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Dynamic Facet Ordering for Faceted Products Search Engines

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Abstract:

Faceted browsing is widely used in Web shops and product comparison sites. In these cases, a fixed ordered list of facets is often employed. This approach suffers from two main issues. First, one needs to invest a significant amount of time to devise an effective list. Second, with a fixed list of facets it can happen that a facet becomes useless if all products that match the query are associated to that particular facet. In this work, we present a framework for dynamic facet ordering in e-commerce. Based on measures for specificity and dispersion of facet values, the fully automated algorithm ranks those properties and facets on top that lead to a quick drill-down for any possible target product. In contrast to existing solutions, the framework addresses e-commerce specific aspects, such as the possibility of multiple clicks, the grouping of facets by their corresponding properties, and the abundance of numeric facets. In a large-scale simulation and user study, our approach was, in general, favorably compared to a facet list created by domain experts, a greedy approach as baseline, and a state-of-the-art entropy-based solution...

Keywords

Facet, Spam, Social Media, behavioral, user-linguistic...

I. Introduction

Nowadays, many Web shops make use of the so-called faceted navigation user interface , which is in literature also sometimes referred to as ‘faceted search’ . Facets are used by some users as a search tool, while others use it as a navigation or browsing tool .One of the reasons why faceted search is popular among Web shops is that users find it intuitive. Faceted search is primarily helpful in situations where the exact required result is not known in advance.

Problem Definition:

We propose an approach for dynamic facet ordering in the e-commerce domain. The focus of our approach is to handle domains with sufficient amount of complexity in terms of product attributes and values.

Objective Of The System:

A query may have multiple facets that summarize the information about the query from different perspectives. Query facets provide interesting and useful knowledge about a query and thus can be used to improve search experiences in many ways.

• First, we can display query facets together with the original search results in an appropriate way. Thus, users can understand some important aspects of a query without browsing tens of pages. For example, a user could learn different brands and categories of watches. We can also implement a faceted search [1], [2], [3], [4] based on the mined query facets.

• Second, query facets may provide direct information or instant answers that users are seeking.

• Third, query facets may also be used to improve the diversity of the ten blue links. We can re-rank search results to avoid showing the pages that are near-duplicated in query facets at the top. Query facets also contain structured knowledge covered by the query, and thus they can be used in other fields besides traditional web search, such as semantic search or entity search.

• This method is likely not to be suitable for the domain of e-commerce, where also small data sets occur and statistically deriving interesting attributes is not possible.

• Approach does not consider numeric facets and the use of disjunctive semantics for values.

• Large number of facets are available. Displaying all facets may be a solution when a small number of facets is involved, but it can overwhelm the user for larger sets of facets.

II. Literature review

Initially the language was called as "oak" but it was renamed as "Java" in 1995 .The primary motivation of this language was the need for a platform-independent (i.e.,architecture neutral) language that could be used to create software to be embedded in various consumer electronic devices.

- Java is a programmer's language.
- Java is cohesive and consistent.
- Except for those constraints imposed by the Internet environment, Java gives the programmer, full control.

Finally, Java is to Internet programming where C was to system programming.

Importance Of Java To The Internet:

Java has had a profound effect on the Internet. This is because; Java expands the Universe of objects that can move about freely in Cyberspace. In a network, two categories of objects are transmitted between the Server and the Personal computer. They are: Passive information and Dynamic active programs. The Dynamic, Self-executing programs cause serious problems in the areas of Security and probability. But, Java addresses those concerns and by doing so, has opened the door to an exciting new form of program called the Applet.

Applications And Applets:

An application is a program that runs on our Computer under the operating system of that computer. It is more or less like one creating using C or C++. Java's ability to create Applets makes it important. An Applet is an application designed to be transmitted over the Internet and executed by a Java –compatible web browser. An applet is actually a tiny Java program, dynamically downloaded across the network, just like an image. But the difference is, it is an intelligent program, not just a media file. It can react to the user input and dynamically change.

III. System Design and Architecture

A. Existing System

• The faceted search system proposed in existing focuses on both textual and structured content. Given a keyword query, the proposed system aims to find the interesting attributes, which is based on how surprising the aggregated value is, given the expectation. The main contribution of this work is the navigational expectation, which is, according to the authors, a novel interestingness measure achieved through judicious application of p-values.

• These solutions often assume that there is a ranking of the results, based on a preceding keyword-based query or external data, which is often not the case for e-commerce.

Disadvantages Of Existing System:

• Large number of facets are available. Displaying all facets may be a solution when a small number of facets is involved, but it can overwhelm the user for larger sets of facets.

• Currently, most commercial applications that use faceted search have a manual, 'expert-based' selection procedure for facets or a relatively static facet list. However, selecting and ordering facets manually requires a significant amount of manual effort.

• Furthermore, faceted search allows for interactive query refinement, in which the importance of specific facets and properties may change during the search session. Therefore, it is likely that a predefined list of facets might not be optimal in terms of the number of clicks needed to find the desired product.

• This method is likely not to be suitable for the domain of e-commerce, where also small data sets occur and statistically deriving interesting attributes is not possible.

• Approach does not consider numeric facets and the use of disjunctive semantics for values.

Proposed System:

• We propose an approach for dynamic facet ordering in the e-commerce domain. The focus of our approach is to handle domains with sufficient amount of complexity in terms of product attributes and values. Consumer electronics (in this work 'mobile phones') is one good example of such a domain. As part of our solution, we devise an algorithm that ranks properties by their importance and also sorts the values within each property.

• For property ordering, we identify specific properties whose facets match many products (i.e., with a high impurity). The proposed approach is based on a facet impurity measure, regarding qualitative facets in a similar way as classes, and on a measure of dispersion for numeric facets. The property values are ordered descending on the number of corresponding products. Furthermore, a weighting scheme is introduced in order to favor facets that match many products over the ones that match only a few products, taking into account the importance of facets.

• Our solution aims to learn the user interests based on the user interaction with the search engine.

Advantages Of Proposed System:

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• In our study, we use the common disjunctive semantics for values and conjunctive semantics for properties and take into account the possibility of drill-ups. This means that result set sizes are expected to both increase and decrease during the search session, either by deselecting a facet or choosing an addition facet in a property

• In terms of the number of clicks, our approach seems to outperform the other methods, except in the case of the Best Facet Drill-Down Model, where each approach performs equally well. Furthermore, for the Combined Drill-Down Model our approach results in the lowest number of roll-ups and the highest percentage of successful sessions.

• The relatively low computational time makes it suitable for use in real-world Web shops, making our findings also relevant to industry. These results are also confirmed by a user-based evaluation study that we additionally performed.

IV. Results

Fig 1: Content Diagram of the project

Fig.2 Loading dataset

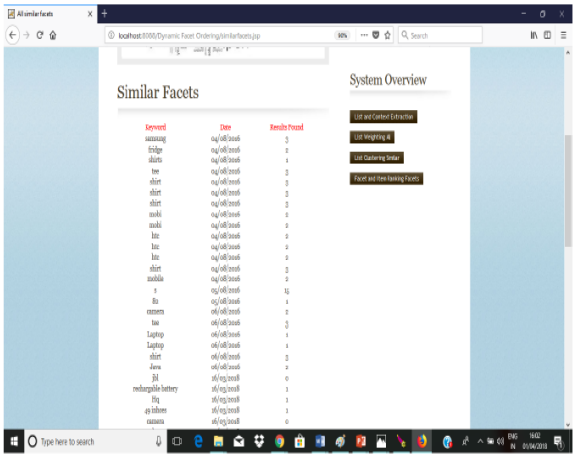

Fig.3 Similar facets

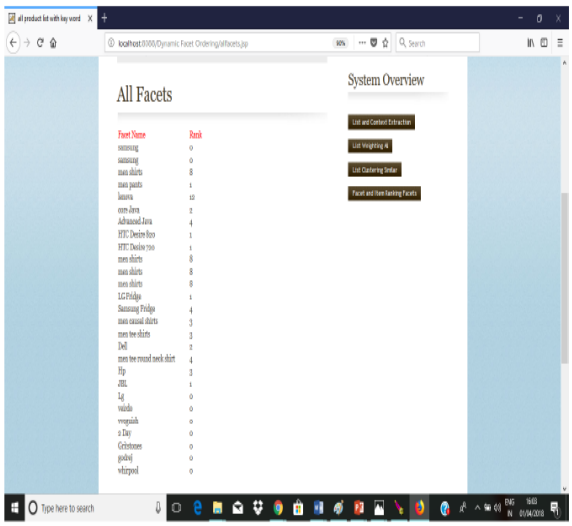

Fig.4 All facets Ranking

V. Conclusion

In this work, we proposed an approach that automatically orders facets such that the user finds its desired product with the least amount of effort. The main idea of our solution is to sort properties based on their facets and then, additionally, also sort the facets themselves. We use different types of metrics to score qualitative and numerical properties. For property ordering we want to rank properties descending on their impurity, promoting more selective facets that will lead to a quick drill-down of the results. Furthermore, we employ a weighting scheme based on the number of matching products to adequately handle missing values and take into account the property product coverage.

We evaluate our solution using an extensive set of simulation experiments, comparing it to three other approaches. While analyzing the user effort, especially in terms of the number of clicks, we can conclude that our approach gives a better performance than the benchmark methods and in

some cases even beats the manually curated 'Expert-Based' approach. In addition, the relatively low computational time makes it suitable for use in real-world Web shops, making our findings also relevant to industry. These results are also confirmed by a user-based evaluation study that we additionally performed.

Future Enhancement

In future we would like to replicate our study on a different domain than cell phones, thereby addressing one of the limitations of the current evaluation. Also we would like to investigate the use of other metrics, such as facet and product popularity, for determining the order and optimal set of facets.

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