first Steam Engine creation”



At this time the most adequate web-page will be the Wikipedia:

The list of web-pages is changed in comparison with the first attempt, where the set of words steam, engine, history for search was used.

USE is a logical and strong structure, and if User didn't get data corresponding to some USE box, User will understand at once that some information is missed. This understanding will help to start search of specific information in well-known direction. This understanding is the guiding light for both cases:

- such information exists and it can be found – the tool is more narrow and detailed search;
- such information doesn't still exist, and it can be created – the tool is scientific approach.

Here I see the strong analogy with discovery of unknown chemical elements with help of Periodic table – its empty cells (i.e. "informational holes") were signs that unknown elements ought to exist; furthermore - the neighboring cells suggested where these unknown elements could be found.

Advantages of the suggested approach

1. Completeness and logics of evolution description for any object - it follows out from proofed universality of USE - USESoft approach.
2. The objectivity of content (information, data) during search and creation - by means of «Search Engine + USE-USESoft» search is being performed:

- **User of content involvement**

It is obvious that User's erudition, horizon of experience, professional skills, sometimes even User's mental condition, influence upon set of key words for search, and by that, upon the results of search. Use «Search Engine + USE-USESoft» would allow decreasing these subjective factors.

- **Author of content involvement**

Today the tagging is the Author's responsibility. So, the subjective Author's factors play their role too. As a result, the quality of search, which is based on subjective tags, is lower than it can be, if the tags would be generated (created) automatically on the base of objective evolution representation.

3. The USE-USESoft approach really helps User to see very important direction of evolution as systems combining or, what is the same, the transition to supersystem. Inventors' experience shows that it is very hard to realize the necessity of such combining and find the second system for combining with the initial one.[5]
4. User by means of uniform representation of evolution of different objects is being accustomed to see unity of the world and unity of means of world's description in form of trends of evolution. This knowledge comes to User not in the declarative form, but through the really studied objects – constantly and from anywhere.

[5] V.Gerasimov and L.Kozhevnikova. Paper "Alternative Approach to Problems Formulation" for Summit of TRIZ Developers "Development Analytical Tool for Problems Formulation" Moscow, 2007
http://www.triz-summit.ru/ru/section.php?docId=3713

Conclusion

Actually, "Search Engine + USE-USESoft" combination could provide new quality for searching information on the Internet. As it was supposed before[6]: "… dialog with USESoft may be similar to a conversation with the specialist, the TRIZ expert or with an AI system." So, please, remember that Artificial Intelligence was pointed out by Douglas Merrill as a characteristic of future Search Engine.

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[6] A.Zakharov. Explore the Future of TRIZ With the Trends of Evolution. TRIZ Journal, May 2008 http://www.triz-journal.com/archives/2008/05/03