

Future Trends Report

Based on Analysis of the Team's Chosen Community / Organisation in Mid-Term and Final Evaluation

Searching Behind The Search Engine (Group 10-16)

Community / Organisation Studied: Internet and Search Engine Users

STEP 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 5 most important challenges and write them in the space provided. Include applicable research with appropriate in-text citations.

Challenge 1: Unethical Censorship of Search Results

Freedom on The Net (FoTN), an independent watchdog organization advocating for worldwide freedom and democracy found that in 2016, about 35% of the world's internet population does not have freedom from censorship of search engines, with authoritarian governments flagrantly disregarding the Universal Declaration of Human Rights. (Observation)

Given that search engines such as Google have come under fire¹ for "systematically excluding" certain Web Sites based on consumers' identity so as to push most suitable results, these "invisible filters" thus lead to a threat towards our freedom of speech and liberty. In the long term, independent and diverse viewpoints may cease to exist in the future, defying the very purpose of search engines: to give voice to members of society. (Why)

One example of this is a study by Halpern Pariser. When 2 users searched the same keyword when researching on the British Petroleum (BP) and the Deep Water Horizon oil rig accident, a user the search engine identified as a businessman received investment information on BP, while another user identified as an environmental activist only received news articles on the oil spill. More serious cases of unethical censorship involve censorship of political sites¹ (China), and even simple topics such as climate change depending on one's political beliefs. (Research)

¹Protests and ethical concerns by Google Employees and public against Google's decision to develop highly censored search engine for China

Challenge 2: Moral Accountability and Social Responsibility for Search Engine Companies

Based on our interview with Derek Tong from VMWare, a data analytics company, he says, “An organisation’s reputation is at risk when using covert surveillance. If a companies’ digital security is compromised, it will be difficult to build back confidence people have in the company”. (Observation)

Given that a search engine catalogs large amounts of data about its users, there is the potential for it to be accidentally leaked or breached, **thus leading to** millions being vulnerable with their information being available for third parties to access for malicious purposes. **In the long term**, this may result in users no longer being in control of how their actions, ideas, and information are used on online platforms. (Why)

According to The Washington Post, Facebook is currently being investigated for allegedly violating users’ privacy, as the social network’s data has been used to manipulate elections. Google is also facing backlash about its data collection policies, and how they impact consumers. For example, the government may subpoena user data from search engines, such as to prevent terrorist attacks or for legislations such as the Child Online Protection Act (2006). When governments have increased access to user data, “function creep” may occur, where the data is used for other purposes like debt collection. (Research)

Challenge 3: Alteration in decision-making

Based on our interview with Derek Tong from data analytics company VMWare, he has stated that although covert surveillance betters buyer experience due to the ability to target the various needs of customers, this constant surveillance may negatively influence customers’ decision making. He mentioned that the use of artificial intelligence could lead to the search engine recommending products which the customer does not innately want, and the customer would stick by that recommendation instead of following their free will. (Observation)

When information is conveniently placed in front of the customer by the search engine, they may not analyse search results but instead abide by what the search results list for them, taking it as the definitive answer. They are deprived of seeing all the information presented to them to possibly make another decision, which results in a loss of free will. This would be a problem as one’s individuality would be lost. Society will have much less freedom of speech and diversity of views. Furthermore, people will not necessarily receive the information they want and thus will be impeding on free will. (Why)

According to a study done by Jon Penney, a researcher, the year after Snowden disclosed the US’ cover surveillance tactics, a sudden decline in Wikipedia searches on extremist religious groups, such as Al Qaeda was observed, suggesting that people feel an invasion of privacy when using search engines, and are thus inclined to self-censor. Another

study done by Robert Epstein and Ronald E. Roberston of the American Institute for Behavioral Research and Technology showed how covert surveillance in search engines could be used for political agenda, influencing less knowledgeable voters to choose a certain candidate in what they coined Search Engine Manipulation Effect. (SEME) In today's Covid-19 Crisis, covert surveillance also causes search engines to be partial when disseminating information. For example, when searching "coronavirus" on Bing, healthcare-related sources constituted almost half of the top 20 results, whereas for Google, Yandex, and Yahoo, they comprised less than one-quarter of the top results. These discrepancies could cause the public to misinform the public and limit their decisions to be based on unreliable sources of information. (Research)

4: Improper Handling of Data

With reference to an interview with Derek Tong from VMWare, one of the most important aspects to data is security, which is considered one of the pillars in digital transformation. If companies endanger this security and leak personal information of their customers, there will be severe ethical ramifications. (Observation)

Given that covert surveillance can lead to private information being revealed and can cause a huge detriment to someone's career, be it an insensitive comment made by someone in private or a more major criminal activity by one, this thus leads to the problem that when information like this is leaked from the data collection organisations, **it can potentially destroy a person's career and reputation. Worse of all, when important personal data is leaked, external parties may exploit the data for malicious purposes. (Why)**

One example is Yahoo, American web service provider, which is known for being the subject of multiple breaches and hacks that have compromised large amounts of user data. As of late 2016, Yahoo had announced that at least 1.5 billion user accounts had been breached during 2013 and 2014. The data compromised in the breaches included personally identifiable information such as **phone numbers, email addresses, and birth dates and encrypted passwords**. Yahoo made a statement saying that their breaches were a result of state sponsored actors, and in 2017, two Russian intelligence officers were indicted by the United States Department of Justice as part of a conspiracy to hack Yahoo and retrieve user data. (Research)

Challenge 5: Compromised Freedom of Speech

In 2013, information was leaked about the “PRISM” program, a mass online surveillance program by the US National Security Agency. Major search engines like Google, Yahoo and Microsoft were found to be partners of this program, sparking public controversy from governments and human rights activists, as well as changing the way many viewed and behaved on search engines after the incident. (Observation)

Given that most covert surveillance methods may be focused onto minorities and communities of colour, they may become subject to government spying. **In the long run,** these surveillance tactics may have an impact on their communities, as this is inhibiting the religious and political expression of their members, and in turn their free will. (Why)

For example, in the US, the Department of Homeland Security (DHS) implemented a new rule to track the internet activity of all visa applicants, visa holders and legal permanent residents. It would track and store social media account information and other forms of highly sensitive data as part of the individual’s immigration file. This allowed the DHS to collect and track a lot of confidential data from immigrants, such as their social media accounts and search engine results. This system of surveillance was designed as a tactic to “control and fracture dissent”, as stated in an article by The Guardian. As a result, it impacted the dignity and fairness extended to American immigrants, and kept them from feeling like full members of society. (Research)

STEP 2. Craft the Underlying Problem

Using the challenges listed in Step 1, identify a problem of major importance to the chosen community / organization in the future. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Incorporating Challenge(s) # 1,3,5

Given that most internet users' personal information is being held in databases, posing a risk to their privacy (Condition Phrase), how might we encourage a search engine's user's control over his personal data (KVP), so as to allow users' to make informed and self-reliant decisions even while using web technology(Purpose) from 2025 onwards in Singapore? (Time & Location)

STEP 3. Produce Solution Ideas

Generate solution ideas to the Underlying Problem in Step 2. Choose the 5 most effective solutions and write the elaborated ideas in the space provided. Include applicable research with appropriate in-text citations.

Solution 1: DataYours

We, *MyDataIsSafe*, will push out *DataYours*, a free-to-use database available to everyone. Users can link the search engines that they use to *DataYours*. *DataYours* will show what data the search engine has collected and allow users to choose what to do with the data, such as whether it should be deleted completely from the search engine's databases or whether it should affect search results. Search engines will have to cooperate with this database and allow it access to this information.

Thus, this database allows users to have full control over their data and how it affects them and hence allows the user to make self-informed and reliant decisions. By working with popular search engines, we can increase security and give internet users greater peace of mind when using search engines. This will take place in Singapore and will be done by 2023, with more improvements made using user feedback for following years.

DataYours will utilise RBAC (role-based access control) security system found in many web management systems. By adopting a "permissions and restrictions" concept, most commonly found in Web Management Systems like Google Analytics, Google Ads and Github, users only have the relevant permissions to access their personal data from the database and not others, creating a safe and accessible database. (Research)

Solution 2: Honest Act

We, *MyDataIsSafe* will lobby the government to push out the *Honest Act*, which regulates their agencies' surveillance tools. This will require social media and search engine surveillance programs employed by the government to publicly disclose how they use customer data, details of third parties that have access to the data, and how third parties use the data. Futuristic technology will also be implemented. On top of conducting audits by man, a smart A.I will be constructed to sieve through the company's software, checking efficiently without violating any privacy guidelines. Information disclosed will be released to the public online, in a large database where all previous information is stored to be at hand any time.

The implementation of the *Honest Act* will allow the government to display their honesty, building a bridge of trust between both parties. The public, which largely constitutes internet users, will also be able to make an informed and safe decision.

The Honest Act is similar to a transparency report, which is already prevalent in many social media companies, like Youtube and Facebook. Both companies frequently release statistics on their content removals and how they collect data. Thus, it is ideal for other search engines companies to do the same, with this Act enforcing this measure. (Research)

Solution 3: WikiShare

We, *MyDataIsSafe*, will push out *WikiShare*, a search engine using community contributions to provide a better user experience rather than through collection of user's private data. Using the same concept of *Wikipedia*¹, *Wikishare* is a non-profit effort to protect the privacy of user data. *Wikishare* will present a simplified search algorithm where users help provide key words for common topics searched by other users (e.g. Tourism in Singapore, Famous Street Food). These keywords will be utilised by *WikiShare* to recommend appropriate websites when these topics are searched, thus creating a smooth and simple user experience. Simple A.I can be used to remove irrelevant results, without tampering with the idea of community contributions. This project can start on a small scale in Singapore (e.g. limited to search results about tourism in Singapore in 2023). This allows time for developers to make tweaks to A.I and algorithm, so it can be rolled out as a full search engine by 2025.

By using community contributions to create smooth and simple user experience on search engines, this eliminates the need to use covert surveillance to collect user data to filter and personalise search results. Thus, users can have more control over their personal data, and make informed and self-reliant decisions when using web technology.

Modelled after Wikipedia, WikiShare can function in a collaborative system where anonymous writers are able to make changes to information. With 127,379 people having edited in wikipedia in the last 30 days, WikiShare can make use of the same "collective wisdom" strategy to maximise efficiency and reliability. An approval system could also be added to WikiShare, which is similar to the approval system in Wikipedia's AFC (Articles for Creation). This involves editors submitting user-created articles for review. Others will review the article, and make changes and comments to better the article. (Research)

¹A search engine that allows users to to make public contributions to information, with a firm belief in the free knowledge movement

Solution 4: Awareness Scheme

We, *MyDataIsSafe*, will push out an awareness scheme, to help the public to understand how to have better control over their personal data, and make more informed decisions. This will be especially useful for the elderly, who may be unfamiliar with the technological field and could be unknowingly feeding search engines their private information. This solution will be carried out in many ways. For example, we will advertise the dangers of data collection by search engines on public billboards, through television advertisements, social media or through courses, which can be held at community centres or schools. We will also help identify search engines who collect mass data and make decisions off them so as to increase public awareness and improve users' control over their personal data.

By raising awareness on security issues and teaching the public how to manage their personal data, we hope to ensure that they will have a peace of mind when online and that they will have access to a basic human right - internet privacy.

Awareness schemes through campaigns have shown strong success in the past. Examples include the Privacy Awareness Week (2019) hosted in Singapore, and the GDPR (General Data Protection Regulation) awareness scheme in the EU. Through training programmes and courses, and a survey after the 6 months of the scheme, 44% of respondents understood how the GDPR protects their privacy, and are more vigilant and skeptical when sharing personal data with online organisations.

Other forms of awareness schemes include the ALS Ice Bucket Challenge to promote awareness of the disease amyotrophic lateral sclerosis. It was extremely successful, raising \$115 million for research into the disease, also making the name ALS more recognizable, raising awareness. Big names such as Bill Gates have also participated in the awareness scheme. (Research)

Solution 5: New Rule under PDPA

We, *MyDataIsSafe*, will lobby the government to enforce a new rule under the Personal Data Protection Act (PDPA) that makes it necessary for companies to grant users the right to see what personal data has been collected, how it is used and also grant the ability to turn off data collection and tracking features. If companies violate this rule, financial penalties can be imposed on the offenders. A commission could be set up to assess the various situations regarding this rule at any time. Through this rule, users get full control over their personal data collected by companies and can make self-informed and reliable decisions. This rule can be imposed earliest by 2023, so as to be effective in reducing covert surveillance and collection of users' private data from 2025 onwards in Singapore.

Prior research has shown the effectiveness of rules under the PDPA. After its introduction, 80.2% of consumers felt that they gained more control over their personal data online, and trusted the PDPA to protect their data from misuse. PDPA also empowers PDPC (Personal Data Protection Commission) to enforce these rules and put penalties on those who violate the Act, thus ensuring that this new rule will be effective towards reducing covert surveillance and collection of private data in search engines. (Research)

STEP 4a. Select Criteria

Generate criteria to determine which solution idea does the best job of solving your Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided.

Criterion 1:

Which solution would be the most reliable so that it can be sustained over a long period of time?

Criterion 2:

Which solution would be the most cost-effective for the government of Singapore so that it can maximise its resources to solve the problem?

Criterion 3:

Which solution is the easiest for the public to understand and use, so as to increase effectiveness of the solution?

Criterion 4:

Which solution can be implemented with the most versatile technology, such that it can solve a wide variety of problems?

Criterion 5:

Which solution can be implemented in the shortest amount of time possible, so that Singaporeans' data can be protected as soon as possible?

STEP 4b. Apply Criteria

List the solution ideas from Step 3 on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 5 (best). The weighting for one important criterion may be doubled if necessary.

Step 3 Sol'n #	Solution Idea	Criteria					Total
		1	2	3	4	5	
#1	DataYours	3	1	4	3	2	13
#2	Honest Act	4	2	2	2	4	15
#3	WikiShare	2	4	5	5	1	17
#4	Awareness Scheme	1	5	3	4	3	16
#5	New rule under PDPA	5	3	1	1	5	15

STEP 5. Develop an Action Plan and Evaluate its Feasibility

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the community / organisation will be affected. Explain how this

Action Plan is feasible with secondary research consulted, preferably also with primary research (feedback from chosen community / organization)

Action Plan Derived from Solution #3:

WHO

We would collaborate with Wikipedia to help with this project. They will help WikiShare develop the proper policies, guidelines and software for a functional search engine. Partnerships with DuckDuckGo and Google, popular search engines could also be established to aid us in the coding of simple A.I. For beta testing, we would reach out to the Singapore Tourism Board.

WHAT

WikiShare is a search engine using community contributions to provide a better user experience rather than through collection of user's private data. Users can apply as community editors and contribute key words for topics to aid in providing better user experience for others. Other users can use WikiShare without a personal account, and can browse freely without worrying about collection of private data.

There will also be beta testing where WikiShare is limited to searches on tourism in Singapore. Then, it will be released as a fully functional search engine in 2025.

WHERE

WikiShare will be released with headquarters and technical software in Singapore.

WHEN (timeline)

From 2020-2025, 2 years will be used for development of WikiShare, before it is released for beta testing. In testing, WikiShare will be implemented in Singapore's tourism industry. By limiting WikiShare to only searches about travel in Singapore, Singaporeans are encouraged to participate as they feel a sense of pride for their country. By collaborating with the Singapore Tourism Board, WikiShare can also gain recognition in Singapore, and gain first-hand experience in managing international users (tourists). After final tweaks, WikiShare will be officially released in 2025.

WHY

Our solution introduces a viable search engine that does not require users' private data, allowing for greater peace of mind and control over one's data and also encourages other search engines to follow a similar community contribution system. Using keywords instead of personalised search results, WikiShare is therefore able to protect users' private data, and allow them to make informed and self-reliant decisions.

HOW (funding)

For funding, WikiShare will reach out to the Ministry of Communications and Information and use a KickStarter campaign. As a non-profit effort, WikiShare also aims to garner the support of fellow I.T technicians and coders in Singapore, to ultimately establish a volunteer development team, all passionate about creating a safe search engine for the good of all.

CHALLENGES & FLAWS

WikiShare is subject to personal bias from community editors; certain answers could be encouraged more than others due to issues such as racism and xenophobia, in turn affecting the reliability of the search engine.

Furthermore, A.I is only designed to delete blatantly irrelevant key words. People may be misunderstood on certain topics, and input inaccurate key words that may affect the reliability of this search engine.

In order to overcome these challenges, WikiShare will include an approval system, where a certain number of editors are required to approve of a keyword before it is accepted and presented on the search engine. Also, a suggestion system where users can suggest edits and improvements, and a reporting system that will allow users to flag out keywords that are inappropriate will be implemented. Therefore, bias will be eliminated with greater emphasis on “collective wisdom¹”.

¹Collective wisdom is the idea that large groups of people are collectively smarter than individual experts when it comes to problem-solving, decision making, innovating and predicting.

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Cite the resources you consulted using the APA format.

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