WHITE PAPER

Solving the long-standing problem of search-as-a-service for any level of customer, whether it be a sole-proprietor app developer, a start-up company or a large enterprise.

Introduction

Web search engines are an essential part of many aspects of society today. They serve as the primary portal for accessing the rich abundance of knowledge that is accessible through the world wide web. Web search engines are expected to answer any user question in real time and show the most relevant webpages for every topic.

While most private users are well served by the existing monopoly of a few dominant search engines such as Google and Bing (and their satellites such as DuckDuckGo and StartPage, etc.), enterprises are seriously lacking programmatic access to web search engines. Such access is pivotal to harnessing the sea of data on the web and exploiting the opportunities presented by the fourth industrial revolution.

Building a competitive web search engine is notoriously difficult; and so far, every attempt has ended in the internet graveyard. Google's technology is light years ahead of everyone else's. During the 20 years of its evolution, Google has been collecting massive quantities of user data (such as user's search queries and the webpages they click on). It's massive head start and humongous success have set it at the game's pinnacle and has raised a colossal technological barrier of entry – the so-called *web search bootstrapping problem*. This barrier of entry into this field is so insurmountable that even the most tenacious and deep-pocketed organizations shy away from it.

It is true that you cannot build a competitive web search engine without huge amounts of users' data. **However, *the myth that a web search engine cannot be built without collecting real user's data has now been exploded. That's where AI comes into the picture.***

Instead of **collecting** user data – we **generate** it.

Our recent technological breakthroughs have solved the bootstrapping problem by generating synthetic data that it is identical to real users' data. Our innovative search technology enables us to build completely independent web search engines entirely from scratch, without collecting any user's data – and it's extremely competitive with Google and Bing.

Our technology has enabled us to solve the long-standing problem of search-as-a-service for any level of customer, whether it be a sole-proprietor app developer, a start-up company or a large enterprise. This solution addresses a wide variety of needs – from relatively simple in-app or site specific searches, to search engines across a company's various sites, all the way to large-scale complex search engines that focus on a specific portion of the world wide web or on the world wide web in its entirety.

1. Usearch – Services

1.1 The Need

Search engines essentially act as filters for the wealth of information available on the internet. They allow users to quickly and easily find information that is of genuine interest or value.

While private users are well served by the existing monopoly of a few dominant search engines, enterprises are seriously lacking control, unlimited accessibility and a variety of other customized features that would serve their needs. This lack is seriously detrimental to their ability to leverage big data analytics, machine learning and customized web search in order to enhance and to innovate their products.

Ideally, enterprises, organization and companies should have search technology capabilities or access to a web search engine in order to harness the opportunities presented by the fourth industrial revolution.

The problem is that existing technologies and services do not provide an easy and economical way for organizations to create their own internet search engine or to access its underlying features and/or services.

Let's delve deeper into the reasons that this status quo has prevailed for so long.

1.2 Current Internet Search Services

An overview of the search business reveals two extremes –

- At one end of the spectrum, we find the two behemoths of the internet search engine space – Google and Bing (which also power satellite search engines, such as AOL, YAHOO! and DuckDuckGo). These two search engines handle up to 50 billion webpages in numerous languages, making them the biggest web libraries in existence. There is very little that third-party users can do with the technologies that power these two search engines, as they provide extremely limited and restricted programmatic access to their search engine technology.

- At the other end of the spectrum, are the custom search platforms and services, that specialize in site searching and structured data indexing, such as Algolia and Swiftype. They offer users analytics and visualization, as well as a friendly user experience. Despite this, their search experience is lightyears away from a Google-like experience. In addition, their technology is neither economical nor scalable enough to enable the construction of a large-scale search engine. This fact was also declared by Algolia's co-founder and former CEO, Nicolas Dessaigne who said, "Algolia's technology wouldn't work to power a large-scale web search engine".

1.2.1 Google

Google (the company that claims to be the "gate guardian of the internet") only provides companies with extremely restricted access to some of its search technologies. They only offer a limited custom search service, which is primarily aimed to embedding search boxes in sites. Their main focus is on the B2C market.

Google has built one of the most profitable online businesses in history by introducing pay-per-click (PPC) keyword ads into their search results; and Google's service pricing is a direct derivative of its business model as an ad tech company. Google Search can be viewed primarily as a platform for exposing ads, and not as a tool that exists to make the web and its data optimally accessible. This is evident by its pricing model and the limitations that Google puts on its Custom Search product –

- **Search Box Inside a Site – Ads and No Content Control –**
  The free version of Google Custom Search enables to place a search box inside your site. It naturally comes with ads that account for over 80% of this behemoth's revenue. Google's ads ruin the search experience for users. These search boxes also do not provide you with any control over the data that is searched and the results that are shown.

- **Programmatic Access via an API –** Google Programmatic Custom Search provides 100 search queries per day for free. Additional requests cost $5 per 1000 queries, with a limitation of up to 10k queries per day. If you need more than 10k queries per day, then you must restrict your search engine to 10 sites or fewer.

1.2.2 Bing

Bing offers a more B2B oriented service, by providing (in addition to the Custom Search service) API access to its web search engine. Bing's pricing is similar to Google's (an average of 5$ per 1000). In addition, it restricts the number of requests per second that can be made to the API.

These restrictions are in place in order to guarantee Google and Bing Search's dominance, which ipso facto ensures that they will continue to lead the Internet ads industry by a large margin. Needless to say, they provide no on-prem internet search solutions, and keep their data organization, aggregated user queries and indexing and ranking heuristics secret.

1.3 Current Technologies

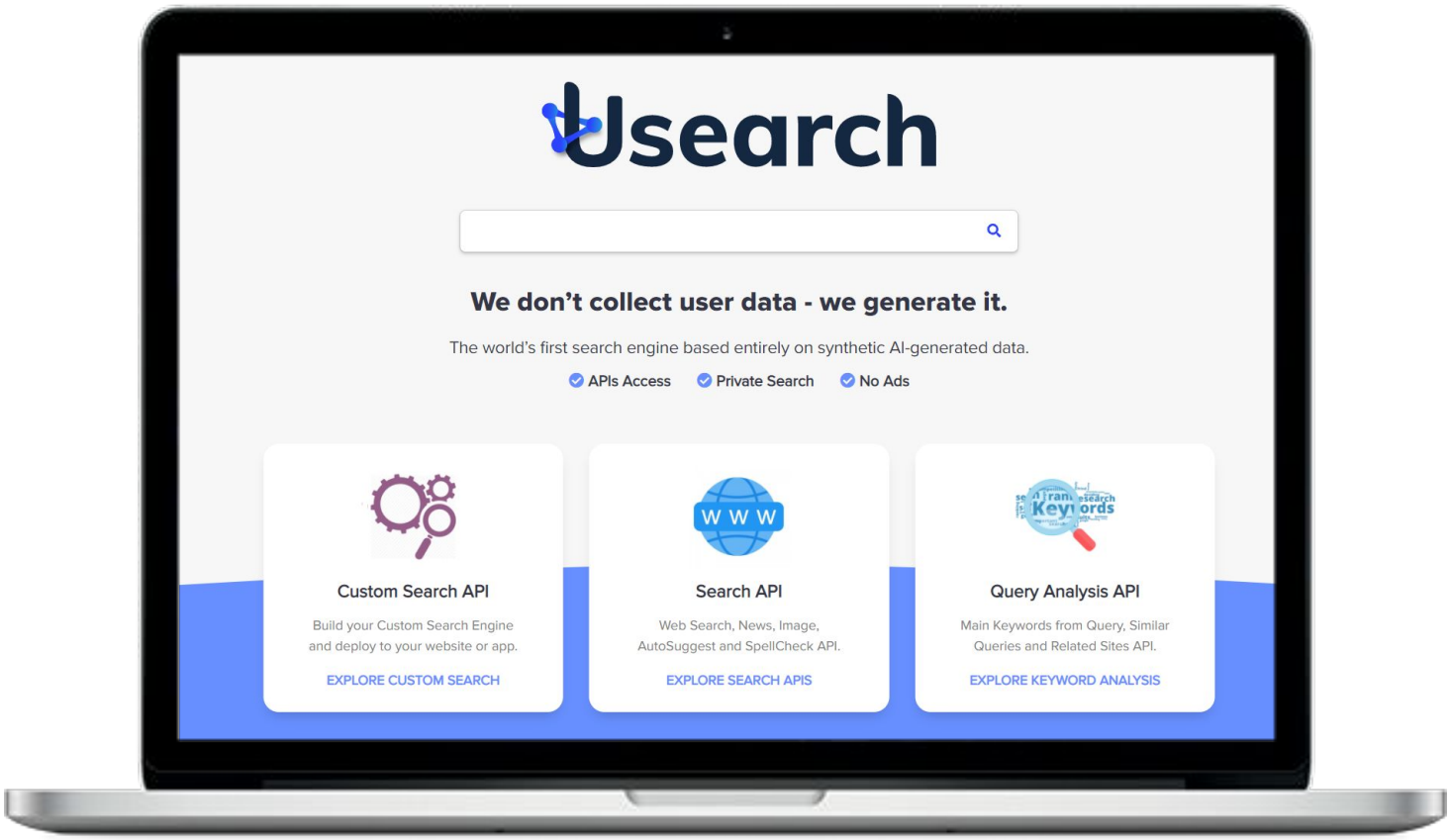
Until now, companies and developers who required search technologies, had only one realistic solution – to build and maintain their own search engine using open source technologies (such as Elasticsearch or Solr) and then to build the necessary features on top.

Building a search engine based on an open source technology is a complex task as search engines are complicated distributed systems by nature and are extremely expensive to operate. This is compounded by the problem of handling enormous amounts of data. On one hand, the more data a search engine processes and indexes, the more quality results it provides. However, on the other hand, as the quantity of data increases, the more scalability challenges intensify (because of the storage and processing power required for processing). These challenges have become increasingly laborious and technically complex, even for the most tenacious and deep-pocketed organizations.

Reality has proved that no matter how hard anyone tries, the search engine experience offered is almost always orders of magnitude behind Google Search, which is the current benchmark for the search experience.

1.4 The Solution – Usearch

Fortunately, all the doom and gloom discussed above can finally be put behind us. We have completed the painstaking process of building web search technologies that provide enterprises with accessible, easily implemented web access and content control. Our algorithms are inspired by ground-breaking advances in the field of neuroscience. It is extremely scalable and highly competitive with Google and Bing. It enables us to reduce costs dramatically and to offer an entry point for harnessing the sea of data on the web.



2. Usearch Services

Usearch offers Search-as-a-service that includes –

- Custom Search
- Web Search
- Query Analysis

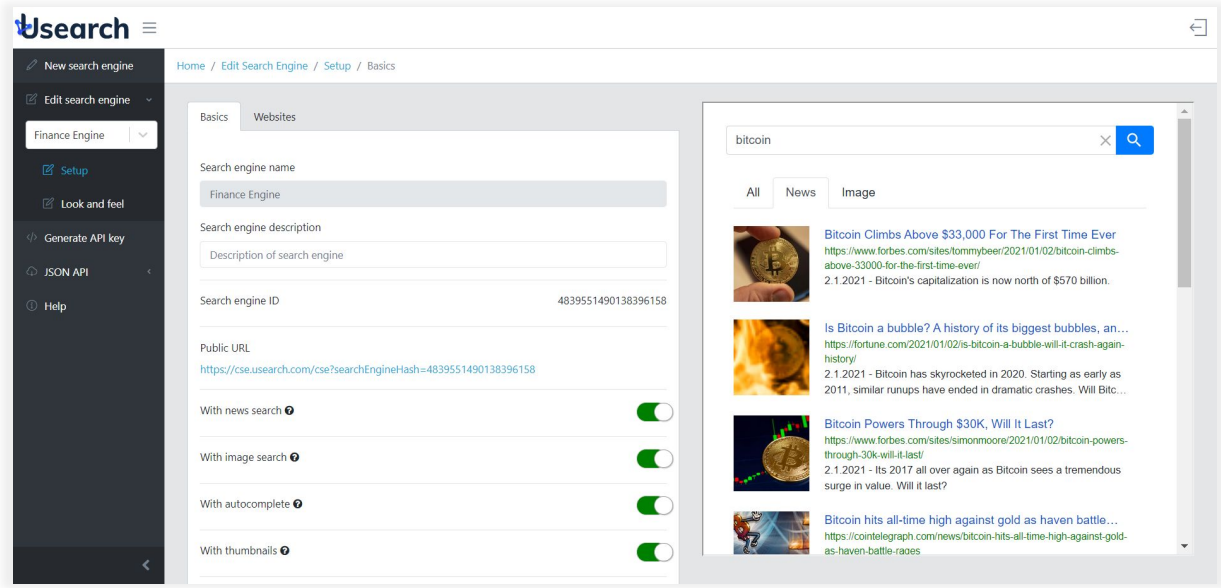
2.1 Custom Search

Usearch enables users to create large scale internet search engines and to easily integrate them in their products. There is no need for prior or extensive knowledge. Here's the extremely simple process –

1. **Specify Which Site(s) –** The user provides a list of sites to be indexed (of any size).

2. **Usearch Creates the Search Engine –** Usearch creates a customized search engine according to preferences, in real time.

3. **Integrate the Search Engine –** The user can easily integrate the search engine into systems and applications using our API service or our client-side interface.



There are no restriction on the number of sites serviced by your customized search engine or the number of queries you can make to the search engine – and we don't show ads.

2.2 Web Search APIs

With the Usearch APIs in hand, you have all you need to build the search part of your business!

The Usearch service provides full access to our search engine usearch.com. Here are some of its main features –

- **Web Search API –** This is your gateway to the entire web. This Web Search API enables you to search through billions of webpages. Our advanced ranking algorithms guarantee highly relevant results.
- **News API –** This API provides access to recent news stories and articles from millions of news sources and blogs.
- **Images APIs –** This API provides access to billions of up-to-date images from all over the web. In addition, the Image API provides high-quality thumbnails.
- **AutoSuggest API –** This API predicts and provides search suggestions as user queries are typed.
- **SpellCheck API –** This API corrects spelling errors in all types of queries, whether it's brand names, slang, phrases, Q/A and so on.

2.3 Query Analysis

The Usearch service provides full access to our data tools. This includes –

- **Query Analysis API –** This API allows you to analyze a query and extract its main keywords (context).
- **Similar Queries API –** This API shows the top similar queries for a query together with an indicator bar that shows how popular each similar query is. The response includes –
  - All possible forms of the query. These forms include synonyms, acronyms and so on.
  - Popular queries related to the query's keywords.
  - Long tail keywords.

- **Popular Query Sites API –** This API shows the top sites relevant to the query together with the the share of the total number of relevant webpages of each site. The response includes –
  - Specific sites that are almost exclusively dedicated to the query.
  - Sites that contain a high volume of webpages relevant to the query (high authority domains)
  - Relevant sites with high global domain rank (high PageRank).

3. Deconcentrating the Search Engine Industry

Using our technology, we have solved the long-standing problem of search-as-a-service for any level of customer, whether it be a sole-proprietor app developer, a start-up company or a large enterprise. A customer might need something as relatively simple as in-app or site specific search, a search engine across the company's various sites, or something as complex as a large scale search engine that concentrates on a portion of the world wide web or on the world wide web in its entirety.

It matters not what the need is. In regard to search engine technology, Usearch is currently unmatched in providing this uniquely customized search engine service to the utmost satisfaction of all its customers.

Usearch enables you to create a tailor-made web search engine that is customized for your own niche. Usearch frees you from the long standing dependence on a few powerful corporations so that you can index the rapid changes of the world wide web the way that you want.

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