

Skills4Retail
Building sustainable growth

THE BASICS OF SEARCH ENGINES

Lect. univ. dr. Ștefan-Alexandru CATANĂ

UNIVERSITY OF BUCHAREST

Funded by the European Union. Views and opinions expressed are, however, those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor the granting authority can be held responsible for them.

Co-funded by the European Union

TABLE OF CONTENTS

- 1. WHAT IS A SEARCH ENGINE?
- 2. HOW DO SEARCH ENGINES WORK?
- 3. SEARCH ENGINE OPTIMIZATION (SEO)
- 4. GOOGLE – AN EXAMPLE OF SEARCH ENGINE
- 5. ASSIGNMENTS

Co-funded by the European Union

1. WHAT IS A SEARCH ENGINE?

- A search engine can be defined as **a software system designed to perform web searches**, allowing users to find information on the internet.
- **The importance of search engines:**
  - Search engines are essential tools for finding information, navigating the web, and quickly accessing a vast range of content.
  - They play a significant role in the digital landscape, influencing how information is consumed.
- **Examples of search engines:**
  - **Google**: The most widely used search engine, known for its comprehensive indexing and advanced algorithms.
  - **Bing**: Microsoft's search engine, offering important features such as image search.
  - **Yahoo**: One of the older search engines, still used by many for its portal and search capabilities.

Co-funded by the European Union

THE HISTORY OF SEARCH ENGINES

- **1990:** Archie, the first search engine, is created to index FTP (File Transfer Protocol) sites.
- **1993:** Gopher, an early text-based search protocol, is developed.
- **1994:** WebCrawler is launched, the first search engine to index full text.
- **1998:** Google is founded, introducing PageRank and revolutionizing search with algorithm-based ranking.
- Search engines have **evolved from simple keyword matching to sophisticated algorithms considering hundreds of factors**. Then, **AI and machine learning were integrated to improve search accuracy and personalization**. Today, they are developing features such as **voice search, image search, and real-time updates**.

Co-funded by the European Union

2. HOW DO SEARCH ENGINES WORK?

- **Web crawling** is the process by which search engines use bots/spiders to visit web pages and collect information. Crawlers follow links from one page to another, gathering data and storing it in a database.
  - **Example of a crawler:** *Googlebot:* Google's web crawler that indexes billions of pages.
- **Indexing** is the process of organizing and storing the collected data in a way that facilitates retrieval. The search engine processes the data gathered by crawlers, extracting relevant keywords, metadata, and other information. The data is then stored in an index, a massive database of web content.
  - **Example of an index:** *Google's index* contains hundreds of billions of web pages, organized for quick retrieval.

Co-funded by the European Union

SEARCH AND RANKING ALGORITHMS

- **Search algorithms** are complex formulas that determine which pages appear in search results and in what order.
- **Ranking factors:**
  - **Relevance:** how well the content matches the search query.
  - **Authority:** the credibility of the source, often determined by the number of quality backlinks.
  - **User Engagement:** click-through rates, bounce rates, and time spent on the page.
- **Examples:**
  - **Google PageRank:** evaluates the importance of web pages based on the quantity and quality of links.
  - **Algorithm updates:** Google Panda (focuses on content quality), Google Penguin (penalizes link manipulation).

Co-funded by the European Union

3. SEARCH ENGINE OPTIMIZATION (SEO)

- SEO (Search Engine Optimization) is the practice of optimizing web content to improve its visibility and ranking on search engine results pages (SERPs).
- **Importance of SEO:**
  - Higher visibility in search results leads to increased organic traffic.
  - Essential for businesses to attract and retain customers.

Co-funded by the European Union

ON-PAGE SEO FACTORS

- **On-page SEO factors:**
  - **Content quality:** high-quality, relevant, and engaging content.
  - **Keywords:**
    - In-depth keyword research to find the terms the audience is searching for.
    - Strategic placement of keywords in titles, headers, and text.
  - **Meta tags:**
    - **Title tags:** a concise and descriptive title for each page.
    - **Meta descriptions:** a brief summary of the page's content that appears in search results.

Co-funded by
the European Union

OFF-PAGE SEO FACTORS

- **Off-page SEO factors:**
  - **Backlinks:**
    - Links from reputable websites pointing to your content.
    - Both quality and quantity matter; spammy links should be avoided.
  - **Social signals:**
    - Activity and sharing on social media can indirectly influence search rankings.
    - Engaging content that is widely shared can attract more visitors and backlinks.

Co-funded by
the European Union

BEST PRACTICES IN SEO

- **Efficient SEO strategies:**
  - **Valuable content:** Provide content that answers users' questions and fulfills their needs.
  - **Ethical link building techniques:** Use methods like guest blogging and partnerships to build quality backlinks.
- **Common mistakes:**
  - **Keyword overuse:** Overstuffing content with keywords in an attempt to manipulate rankings.
  - **Poor link quality:** Obtaining backlinks from low-quality or irrelevant sites.
  - **Ignoring user experience:** Having slow-loading pages and non-mobile-friendly designs.

Co-funded by the European Union

4. GOOGLE – AN EXAMPLE OF SEARCH ENGINE

- **Google features and special functionalities:**
  - **Unique features:**
    - **Knowledge graph:** Displays relevant information about a topic directly in the search results.
    - **Featured snippets:** Highlights a portion of a page that directly answers a search query.
  - **Functionalities:**
    - **Voice search:** Allows users to search using voice commands.
    - **Local search:** Provides results based on the user's geographical location.

Co-funded by the European Union

4. GOOGLE – AN EXAMPLE OF SEARCH ENGINE (2)

- **Using Google search operators:**
  - **Effective search techniques:**
    - **site:** Search within a specific site (e.g., site:wikipedia.org search engine).
    - **intitle:** Find pages with specific words in the title (e.g., intitle:SEO tips).
    - **filetype:** Find specific types of files (e.g., filetype:SEO guide pdf).

Co-funded by
the European Union

4. GOOGLE – AN EXAMPLE OF SEARCH ENGINE (3)

- **Google Analytics and Search Console:**
  - **Introduction to Google tools:**
    - **Google Analytics**
      - Tracks and reports website traffic.
      - Key metrics: sessions, users, page views, bounce rate.
    - **Google Search Console**
      - Monitors search performance and identifies issues.
      - Key metrics: clicks, impressions, average position, coverage report.
    - **Core features:**
      - **Traffic analysis** – Understand visitor behavior and traffic sources.
      - **Performance tracking** – Monitor and improve search performance with valuable insights.

Co-funded by the European Union

5. ASSIGNMENTS

- 1. Search on Google for 10 academic articles in the field of digital marketing using effective search techniques.
- 2. Create a title tag and a meta description for a blog post about healthy eating.

Co-funded by
the European Union

REFERENECES

1. AIContentfy, 2023. How to Build Backlinks for Your SEO Strategy [online] Available online: https://aicontentfy.com/en/blog/how-to-build-backlinks-for-seo-strategy, last accessed 2024/06/30.
2. BeFoundOnline, What is On-Page SEO? - Introduction to On-Page SEO [online] Available online: https://befoundonline.com/what-is-on-page-seo, last accessed 2024/06/25.
3. Cox, C., Search Engine Algorithms: What You Need to Know [online] Available at: https://hawksem.com/blog/search-engine-algorithms-what-to-know/, last accessed 2024/06/20.
4. Gillis, A.S., What is a web crawler? [online] Available at: https://www.techtarget.com/whatis/definition/crawler, last accessed 2024/06/29.
5. McCoy, J., 2024. How AI will affect the future of search - Explore the transformative role of AI in search engines and discover how it will affect the future of search, shaping marketing strategies. [online] Available at: https://searchengineland.com/ai-future-search-436277, last accessed 2024/06/30.
6. Nelson, R., 2018. Every Google SERP Feature Explained [online] Available at: https://overthinkgroup.com/serp-features/, last accessed 2024/06/30.

Co-funded by the European Union

REFERENCES (2)

8. Perfect Search, Before Google: A Brief History of Search Engines [online] Available at: https://www.perfectsearchmedia.com/blog/google-brief-history-search-engines, last accessed 2024/06/30.
9. Simmons, M., Flannery, T., 2023. Maximizing Online Visibility, the Importance of Search Engine Optimization on Google, *International Journal of Research Publication and Reviews,* 4(5), 1462-1466.
10. True Ad Solutions, 2024. Google Analytics Vs. Google Search Console: Choosing The Right SEO Analytics Tool [online] Available at: https://trueadsolutions.com/google-analytics-vs-google-search-console-right-seo-analytics-tool/30/, last accessed 2024/06/30.
11. Vineetha, RK., Understanding How the Search Engine Works [online] Available at: https://loonyheads.com/how-search-engine-works/, last accessed 2024/06/25.
12. Wahba, S., What is Off-Page SEO? Know Its Importance And Benefits [online] Available at: https://seobase.com/what-is-off-page-seo-and-its-benefits, last accessed 2024/06/27.

Co-funded by the European Union



Co-funded by
the European Union