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DEVELOPMENT AND IMPLEMENTATION OF INTELLECTUAL INFORMATION TECHNOLOGY FOR INCREASING THE LEVEL OF WEB RESOURCE USABILITY

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Abstract. *The development of Internet technologies and e-commerce requires an intelligent toolkit for Internet promotion of enterprise websites: Email - marketing, search advertising, website promotion in social networks. The article presents the developed structure of intelligent information technology, which can be implemented as an integrated system for promoting websites of any enterprise, which includes a cluster of modules for managing customer relationships, the enterprise's website itself, a cluster of social resources on the Internet, analytics internet marketing. The presented research results allow organizing more optimal communication of the enterprise with a wider audience of potential consumers..*

Keywords: *site optimization, SEO, key queries, backlinks*

Introduction

The advent and development of the Internet has added a number of tools whose function is to achieve the goal of promoting products, as well as several additional tasks related to the use of the Web - these include creating and promoting your own WEB-site and creating your own unique image on the Internet. The company's website is usually a central element of the communication policy pursued on the Internet. That is why the task of its promotion is so important, on the successful implementation of which the effectiveness of the entire communication policy largely depends. On February 16/ 2020, IDC analysts published a study in which they reported that the outbreak of COVID-19 coronavirus in China not only undermines the global economy, but can also benefit the development of the ICT industry and open new business opportunities for information and communication technology developers. In particular, the viral epidemic is urging governments to update their activities, moving towards smart and state-of-the-art technology. This creates opportunities for the development of digital platforms and Big Data solutions.

According to IDC analysts, the outbreak of the COVID-19 coronavirus will lead to five major changes in the Chinese economy: smarter government management, decentralization of urban clusters, accelerated digital transformation in the healthcare system, accelerated implementation of contactless services and a faster implementation of the strategy to turn China into a global leader. supply chain. Also, the coronavirus outbreak is pushing for the creation of smart cities and parks, contributing to the decentralization of the management of urban clusters and, on the contrary, the centralization of individual cities.



Other opportunities lie in online medical services, as the virus is driving the acceleration of the digital transformation of healthcare systems. In addition, according to experts, new opportunities are being created for companies and services that offer employees remote work. Approaches in education are also changing: in case of mass diseases, people will strive for distance education and online courses. Opportunities for business development are obtained by technology developers for stores where a minimum of staff is used or none at all, as well as online food delivery services and telecom operators in the construction of 5G networks and the launch of services based on them [1].

Finally, the outbreak of the coronavirus could give a new round of development of robots for their use in supply management systems. The demand for industrial and service robots should grow, which, in turn, contributes to the development in China of a national strategy called China + 1. Within its framework, authorities and companies seek to contain or reduce labor costs, including through the use of technological solutions ...

IDC analyst Lianfeng Wu recommends that vendors make full use of digital technologies to develop remote customer and partner capabilities and habits, implement effective marketing of online products and services, and properly control costs and use of government support. Working in this direction, investing in promising business ideas and innovations, companies will be able to make significant progress and earn a lot after the end of the epidemic, the expert believes [2].

The Internet provides users with a wide range of communication tools. Any user who joins the Web, immediately gets the ability to navigate sites, the ability to send and receive emails, participate in conferences and chats and much, much more. In other words, the user gets the opportunity to interact with the Internet.

Any company can become an Internet user. As soon as it connects to the Web, it can begin to use new methods in conducting its business, such as interacting with its partners or customers via e-mail or analyzing data about competitors on the Web.

Having mastered the basic services of the Internet, any user can go further and take the most active part in the implementation of the Internet environment, creating their own WEB-site, online store or trading system.

Thus, the WEB-site is one of the main elements of the Internet marketing system and needs the most attention from the marketing service of the enterprise.

1. Analysis of site usability

1.1. General information about the WEB-resource.

The online sports nutrition store dasport.com.ua was chosen to develop information technology to increase the rating status of the WEB-resource [3]. This site is interesting because no one has tried to optimize it for search engines. So you need to start the optimizer from scratch. The site runs on CMS OpenCart.

The design should help the user to navigate and prompt him the theme of the site (Figure 1). The overall design of the site should correspond to its basic idea and information content, while its structural structure, design of WEB-pages, graphics, their number and size should be optimized and adapted to the needs and capabilities of the target audience.



Figure 1. - Site view

This site immediately greets the user with a logo called "DAsport" and a stylized image of a bodybuilder and a banner with sports nutrition, as well as the name in large font "Quality sports nutrition". The design solutions of this site perfectly depict the theme of the information system. One of the issues closely related to the development of site design is the choice of navigation tools. The most important requirement for a navigation system is that it be intuitive for users with any level of training. It should allow not only to quickly find exactly what you need, but also immediately give an idea of the composition of the site.

1.2. The structure of intelligent information technology site analysis

Components of site analysis:

- ✓ Design analysis
- ✓ Availability of site copyright
- ✓ Site analysis for the use of thumbnails
- ✓ Site analysis for adaptability
- ✓ Availability of a feedback order form
- ✓ Analysis of reviews on the site
- ✓ Analysis of contact information
- ✓ Ergonomic selection of the current menu item
- ✓ Adequacy of the search form on the site.

One of the most important points in raising the rating status of WEB-resources is the convenience of the site for users. It does not matter how much traffic is brought to the site, but if it is inconvenient for the user, he will leave it and will not want to come back. Search engines monitor the behavioral factor and this can affect the position of the site very negatively. That is why you need to constantly work on the site - test its usability, test conversions and identify the best design, structure and logic of the site.

2. Internal site optimization

The first step is to configure the server to work properly. HTTP is a language that the client (browser or mail robot) and the web server of the site "speaks" through requests and responses [4]. Each time a request to the server, the browser or crawler transmits service information in HTTP headers. After checking the HTTP headers, it was found that this figure is within the norm (Figure 2).



```

HTTP/1.1 200 OK
Server: nginx
Date: Tue, 19 Jun 2018 10:44:54 GMT
Content-Type: text/html; charset=utf-8
Connection: keep-alive
Expires: Thu, 19 Nov 1981 08:52:00 GMT
Cache-Control: no-store, no-cache, must-revalidate, post-check=0, pre-check=0
Pragma: no-cache
Set-Cookie: PHPSESSID=5b1e011ttucvd1esb691vv5t11; path=/
Set-Cookie: language=ru; expires=Thu, 19-Jul-2018 10:44:52 GMT; Max-Age=2592000; path=/; domain=dasport.com.ua
Set-Cookie: currency=UAH; expires=Thu, 19-Jul-2018 10:44:52 GMT; Max-Age=2592000; path=/; domain=dasport.com.ua
Set-Cookie: php-console-server=5; path=/

```

Figure 2 - Checking HTTP headers

The second step is to check for session logging and duplicates. If the site has the ability to register a user (for example, a forum), it is important to somehow remember the date of his last visit, which pages he visited, what settings he made, etc. To do this, there is a mechanism of sessions - unique identifiers of each site visitor.

For the average user, the session ID is kept in the browser's cookie, but for some users in the browser, the settings are set so that the cookie is disabled. If a user comes to a site with cookies disabled, a session ID (some combination of characters) is added to each address in order to track his actions.

Search engines cannot accept cookies, so they receive a session ID at the page address, like those users who have cookies disabled. Each time a robot comes to a site that uses a session engine, it is assigned a different identifier that is appended to the page addresses, and each time the same pages have different addresses. That is, for him these are different pages.

After several visits to the site at different times, the search engine has huge lists of the same pages with different session IDs. As a result, server resources are used, and the queue for indexing really important pages may not come. Duplicate pages - pages with the same content. The search engine is critical of this problem. As a rule, he selects one page and includes it in his database, and ignores duplicates. If the site has multiple duplicate pages, the search engine may apply sanctions to it, and indexing will be more difficult. To avoid this, you need to check the pages of the site and exclude situations where several different addresses are exactly the same pages.

In the third step, you need to check the HTML code of the pages. When creating sites use HTML format [5]. At the same time errors quite often arise.

Visualize headings and words in the text using the outdated `` tag. This does not use unnecessary title, bold, or italic tags, which may reduce the page's importance to the search engine and reduce the chances of getting to the top lines. A detailed study of the page code is a very painstaking and uninteresting job, but it must be done:

- ✓ Position page elements using a large number of nested tables.
- ✓ Non-optimized code. It happens that too many extra tags, comments and design elements are added to the HTML code of the page. All this prevents the search engine from correctly recognizing important information on the page.
- ✓ Use graphics instead of text. The search engine does not recognize the text shown in the image, so it is better to use text.
- ✓ Unclosed tags.
- ✓ Excessive use of title tags (for example, H1 tag selection).



The check revealed 61 errors in the HTML code (Figure 3).

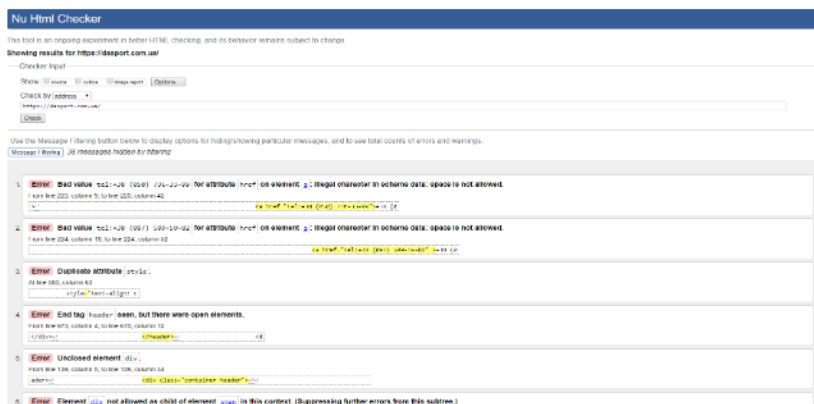


Figure 3 - HTML code validation results

The check revealed 24 errors in the CSS code (Figure 4).

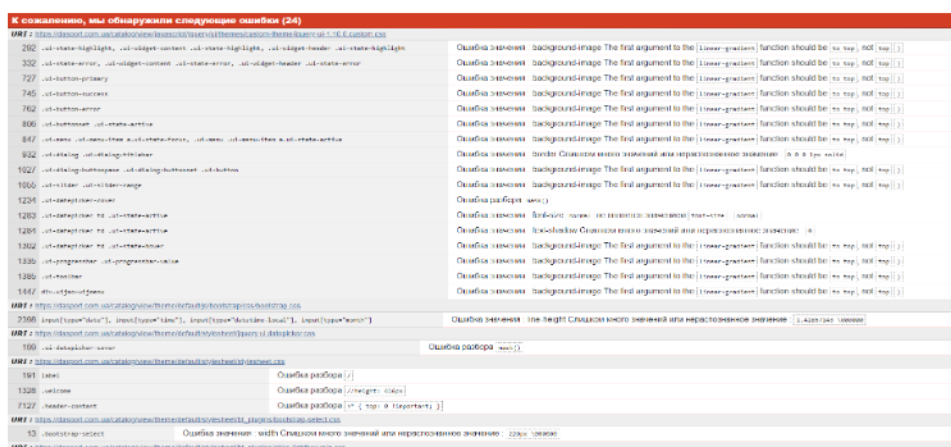


Figure 4 - CSS code validation results

3.External site optimization

The process of external site optimization consists of the following processes:

- ✓ Registration of the resource in search engines;
- ✓ Placement of links in WEB - directories;
- ✓ Registration on thematic forums;
- ✓ Placing links on different partner servers;

External promotion is a factor that is being worked on not on the site, but outside it, it is the work on backlinks. The better these links, the better for the WEB-resource. The link to the site is the same recommendation. And the more often a site is recommended, the higher its credibility for search engines.

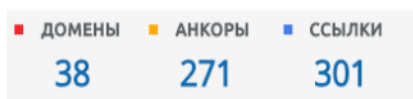


Figure 5 - Analysis of posted links.

During the period from 14.02.2020 to 14.06.2020, 301 links from 38 different domains were posted by various means (Figure 5).



Conclusions

During the work on this resource, full internal optimization, external optimization and constant maintenance of the site were carried out to maintain the positions that have already been received. 90% of all traffic comes from search engines. The site took top positions in Kharkiv and Ukraine in general. Without effective work on the internal optimization of the site would not be able to get such a result in such a short time, because the basis for promotion - a properly configured site. Thanks to the successful introduction of recommendations during this period, the site has successfully improved its position in search engines. During the period from January 1, 2019 to November 1, 2019, the site fluctuated at approximately the same level. All work to improve the rating status of the selected WEB-resource was carried out from 1.12.2019 to 14.06.2020. Since the beginning of work on the site, the movement of the schedule, which began its upward movement, and continues to grow steadily. The number of queries in the search engine increased from 2600 to 7400. The site also became the leader in search engines for the main key queries of the site. This means that looking for the most popular products on this topic, the user will first get to the site, as well as the fact that it was increased not only the number of key queries in the search engine, but also the quality of their placement. Currently, the development of intelligent information technology is considered one of the most important indicators of innovation and technological potential of the world and their opportunities for development in the field of high technology and digital economy. The IIT study is also used as an analysis tool to build comparative rankings that reflect the level of development of the information society in different countries. There is a close link between ICT development and economic well-being, as ICTs today play a leading role in innovation, productivity and competitiveness, diversify the economy and stimulate business activity, thereby helping to improve people's living standards.

References :

- [1] IDG International Data Group // [Electronic resource]. - Access mode [https://www.tadviser.ru/index.php/Компания:IDG_\(International_Data_Group\)](https://www.tadviser.ru/index.php/Компания:IDG_(International_Data_Group)) .
- [2] Garrett D. Web Design: A Book by Jess Garrett. Elements of User Experience = The Elements of User Experience: User-Centered Design for the Web. - Symbol-Plus, 2008. -- S. 192. -- ISBN 5-93286-108-8.
- [3] Jacob Nielsen, Kara Perniche. Web Design: Analyzing the Usability of Web Sites by Eye Movement = Eyetracking Web Usability. - M.: "Williams", 2010. - S. 480. - ISBN 978-5-8459-1652-5.
- [4] Goran Aviani . HTTP and everything you need to know about it . [Electronic resource]. - Access mode <https://github.com/GoranAviani?after=Y3Vyc29yOnYyOpK0MjAxOC0wMS0yOFQxMjoxNzoxN1rOBxBWAA%3D%3D&tab=repositories>.
- [5] Ben Frain. Responsive Web Design with HTML5 and CSS3 - Second Edition. - Packt Publishing; 2nd edition (August 24, 2015). – P. 314. - ASIN : B0114P1L2A.



Анотація. Розвиток інтернет-технологій та електронної торгівлі вимагає інтелектуального інструментарію інтернет-просування веб-сайтів підприємств: E-mail - маркетингу, пошукової реклами, просування веб-сайтів в соціальних мережах. У статті представлена розроблена структура інтелектуальної інформаційної технології, яка може бути реалізована у вигляді інтегрованої системи просування веб-сайтів будь-якого підприємства, яка включає в себе кластер модулів для управління взаємовідносин з клієнтом, безпосередньо веб-сайт підприємства, кластер соціальних ресурсів в мережі Internet, аналітику інтернет-маркінга. Представлені результати досліджень дозволяють організувати більш оптимальну комунікацію підприємства з більш широкою аудиторією потенційних споживачів.

Ключові слова : оптимізація сайту, SEO, ключові запити, зворотні посилання.

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