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Socio-cultural dimensions of Google and alternative search engines

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In search of ideology

Socio-cultural dimensions of Google and alternative search engines

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Keywords

Google, alternative search engine, ideology, social construction of technology, new spirit of capitalism

Abstract

Google has been blamed for its de facto monopolistic position on the search engine market, its exploitation of user data, its privacy violations, and, most recently, for possible collaborations with the US-American National Security Agency (NSA). However, blaming Google is not enough, as I suggest in this article. Rather than being ready-made, Google and its 'algorithmic ideology' are constantly negotiated in society. Drawing on my previous work I show how the 'new spirit of capitalism' gets inscribed in Google's technical Gestalt by way of social practices. Furthermore, I look at alternative search engines through the lens of ideology. Focusing on search projects like DuckDuckGo, Ecosia, YaCy and Wolfram|Alpha I exemplify that there are multiple ideologies at work. There are search engines that carry democratic values, the green ideology, the belief in the commons, and those that subject themselves to the scientific paradigm. In daily practice, however, the capitalist ideology appears to be hegemonic since 1) most users employ Google rather than alternative search engines, 2) a number of small search projects enter strategic alliances with big, commercial players, and 3) choosing a true alternative would require not only awareness and a certain amount of technical know-how, but also effort and patience on the part of users, as I finally discuss.

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1 Introduction

Google is big in many ways. The company has become one of the biggest in the world, it offers a myriad of services and products reaching from basic keyword search to futuristic glass technology, its ranking algorithm is state of the art, it possesses the most comprehensive index of the web and the most extensive database of user data, it is the leader in online advertising, and it figures as search engine number one, at least in the Western world. Just recently, it has been accused of collaborating with the US-American National Security Agency (NSA) exemplifying its powerful role in collecting and profiling personal data.[1] In debates on big data the conventional argument is that big data needs big methods to be mined and made productive for users. In the light of big data Google may be seen as *the* biggest method to be applied when trying to bring order to the web, to find answers to questions, to sift through the sea of information.

It is thus not surprising that Google is a flourishing company and its algorithm incorporates and strengthens the capitalist ideology. Rather than blaming Google for doing evil, however, I suggest thinking of Google as being shaped by society. Google shows us the face of capitalism because it was born and raised in a capitalist society. 'Technology is society made durable', as Bruno Latour (1991) put it. Accordingly, Google is not the only actor to blame. Quite on the contrary, actors like policy makers, jurists, journalists, search engine optimizers, website providers, and – last but not least – users are part of the game, too. If users turned away from Google, the whole business model, including its sophisticated algorithm and 'second index' of personal data (Stalder and Mayer 2009), would fall apart. But where can people turn to? Are there true alternatives to Google & co and their algorithmic ideology?

The goal of this article is to critically examine and discuss a selection of so-called alternative search engines and their ideological underpinnings. If Google embodies the capitalist ideology, what ideology do alternative search engines incorporate? What values do privacy-concerned search tools like DuckDuckGo carry? What is green about green search engines? May peer-to-peer search engines like YaCy be interpreted as communist search engines? Could search be seen as a scientific endeavor as Wolfram|Alpha suggests?

[1] For more information on accused collaborations between the NSA and IT companies leaked by Edward Snowden see, for example: Glenn Greenwald and Ewen MacAskill, 2013: 'NSA Prism program taps in to user data of Apple, Google and others':
http://www.theguardian.com/world/2013/jun/06/us-tech-giants-nsa-data

2 Google and its algorithmic ideology

In my previous work (Mager 2012a), I argued that algorithms – like all other technologies – should not be misunderstood as merely technical, mathematical or 'objective' tools; even though Google and its competitors try to establish them as exactly that. Rather, they should be seen as socially constructed entities mirroring and solidifying socio-cultural norms and values. Drawing on interviews with search engine experts of various kinds,[2] I showed how the capitalist ideology gets inscribed in Google's search algorithm by way of social practices. Following Luc Boltanski and Eve Chiapello (2007), I interpreted ideology not only as a moralizing discourse, but also as a set of shared beliefs, which are inscribed in institutions, embedded in actual practices, and anchored in reality. This notion of ideology is rooted in older contributions from critical theory that conceptualized the material dimension of ideology (e.g. Althusser 1971). It further relates to Foucault's (1995, 2002) work on the materiality of discourse and power. Along this line of thought, I exemplified how the 'algorithmic ideology' gets manifested in search technology, Google in particular. In the following paragraphs I briefly summarize central results from this analysis to lay the groundwork for the inquiry of alternative search engines and their ideological underpinnings.

Google's success is built on flat hierarchies, a flexible work force and the global information economy, central characteristics of 'the new spirit of capitalism' according to Boltanski and Chiapello (2007). On the basis of French management literature the authors elaborated how the capitalist ideology transformed from the 1960s to the 1990s and culminated in a globalized capitalism employing new technologies and being dependent on multinationals' interests. Coinciding with this shift is a preference for flexible, mobile and unattached employees, such as those who work at internet companies in Silicon Valley. They argued that the new capitalist spirit has managed to incorporate the 'artistic critique' that was raised by the generation of 1968 and the emerging left. The artistic critique accused industrial capitalism of being hierarchical, dehumanizing and restricting the individual's freedom, authenticity, autonomy, mobility and creativity. The integration of values like self-management and flexibility in the workplace helped the new spirit of capitalism to endure, as Boltanski and Chiapello stated. Google may be seen as illustrating central characteristics of this new form of capitalism very well. Moreover, Google also well corresponds to the new mode of exploitation that rose with the new spirit of capitalism. '*A form of exploitation that develops in a connexionist world* – that is to say, a world where the realization of profit occurs through organizing economic operations in networks' (Boltanski and Chiapello 2007: 355; italics in original). Rather than taking over classical business models based on audiences (such as web portals that collapsed during the dot-com crash), Google developed a new business model based on the 'traffic commodity', the flow of visitors from one website to the other (Van Couvering 2008). Later it began to syndicate cost-per-click advertisements to partner websites through its AdSense program, which allowed advertisers to relate their advertisements to a website's content.[3] Google hence succeeded in

[2] Between October 2010 and February 2011 I conducted 17 expert interviews, both personally and via Skype. My interview partners included computer scientists, programmers, software developers, and people working in information retrieval (mainly from big, universal search engines). Furthermore, I talked to one search engine optimization expert, one economic journalist, one net activist, one jurist and two policy-makers concerned with search technology, as well as multiple search engine scholars from the social sciences (all from the US and Germany, one from Ireland). This research was supported by HUMlab, Umeå University (Sweden), where I worked as a post-doctoral fellow from 2010-2012.

[3] In fact Google imitated a technology originally invented by the search engine GoTo that allowed advertisers to bid on how much they would like to pay to appear on top of sponsored search results in relation to individually chosen search terms.

aligning its technology with a business model that perfectly fits the 'connexionist world'. Jarvis (2009:5) described Google's success as follows:

> 'Google thinks in distributed ways. It goes to the people. There are bits of Google spread all over the web. About a third of Google's revenue – expected to total $20 billion in 2008 – is earned not at Google.com but all its sites all over the internet.'

Scholars like Matteo Pasquinelli and Christian Fuchs explained how Google extracts value from networks. Pasquinelli (2009) argued that Google's PageRank algorithm exploits the collective intelligence of the web since Google uses links from other websites to measure a websites' value. These links may be seen as a concretion of intelligence that is used by Google to create surplus value. Fuchs (2011) further hinted to the importance of including users' activities to understand Google's capital accumulation cycle. Google not only exploits website providers' content, but also users' practices and data. He thus concluded that 'Google is the ultimate economic surveillance machine and the ultimate user-exploitation machine' and that class needs to be newly examined under the conditions of 'informational capitalism' (Fuchs 2011). My colleague Jenny Eklöf and I (2013) additionally showed that the capitalist ideology Google carries contributes to a commercialization of search results and has thus wider implications on the way we approach information and make sense of the world we live in.

But criticizing Google and its business model is not enough, as I further elaborated. Rather, it is essential to understand power relations and social practices involved in the construction and solidification of search algorithms. Website providers and users are not simply exploited by Google (and others). Quite on the contrary, they clearly benefit from the search services Google provides. Website providers aim to gain visibility in the multitude of web information and reach users to communicate their content. Users, in turn, want to conveniently find information and filter them along their needs. Search engines have managed to satisfy both website providers' and users' needs with their services. Especially, Google has become an 'obligatory passage point' (Callon 1986) website provider and users have to pass to reach their own goals (Mager 2009, Röhle 2009). As a consequence, providers and users of web information solidify search engines and their capitalist spirit – both consciously and unconsciously. Also, services like Google AdWords and Google AdSense would not work if people would not advertise with or click on Google ads. Furthermore, broader socio-political frameworks strengthen corporate actors like Google. The politics of privatization of the last decades put search on the free market. Despite efforts to create a European search engine,[4] policy makers have not succeeded in establishing a competitive, non-corporate search engine in the past. Consequently, Google has become a powerful player challenging politics, law and economics in Europe and beyond. Whether lack of financial resources and technical expertise have led to policy's loss of control over search technology, or whether governments actively decided to outsource search – and related tasks of data collection and citizen surveillance – to big companies to profit from their databases in post-9/11 societies cannot be answered here. What is certain, however, is that politics, but also mass media strongly participate in the stabilization of big players; the latter by constantly featuring new services, products and, ultimately, IT companies. This techno-euphoric breeding ground is about to change now that more and more data protection violations and scandals like the NSA affair are critically discussed in the public domain. All these examples show that search engines like Google are no external factor to society, but rather enacted and

[4] One example is Quaero, a joint German-French search project that got split up and divided in the French multimedia search project 'Quaero' and the German semantic technology project 'Theseus'. Another example is Europeana, which is a virtual library of European culture (books, paintings, films, museum objects and other archival objects) more than a search tool though.

negotiated in society. Actors like Website providers, users, marketers, journalists, policy makers and jurists are all part of the actor-network strengthening Google and its capitalist ideology.

This, however, would give us the chance to opt out of Google's accumulation cycle, if we wanted to. If website providers and users broke out of the network dynamic, the power of Google and its scheme of exploitation would fall apart. If mass media and activists continued a critical debate about search engines and the myriad of data they collect, store and process, big players would be destabilized. If politics and law took on a stronger role in the regulation of search technology, limits would be set regarding the collection and use of personal data, but also business practices and advertising schemes. First steps towards a renegotiation of search engines are seen on various levels. A new data protection law is currently negotiated in the EU. More critical media debates on Google, Facebook, Apple, and other IT companies are seen due to the increase of tracking methods, privacy violations, illicit practices of scraping WiFi data, and possible collaborations with secret services.

So the question is why are users still not turning away from big players like Google? Why do they not leave big search and move towards smaller, alternative search engines? The common answer, even amongst search engine experts, is because there are no real alternatives. But is that actually the case? What about all the other search projects trying to challenge Google and provide an alternative style of search?

3 Alternative search and its ideological inner life

There are a number of so-called alternative search engines. Search engines that are not big players like Google, Bing or Yahoo!. Search engines that lead their lives at the margins of the search market. Of course, Bing may be conceptualized as an alternative to Google in terms of its index and algorithm too. However, Bing may also be considered as yet another for-profit search engine like Google. It is no true alternative from an ideological standpoint. In line with the purpose of this article I conceptualize alternative search engines as search tools that claim to have a particular ideological agenda that clearly distinguishes them from big, corporate search tools.[5] Accordingly, all search engines included in the analysis explicitly devote themselves to a particular ideological framework. Further, all of them are general-purpose search engines with no particular topical focus, even though Wolfram|Alpha is specialized in answering factual questions rather than cultural, social scientific or commercial ones, as I will exemplify later.

The central aim of the following analysis is to scrutinize whether the chosen search engines may be seen as true alternatives in terms of their ideological stance and what norms, values and ideas they carry. Further, their self-descriptions will be juxtaposed with their actual practices. Whether they could be true alternatives on a technical level or whether their search results are better than those of their bigger relatives can only partly be answered since this would go beyond the scope of this article.

[5] Social search or social bookmarking techniques like Delicious may also be seen as alternatives to big search. But since their search services are limited to a certain platform or user-generated indexes they will not be included in the analysis.

Privacy first

The first search engine I included in the analysis is DuckDuckGo because it claims to be a privacy-concerned search engine. DuckDuckGo was founded by the entrepreneur Gabriel Weinberg and its developers **'**believe in better search and real privacy at the same time**'**.[6] Its website further explains that DuckDuckGo does not track, does not filter bubble, and does not share data with third parties and goes on with a lengthy discussion on privacy issues and a visual explanation of what it actually means to be tracked, collected and shared with third parties when using search engines like Google. So they clearly try to provide an alternative to major search engines in terms of data protection and anonymous search. Their default settings protect privacy rather than collecting and offering personal data to third parties (what big search engines usually do). They incorporate privacy in their technical Gestalt and may hence be interpreted as following the principle of 'Privacy by Design'. Privacy by Design builds on the idea of integrating privacy relevant features in the design process of IT technologies to enable 'value-sensitive innovation' (Allhutter and Hoffmann 2010). But can privacy be seen as their ideological framework?

Figure 1: DuckDuckGo homepage, subpage: more: privacy: don't track

Privacy is a moral concept, no doubt. It is about fundamental rights. Privacy is a central component of human rights and is regulated in international agreements and law like the UN's Universal Declaration of Human Rights and the EU's Charter of Fundamental Rights. In the context of information technologies, it is codified in recommendations like the OECD Privacy Guidelines and legal norms such as the EU Data Protection Directive 95/46/EC (Čas 2011). The latter one is currently under negotiation since the European Commission plans to unify data protection within the EU with a single, binding law, the General Data Protection Regulation. But privacy is not only about rights, it comes with ideas about autonomy and freedom, and it is an essential prerequisite for democratic societies (Čas 2011, Peissl 2010). Privacy can thus be seen as something stronger than law and regulations. It may be interpreted as an ideological tool to tame the free market, to set boundaries, where boundaries are missing. To provide technological alternatives that enable individual choice. DuckDuckGo may indeed be seen as positioning itself as an ideological counterpart to search engines like Google with its practice of user profiling. This seems to work in times of increased privacy violations and

6 https://duckduckgo.com/about

scandals, as the record traffic of DuckDuckGo shows that followed the news coverage of Google's possible collaboration with the NSA.[7]

So can this become a success story just like the one of David against Goliath? In terms of data protection it probably can since users are provided with the possibility to search the web, while protecting their personal data. In the long term, if enough users would switch to anonymous search, the business model of big search engines may even be threatened because the flow of user data – lying at the heart of their business practices – is interrupted by search engines like DuckDuckGo. When looking more closely, however, DuckDuckGo is troubled with cosmetic flaws. Even though it does not sell personal data to gain profit it does provide contextual advertising on its site. Its ads are provided by Bing Ads, but should be adhering to their privacy policy, as its website claims. However, the use of Bing Ads on its website clearly contributes to the revenue model of Bing and its partner Yahoo!. Furthermore, DuckDuckGo does not only use Bing Ads, it also uses Bing's search results. Although DuckDuckGo operates its own web crawler, the DuckDuckBot, it is also dependent on results from other search engines and sources since its index of the web is pretty small. According to its community platform it gets its results from over 100 sources including crowd-sourced sites like Wikipedia, but also for-profit search tools like Yandex, Wolfram|Alpha, Bing, and Yahoo! (also displaying Bing results).[8] Maintaining its own web crawler and building a comprehensive web index is a very expensive endeavor. Consequently, most search engines either partner with one search engine or use results from multiple sources. Since DuckDuckGo is using commercial and non-commercial sources it partly depends on for-profit search engines like Bing, which does track users and which does sell personal data to third parties. So even if DuckDuckGo provides encrypted search and does not sell user data to third parties itself, it does make use of big players and their business practices. This, I would say, casts a shadow over its belief in privacy and fundamental rights since DuckDuckGo is in alliance with commercial players and their tracking methods. In fact, it needs big search in order to keep their small search engine running. An aspect that similarly applies to other privacy-concerned search engines including Ixquick[9] or MetaGer[10], which both use results from other, partly big search engines. They all fetch results from other search engines without saving users' IP addresses or passing on personal information. But still, they would not be able to exist without their data collecting counterparts.

Green search

Another model of ideological search is green search. Green search engines are offering the possibility to financially support ecological projects by using their search services. Ecosia, for instance, helps to plant trees, as it states most prominently on its starting page.[11] It describes itself as a 'social business' based in Berlin. Its basic idea is to donate 80% of its advertising revenue to the Nature Conservancy, which helps to afforest the Brazilian rainforest. The ads it displays on its site are served by Yahoo!, who pays Ecosia a share of its revenue generated with these ads. Its own servers run on green power. Its search results come from Bing though, which does not use green energy. This is an example of what Dirk Lewandowski (forthcoming) coins the 'partner-index model'. Ecosia uses Bing's partner index and, in turn, the advertising

7 Jennifer Slegg, 2013: http://searchenginewatch.com/article/2275867/DuckDuckGo-Sees-Record-Traffic-After-NSA-PRISM-Scandal

8 https://dukgo.com/help/en_US/results/sources

9 https://www.ixquick.com/eng/

10 http://metager.de/en/

11 http://www.ecosia.org/

revenue is split between Yahoo! (partnering with Bing) and Ecosia (donating 80% to the rain forest). Since online searches are co-produced by computers, computer networks and servers a great deal of CO_2 emission is produced during each search (up to 7 grams of CO_2 in the case of Google according to a Harvard physicist).[12] To compensate for the CO_2 emission generated by the Bing searches Ecosia supports a project in Madagascar.[13]

When looking at its initiatives Ecosia clearly follows a green agenda. Contrary to search engines that help to find ecological information like the Green Planet Search,[14] Ecosia enables users to take action. Since environmentalism is increasingly embedded in everyday routines and situated in objects (Haider 2011), green search engines can function as a vehicle to engage in environment protection. Like the recycling bin and other objects, green search engines can be seen as a materialization of civic engagement and political action. According to Noortje Marres (2011: 515) such objects '(…) have the capacity to turn everyday material activities into forms of engagement with the environment (…)'.Green search engines may be interpreted as 'technologies of participation' (Thrift 2008) that make involvement easy since they do not require any significant change in the practice itself (compared to green devices that would require crucial material, social and technical transformations; Marres 2011).

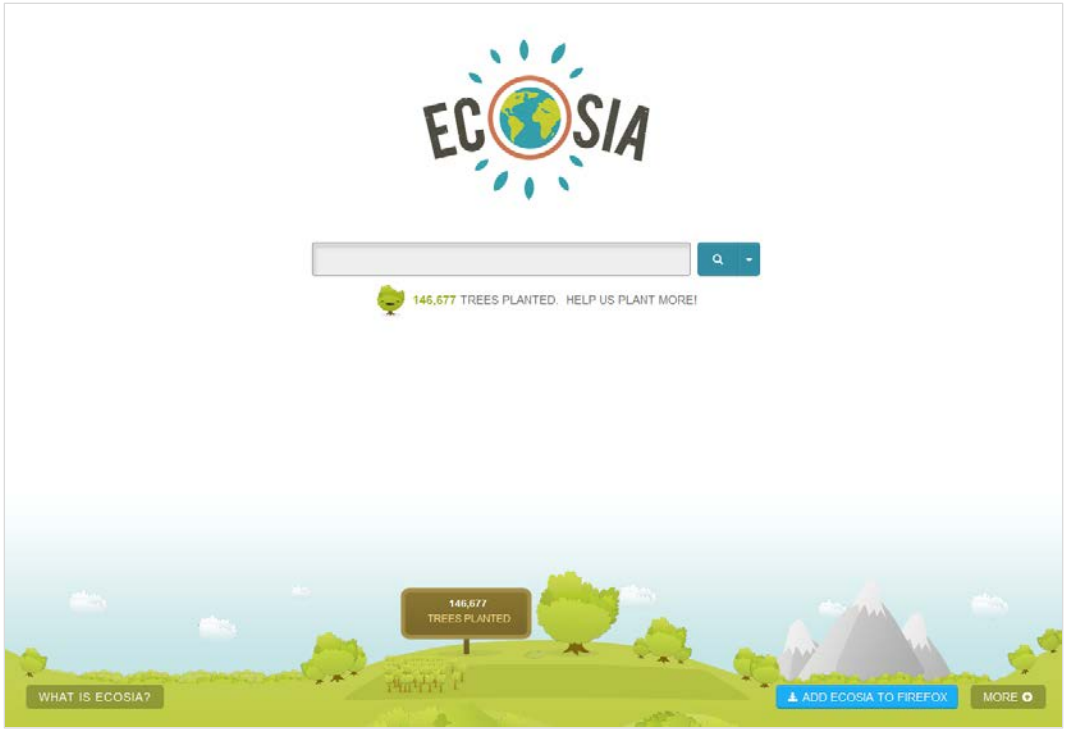

Figure 2: Ecosia homepage

12 Jon Swaine, 2009: http://www.telegraph.co.uk/technology/google/4217055/Two-Google-searches-produce-same-CO2-as-boiling-a-kettle.html

13 In 2010 Google launched its green initiative with the main purpose of cutting down its environmental impact (e.g. by reducing their data center energy use) and investing in environmentally conscious technology: Jack McGrath, 2011: http://www.technobuffalo.com/2011/05/18/googles-green-initiative-environmentally-conscious-technology/

14 http://www.greenplanetsearch.com

Similarly to privacy-concerned search engines, however, their green ideology is endangered by their dependence on big search in terms of both search results and advertising revenue. That is a threat not only in an ideological, but also in a very practical sense, if we look at the history of green search projects. There were multiple green search engines in the past. Except from Znout,[15] which compensates Google searches with renewable energy certificates, all of them were closed down. Most of them used Google search as their back-end, such as Ecocho, and are no longer supported by Google because they 'jibe with Google's AdSense policy, which prohibits the compensation of third parties through the promise of performed searches'.[16]

Their fate hence exemplifies the difficulty that comes with the dependency on a single search engine. Big players can simply stop supporting small projects if their policy does not harmonize with their own advertising policy anymore. Besides, green search engines actively support big search in terms of their revenue model. They do not only use big search tools for their own results, they even support advertising practices by corporate search tools since they use (need) them for their own (green) purposes. It is a collaboration that serves both parties. Green search engines may thus be seen as surfing on the capitalist wave towards more ecological technology. However, their journey may abruptly be stopped any time, if big search tools decide to opt out of green projects, as we have seen in the past. 'Informational capitalism' is the captain steering the green ship through the rough sea of online search after all.

The commons

Besides search engines with a centralized web index, there are projects that try to provide decentralized search following the principle of file-sharing networks like the PirateBay. The most popular proponent of such decentralized search projects is the peer-to-peer network YaCy, created by the German free software enthusiast Michael Christen. If reading through the YaCy website, the major goal and ideological ambition of the search engine jumps at you right away: 'We want to achieve freedom of information through a free, distributed web search which is powered by the world's users.'[17] The image that is displayed in their About Us section clearly shows that the search engine characterizes itself as a true alternative to centralized search engines like Google or Bing and their capitalist ideology (see Figure 3).

Freedom and independence are put first. Rather than relying on big search engines, YaCy provides users with the possibility to run a search technology on their own computers and/ or participate in a private computer network that is not controlled by a single company or individual. This basically means that there is no central index of the web, such as Google's index. Rather, there is an index that each user builds by searching the web through the YaCy Proxy (that one needs to install first). This index is then shared with other peers in the network so that a global index comes into being. Furthermore, a web crawler expands the index, which has gained more and more importance over the last years. When users do a global search, the index of all peers, that are currently online, is searched.

This means that everyone can see how information is obtained by the search engine and displayed to the user. YaCy is open-source, free software, which is completely transparent, as its website claims. No collaboration with big search engines is needed[18]. Quite on the contrary,

15 http://us.znout.org/

16 Nathania Johnson, 2009: http://searchenginewatch.com/article/2054343/Google-Says-No-to-Ecocho

17 http://yacy.net/en/index.html

18 In contrast to the peer-to-peer search project Seeks, which aims to be a free software/open source project, but uses commercial search engines to generate its index too: http://www.seeks-project.info

YaCy wants to make free content accessible through free software so that users do not have to go through proprietary search engines 'in an increasingly monopolistic internet infrastructure because then the monopoly holders decide what information is visible'.[19] Moreover, YaCy protects privacy since there is no central evaluation or monitoring of search queries and helps to green the web because only users' computers are needed and no additional data centers with enormous power consumption are required.

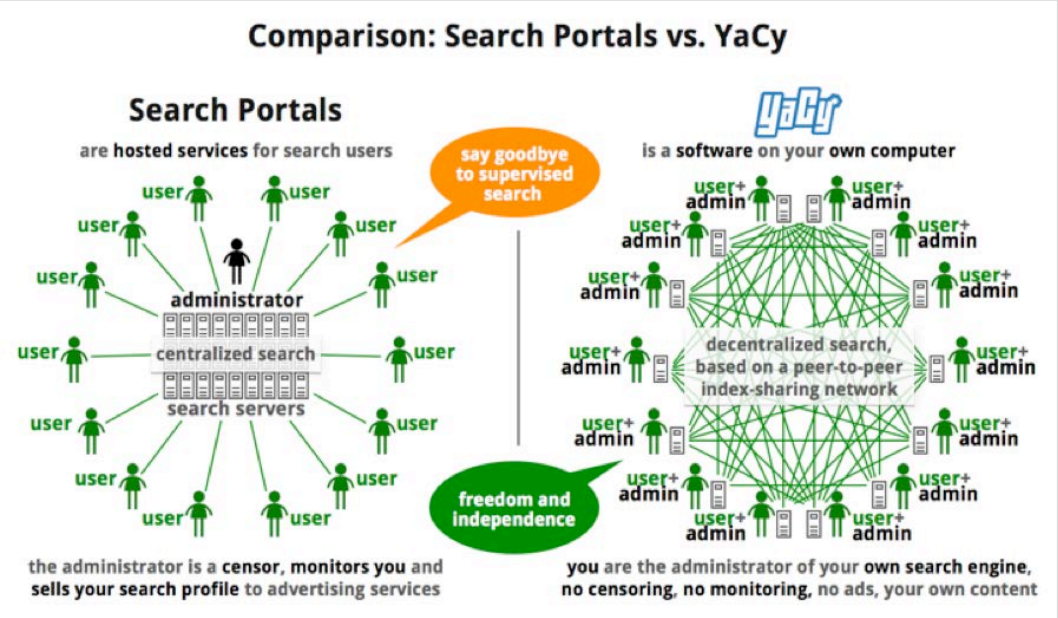

Figure 3: YaCy homepage, subpage: about YaCy

From an ideological standpoint YaCy may be interpreted as devoting itself to 'commons-based peer production', a term coined by Yochai Benkler (2006). 'The salient characteristic of commons, as opposed to property, is that no single person has exclusive control over the use and disposition of any particular resource in the commons.' (Benkler 2006: 61) Michael Hardt (2011) even goes further by arguing that the commons are able to create not only new goods, but also new humanity:

> 'Communism should be defined not only by the abolition of property but also by the affirmation of the common – the affirmation of open and autonomous production of subjectivity, social relations, and the forms of life; the self-governed continuous creation of new humanity.'[20]

The communist manifesto is not on the list of references that YaCy provides on its website though. It does, however, reference and support manifestos by the Free Software Foundation Europe, the Chaos Computer Club, the German Pirate Party, or the Charter of Civil Rights for a Sustainable Knowledge Society. This shows that the free software movement and commons-based peer production are central pillars of YaCy's ideological framework. Following Hardt's argumentation YaCy may even be seen as closer to the communist spirit than to the capitalist ideology.

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19 http://yacy.net/en/Philosophy.html

20 Michael Hardt, 2011: http://www.theguardian.com/commentisfree/2011/feb/03/communism-capitalism-socialism-property

Scientific search

Finally, to round off the picture, scientific search engines are worth mentioning in terms of alternative search projects. Wolfram|Alpha is well-known for this style of search. Wolfram|Alpha is a search tool, or rather software, developed by Stephen Wolfram, a British physicist and mathematician. Wolfram built the software Mathematica, which integrates computer algebra, symbolic and numerical computation, visualization and statistics. On its website, Wolfram|Alpha is described as a scientific tool that provides answers to factual queries by computing external sources: 'Our goal is to build on the achievements of science and other systematizations of knowledge to provide a single source that can be relied on by everyone for definitive answers to factual queries.'[21] Rather than offering users sources and websites that may contain answers to their questions, Wolfram|Alpha wants to provide users with straight answers in a scientific manner. It favors 'expert-level knowledge', facts, and figures and hence clearly dedicates itself to the scientific paradigm. The attempt to offer knowledge rather than information, Wolfram|Alpha describes itself as a 'knowledge engine', mirrors the idea of enlightening citizens. In contrast to conventional search engines providing users with heterogeneous, often contradictory information that needs to be actively transformed into knowledge by the individual user (Mager 2012b), Wolfram|Alpha promotes reason and scientific thought and aims to provide users with straight knowledge. Rather than pointing to bits and pieces of information that need to be integrated from the bottom up, WolframAlpha claims to offer 'reliable' knowledge from the top town resembling modern value-systems more than postmodern chaos.

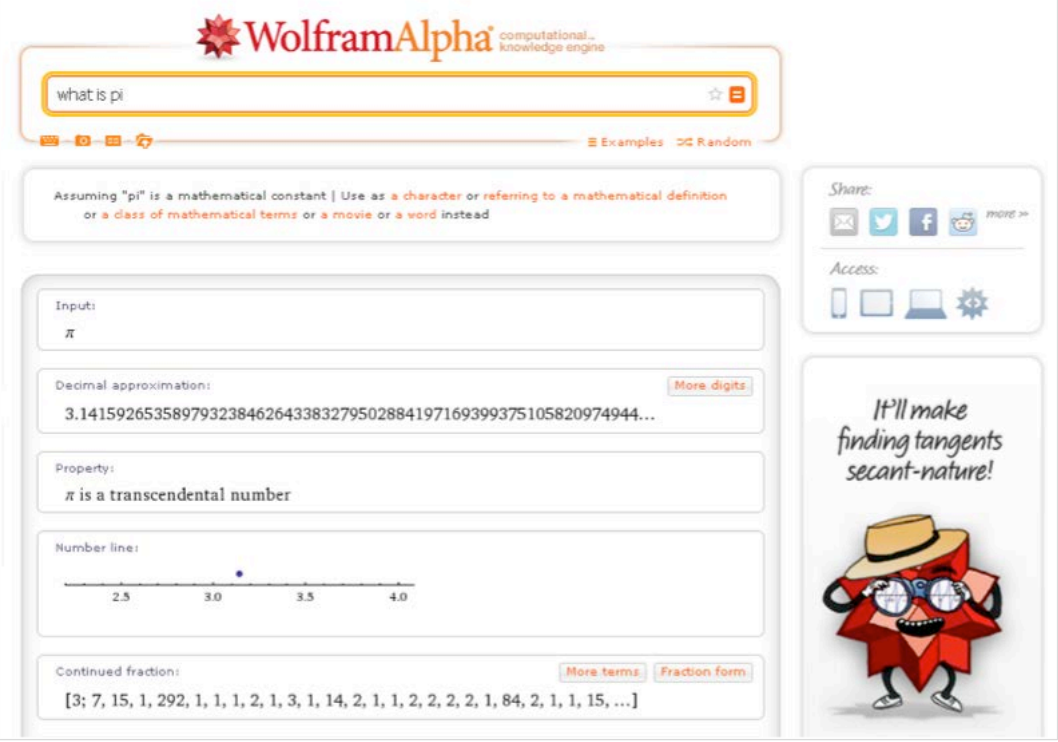

Figure 4: Wolfram|Alpha: http://www.wolframalpha.com; search query: 'what is pi?'

21 http://www.wolframalpha.com/about.html

Technically it contains of a natural language interpreter at the front-end and a number of key data sources, which have been captured and standardized by Wolfram staff, at the back-end (e.g. Wikipedia, Encyclopædia Britannica, or newspapers). Economically Wolfram|Alpha tries to incorporate the capitalist ideology into its scientific endeavor. Unlike big, universal search engines it does not only count on advertising though. Besides its free, advertising-based search tool, Wolfram|Alpha offers a Pro version that includes additional features for a monthly subscription fee of $5 and does not display advertising. It further makes money with sponsoring contracts and licensing partnerships. This underlines the fact that Wolfram|Alpha is a software product rather than a search tool. The Infoworld journalist Neil McAllister argued that Wolfram|Alpha even goes beyond conventional software companies in terms of copyright questions.[22] When reading through Wolfram|Alpha's terms of use one can see that the software does not only claim ownership for the software itself, but also for its output. This is the exact phrasing:

> 'In many cases the data you are shown never existed before in exactly that way until you asked for it, so its provenance traces back both to underlying data sources and to the algorithms and knowledge built into the Wolfram|Alpha computational system. As such, the results you get from Wolfram|Alpha are correctly attributed to Wolfram|Alpha itself.'[23]

Taking this seriously would mean that Wolfram|Alpha holds a copyright of all users' search queries. Moreover, open data are closed down when being processed by the software that claims to 'bring broad, deep, expert-level knowledge to everyone', as it claims on its homepage. This crucially runs counter the ideal of both free software and freedom of information. In contrast to YaCy, Wolfram|Alpha contributes to closing down web information that is freely available by simply processing it. Serious trouble with copyright law may follow from this policy since computers should not be entitled to credit for their calculations, as the free software activist Richard Stallman remarked.[24]

22 Neil McAllister, 2009: http://www.infoworld.com/d/developer-world/how-wolfram-alpha-could-change-software-248?page=0,0

23 http://www.wolframalpha.com/termsofuse/

24 Richard Stallman, 2009: http://lists.essential.org/pipermail/a2k/2009-August/004865.html

4 Conclusions

When considering alternative search projects in the limelight of ideology we can see that the capitalist spirit is by far not the only ideology shaping contemporary search engines. Quite on the contrary, there are multiple 'algorithmic ideologies' (Mager 2012a) at work. There are search engines that carry democratic values, those that incorporate the green ideology, some that believe in the commons, and others that subject themselves to the scientific paradigm. This means that we can set an ideological example by choosing one search engine over the other.

In daily practice, however, the capitalist ideology appears to be hegemonic since not all ideologies are equal in terms of exercising their power for the following reasons: 1) The majority of users turns to big search engines and hence solidifies the capitalist spirit more than any other ideology.[25] 2) Moreover, most alternative search engines subordinate to 'informational capitalism'. DuckDuckGo and Ecosia both entered alliances with big search engines by using their search results and advertising methods. They assimilate the capitalist spirit by relying on big search and its capital accumulation cycle. Their ideological agendas are not deeply embedded in technical layers and algorithmic logics because both the index and the algorithms they use are borrowed from other search engines. Their ideology is only carried on the surface; e.g. their user interfaces, encryption techniques and donation models. In contrast, Wolfram|Alpha chose to be independent on an algorithmic level, but ended up as a commercial product too. The only exception is YaCy. The peer-to-peer network is the only search tool discussed in the article that provides a true alternative to corporate search engines. It is the most radical alternative to proprietary search and expresses its values on the level of infrastructure, software and content. Its ideology is deeply woven into its technical Gestalt and computational logics and hence embedded in actual practices. All other search tools absorbed the capitalist spirit in one way or the other.

This indicates that opting out of big search and its capitalist underpinning is not as easy as it may seem at first sight. Everyone is free to choose alternatives, of course. But, and this is the 3) obstacle to challenging the capitalist hegemony, selecting a true alternative, both in terms of technology and ideology, would require not only awareness and a certain amount of technical know-how, but also effort and patience. The latter have become rare goods in our fast moving, comfortable consumer culture. Using YaCy to its full extent, for example, requires installing YaCy first, accessing the global index, and being patient in case the desired information does not appear immediately. It probably also involves missing some pieces of information other search engines would provide; for better or worse. The network is only as good as its participants after all. This indicates that the farther you move away from dominant search engines towards alternative ones, the more beautiful their technical and ideological Gestalt become. It, however, further reveals that the beauty of search comes at a cost. True alternatives can only be reached with a critical mass of users that are willing to sacrifice bits of their convenience in return to a search tool that is created and owned in the public domain.

Whether a peer-to-peer search engine like YaCy will ever be able to compete with Google in regard to scope and quality of its results will ultimately depend on the number of users participating. But time and money is needed too. Crawling and indexing the web has become a time-consuming and very expensive undertaking that involves sophisticated technology and highly skilled engineers. In case of centralized search it further needs large data centers around the

[25] Google has a market share of more than 90% in most European countries according to the website SEO chief, 2010: http://www.seo-chief.com/5950/the-market-share-of-google-in-various-countries

globe. Big search engines like Google possess years of experience with handling big data, an enormously skilled workforce and large-scale infrastructure. Small search engines, like the ones discussed in the article, just started out with taming big data and challenges that come along with it. Whether they will succeed in providing a true ideological alternative to corporate search tools like Google will depend on the human resources and funding they are able to acquire in the end. Just recently, Lewandowski (forthcoming) suggested providing public funding for creating a public index of the web that would enable programmers to build various search engines on top of it and, as a result, to achieve greater diversity on the search engine market. Contrary to funding one single search engine, funding an open web index would enable the creation of multiple different algorithms and search tools. The author argued that such an open index

> 'would motivate companies, institutions, and developers pursuing personal projects to create their own search applications. The data available on the web is so boundless that it lends itself to countless applications in a broad range of fields. A new search engine index would not only make it possible to operate comprehensive web search engines that seek to include practically everything available on the web, it would also enable specialized search engines covering a broad range of subjects.' (Lewandowski forthcoming)

Consequently, users would be able to choose from different ranking mechanisms and hence different search results. Lewandowski concluded with arguing that the task of building and maintaining a search engine index is part of government's role to provide public infrastructure. 'The state finances highways used by everyone, ensures that the electrical grid is available to all, and generates and disseminates geodata. Making web data available is no different from these other public services.' Whether funding an open web index is a feasible strategy to strengthen diversity and non-corporate search engines in the future, or whether alternative incentives and actions would be needed has to be further discussed. What this article has shown though is that there are still certain barriers to be conquered on the road towards alternative search both in terms of technology and ideology.

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