Search Technologies

Crawler Based Search Engine

- These type of search engine use a crawler to search a internet. The crawler digs through a individual web pages, pulls out keywords and then adds the page to the search engine. Google and Yahoo are crawler based search engines.

Directory-Based Search Engine

These engines rely on human-curated categories to organize websites. Editors many add and categories websites into hierarchy of topics, making it easier for user to browse for relevent sites.

Meta Search Engine

These engines don't have their own web crawlers or index. Instead, they act as intermediary sending a user's query to multiple search engine at once and then aggregating the results into a single list. DuckDuckGo and Ixquick.

Vertical Search Engine

These engines specialize in searching a particular type of content such as news, images, videos, or academic journals.

Search Engine Optimization

Search Engine Optimization (SEO) is process of improving the visibility of a website or

web page in Search Engine Result Pages (SERPs) so as to make a company website more discoverable, thereby driving traffic and sales.

Techniques

- On-Page Optimization focus on improving the elements of a web page that search engine can directly control.
- keywood research and optimization Identify relevent keywords and incorporating them strategically throughout the website's content, including title, meta description, headings and body.
- Content Quality: Creak high quality, informative, and engaging content

- **Website Structure**: Ensure that websites have clear and logical structure.

- **Technical SEO**: Optimizes the technical aspects of a website, such as speed, mobile-responsiveness, image optimization.

- **Off-page optimization** focus on improving website authority and credibility in the eyes of search engine.

- **Link Building**: Acquiring high quality backlinks from other websites

- **Social media marketing**: Promoting the website and its content on social media platforms.

XML Query Language

XQuery (XML Query) is a language specifically designed for querying and manipulating data stored in XML formal-

Key Features:

1. **Data Extraction**: to extract elements, attributes and text Xpath expressions
2. **Construction of XML**: XQuery can construct new XML documents from existing XML data.

A XQuery to find the names of patients over 25 years old.

```
for $pat in doc("patients.xml")//
patient
  where $pat/age > 25
  return $pat/Name
```

Semantic Web

The Semantic Web aims to make web data machine readable, adding meaning and context. The creates a web of linked data where machines can understand relationship. Standardized formats like RDF and ontologies define how data is described. This allows for smarter search, data integeration and automated tasks.

Future Web Application Framework

- Front-end frameworks:
  - React.js Developed by facebook, power framework for building user interfaces that uses / component based architecture and virtual DOM for efficient rendering

- **Angular**: Angular popular framework by Google comprehensive solution for single page applications. It offers dependency injection, routing and two way data binding.

- **Vue.js** known for ease of use and versatility. used for small interactive elements or large scale web applications.

- **Backend Frameworks:**
  - **Django (Python)**: A high level python framework known for rapid development capabilities and clean syntax. It's great choice for building complex web applications.

- **Ruby on Rails (Ruby)**: Another popular high level framework. Ruby on Rails is known for its convention over configuration approach, making development efficient.

- **Node.js (JS)** No strictly a framework but runtime environment that enables building server side applications. The frameworks like express.js are build on on top of Node.js.