Searching User Guide

Goal of the Experiment

Explore the effectiveness of the web search engine (Google), and its abilities to search for architectural information in the web during the architectural design process.

Overview on the Experiment

Software architecture design tasks have a big scope, which involve functional and non-functional requirements, as well as constraints. You will be asked to search for architectural information on Google to solve six different design tasks. For each task, you will write queries (keywords) in Google, and evaluate the relevance of each web page to a task. During your searching, you will be using a Google chrome extension to support specifying the relevance of each web page to the tasks. The Google chrome extension captures in background your queries, the searching results, the specified relevance of each web-page and the specified types of information in each web-page. During the experiment, you will be asked to specify the relevance and the types of relevant information in each web-page. We explain both in the following sub-sections.

Web-pages relevance

The relevance of each web-page (in the list of pages listed by Google) to help complete the task is defined on five levels:

- **Very High Relevance** (VH): The web page discusses a similar problem to the task and contains useful information. The web page provides an answer to the searching goal, and helps with fulfilling more than one requirement of the task.
- **High Relevance** (H): The web page addresses a similar problem to the task and contains useful information. The post provides an answer to the searching goal, and helps with fulfilling at least one requirement of the task.
- **Medium Relevance** (M): The web page addresses another problem not similar to the task at hand, but it provides some relevant information to the task, which could be an answer to the searching goal. Nevertheless, the provided information does not consider specifically the task's requirements.
- **Low Relevance** (L): The web page contains relevant information, which is only remotely relevant to solving the given task, but might help for refining the search.
- **No Relevance** (N): The web page has nothing to do with the task. It has no relevant information.

Types of relevant information in web-pages

To facilitate specifying the types of relevant information in web-pages, we designed seven types from which you will select one or more type for each relevant web-page. The types of relevant information are described below:

- **Solution´s description**: The web page contains general Information on an architectural solution. For example, general information on the supported features of a technology or descriptions of architectural patterns.

- **Development and implementation guide**: The web page contains information on how to implement an architectural solution (examples, development guides, installation guides, code examples).

- **Solution alternatives**: The web page contains multiple (alternative) solution options for a certain design issue. For example, lists of broker technologies, lists of SOA patterns. The architectural options could be listed in text or as a comparison of different solution options.

- **Solutions benefits**: The web page contains information about the advantages of certain architectural solutions. For example, the advantages of using a certain technology regarding its performance, which can be supported with benchmarks or tests. Those advantages might be part of a comparison with other options.

- **Solutions drawbacks**: The web page contains information about the disadvantages of certain architectural solutions, or even discourages its application. For example, the disadvantages of using a certain technology regarding its security or Information on when not to decide on an architectural solution.

- **UseCase**: The web page contains explanations about the architecture of a specific system. This includes description for an existing architectural design of a specific system, or explanations about certain design decisions of a specific system. For example, a web page explains the software architecture of Facebook.

- **Others**: The web page contains other relevant architectural information. Please write down which other information you found.

How to install Google chrome extension?

Before solving the tasks, you should install the attached Google chrome extension: "Rate Your Search". You can install the Google chrome extension using the following steps:

1. You will be given a zip file with the needed source code. You need to extract the zip file in a folder.

2. Open a new Google Chrome window.

3. Go to `chrome://extensions/`.

4. Turn on Developer mode at the top right (see the red line in Figure 1).

5. Press "Load unpacked" at the top left (see the yellow line in Figure 1).

6. Choose the folder, where the zip file is extracted.

7. Now the plugin should be in the list of extension.

Figure 1: Upload your own Chrome Extension.

Experimental Procedure

When completing the tasks, you can follow several steps:

1. *Log in*: Log in within the Google chrome extension with your assigned user name and password. To reach the login page, press the extensions icon on the top right of your chrome toolbar. It should look like a red "magnifying glass" as presented in Figure 2. If it does not show up, press the puzzle piece as presented in Figure 2 instead and pin the "Rate Your Search" extension chrome extension.

Figure 2: The icon of Rate Your Search is the red "magnifying glass".

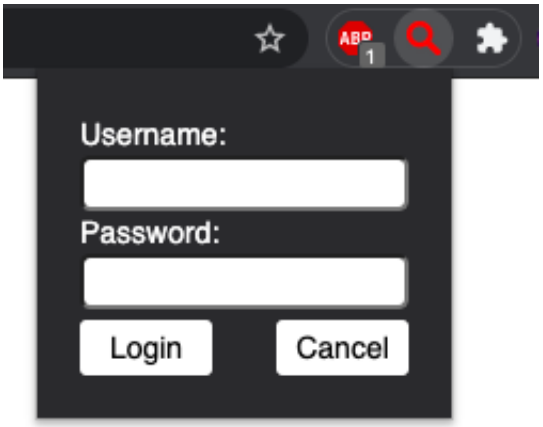

Figure 3: The login screen of Rate Your Search.

2. *Read task*: Read the task carefully to understand the requirements and the goals of the search.

3. *Select task in plugin*: Go to Google.com and select the task you are conducting. Once you reach Google, there should appear a widget at the bottom right corner looking like Figure 4. Here, you can select your task from the drop-down box. Moreover, you can view the description of the task in the widget at the bottom right (Figure 5).

4. *Conduct Search*: Start searching for the relevant web-pages and information that could help achieving the goal and fulfilling the requirements of a given task. During the search, follow these steps:

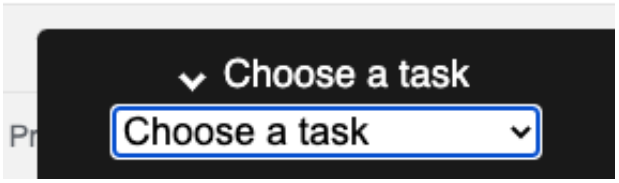

Figure 4: The task widget of Rate Your Search

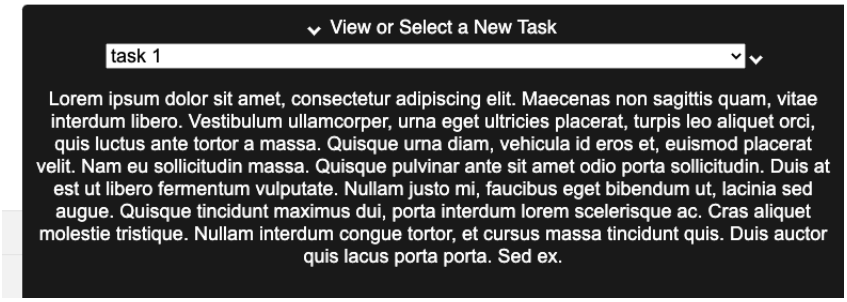

Figure 5: Rate Your Search: ability to read task description in widget.

- Execute **at least three queries** in Google for each task. Try to find as many web-pages as possible relevant to the goal and requirements of a task, and try to execute different queries to cover all the aspects of the task (e.g. different requirements, solutions, constraints). The executed queries must be written in English.
- For each query, assess the **top 10 results**, which are returned from Google. During assessment, **open each web-page, and read it carefully** to make sure that it is relevant to the problem, and do not assess the relevance or the types of information just based on the title of a web-page. Please do not assess any other web pages (e.g. advertisements), which are not from the top 10 results. For each web-page, you need to specify the relevance of a web-page. The relevance assesses the relevance between the content of a web-page and the task (not the query). For relevant web-pages (i.e. web-pages with low or medium or high or very high relevance), please specify the types of knowledge in each web-page.

  On the Google results, you can specify the relevance score of each result web-page directly. This should be done using the box just below each result, as can be seen in Figure 6. Web-pages to be assessed should have the evaluation box in Figure 6. Any other web-pages (e.g. advertisements) will not have the evaluation box.

  Moreover, you can specify the types of architecture knowledge for each web-page as part of the Google results. You can select multiple types of knowledge for each web-page directly. This should be done using the box just below each result, as can be seen in Figure 7.

5. *Go to the next task*: After finishing one task and executing enough queries (at least 3 queries), you can go to the next task by selecting the task from the tasks widget as shown in Fig 4. You can then conduct the search similarly to step 4. For each task, you need to execute new queries. You cannot re-use queries from previous tasks.

Figure 6: Rate Your Search: select the relevance score for a search result on the search engine result page.

Figure 7: Rate Your Search: select the cause of the relevance score for a search result on the search engine result page.

6. *Logout*: After you have completed all the tasks in their sequence, you can log out using the same popup you used to log in. Click on the icon shown in Figure 2, and press the logout button (Figure 9).

7. *Remove extension*: After logging out, you can remove the extension by clicking "Remove" for the extension at `chrome://extensions/` (Figure 10).

Important notes to consider during the experiment

During solving the tasks, please consider the following:

- Solve the tasks in their provided sequence.
- You cannot use any other search engines or web browsers other than Google and Google Chrome.
- You should not open any web-pages, which are not part of Google´s results.
- You should execute the experiment in one Google chrome window.
- Only rate the web page found by google - Do not rate the associated web pages.

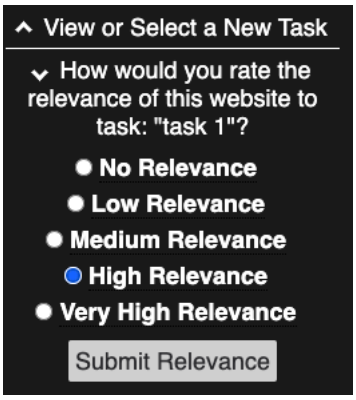

Figure 8: Rate Your Search: select the relevance score for a search result on its web page.

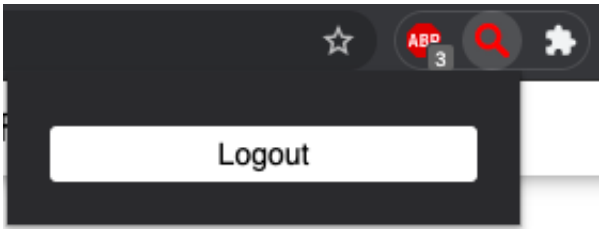

Figure 9: Rate Your Search: log out button.

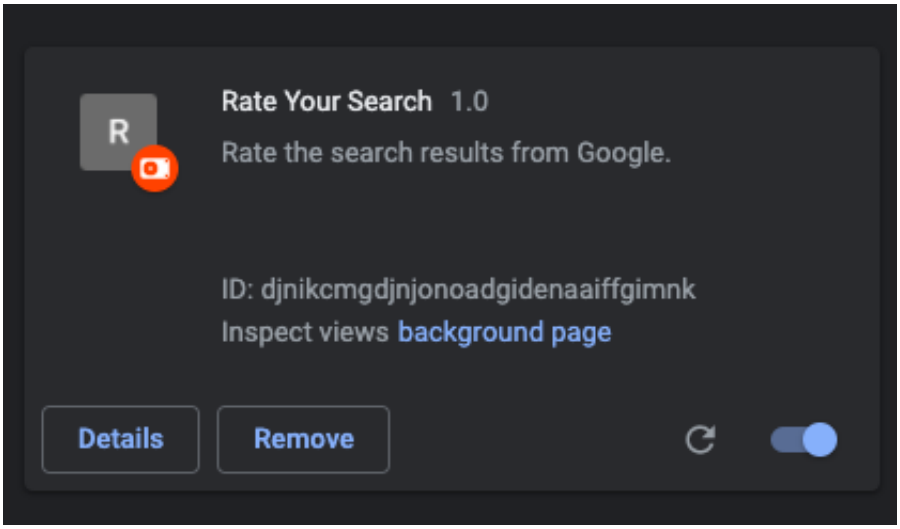

Figure 10: This is what you will see in chrome://extensions/ once you have installed the extension.