

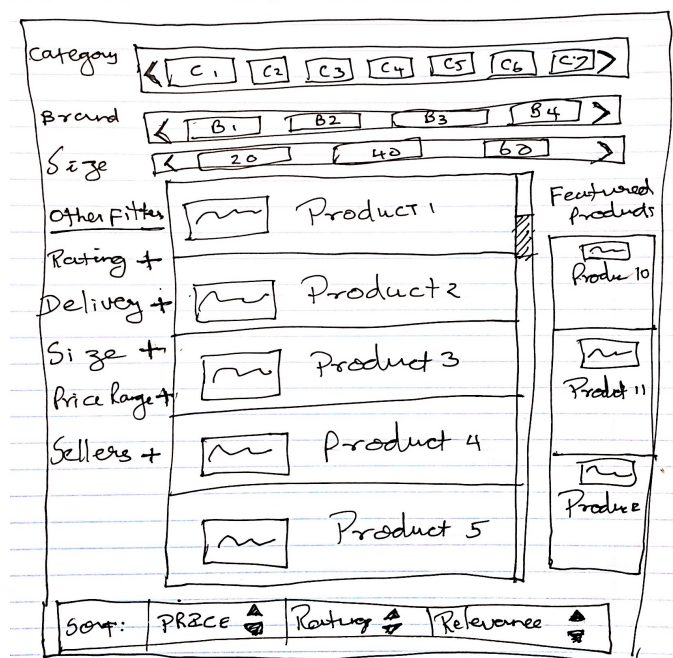
Assignment M4

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Abstract—The objective of the project is to redesign the task of **navigating the search results on the Amazon website**. Although Amazon uses advanced NLP and AI algorithms for search, Amazon returns hundreds or thousands of results for each search due to the sheer volume of the products. The current Amazon desktop website interface to navigate these search results is quite clumsy and this project would attempt to redesign the search result interface to improve the search result navigation efficiency.

1 QUALITATIVE EVALUATION

The Qualitative evaluation for the **Paper prototype would be carried out as a Survey**. The core idea of this prototype is to differentiate the prominent or most used filters and sort options from the endless list of filters and sort in the search navigation pane. The prototype would contain a button like options on top of the page for the most widely used filters. The paper prototype is given below for the context.



1.1 Evaluation Plan

The evaluation is designed as a survey with questions evaluating the usability and other qualitative aspects of the prototype. The participants of the survey would be other students in the class. The survey would be conducted asynchronously using the "Peer Survey". The survey would include the paper prototype and the questionnaire about the prototype. The survey would not be recorded as it is done asynchronously and only the responses of the survey would be collected.

1.2 Survey Details

The survey questions would focus on the ease of use, cognitive load, improvements compared to the current interface, shortcomings, and other feedback on the paper prototype. The actual questions planned for the survey are given below.

- What is your age?
- How often do you use the E-commerce search functionality in a week?
- Do you agree with the idea of separating prominent or most used filters from other filters?
- The given prototype would make it easier for the novice user to find the needed filters?
- The buttons for the prominent or most used filters as shown in the prototype would be more efficient than the usual dropdowns?
- What are the prominent filters you would expect at the top of the page?
- Do you agree that the Sort option at the bottom of the page would be intuitive to use?
- Would be separating featured products to the right pane to improve the usability of the interface?
- The Right and Left scroll on the prominent filter(at top of the page in prototype) is more usable than the usual drill-down approach?
- The list of products in the middle of the page like social media posts would be effective for navigation?
- Do you find the given prototype intuitive overall?
- Please provide any additional comments on the given prototype, if you have any?

1.3 Evaluation Summary

The questions of the survey are designed to evaluate the below key requirements defined for the redesign.

- The most widely used filters like Brand, Price, and Size must be easily available for the user. Also, basic sorting criteria should be available for the user and should be prominent
- The prominent filters and sort options should focus on the novice user as they look for basic filters and sort options, 'The filters need to be intuitive and with less number of options+ and with less clutter.

The results of the survey would be used to validate the prototype against the above requirements and qualitatively and understand if the prototype addresses the above requirements. The changes would be made to the prototype post-execution of the survey. The survey would be evaluated by segmenting the responses based on the user's expertise and demographics as defined in the data inventory.

2 EMPIRICAL EVALUATION

The **textual prototype prepared would be evaluated using Empirical evaluation**. The core idea of this prototype is to have hierarchical search options for the search results. In other words, this approach treats the filters also as another search within the search results. The summary of the text prototype is given below for context.

- Search Result interface would contain two search bars, one usual overall search bar, another "Refine Search" search bar meant for hierarchical searching. "Refine Search" would take the current search results as the input and apply the search results on top of it.
- "Refine Search" can be used multiple times and each time it narrows down the results further. All the previous refine search terms(Since the actual search) would be displayed with 'X' marks on the side. This is to roll back a refined search. This is similar to the functionality that currently exists for filters.
- The filters on the left pane get refreshed as per the refined search,i.e. only the filters applicable for refined search results would be available in the left pane. Sort options would be available in the right pane with intuitive icons for ascending and descending. The sort would be carried over to the refined

result if the refined search was done after sorting.

The prototype at its current stage cannot be practically evaluated using empirical methods. However, the below **empirical method is presented with the assumption that the prototype is functional.**

2.1 Experiment and Metrics

The empirical evaluation would be carried out by comparing the function prototype with the current amazon post-search interface. The experiment will be designed to measure the efficiency of finding out the desired product from the search result.

The experiment would be to navigate the search results to find the desired product in both the actual interface and prototype. Five products would be randomly selected and the users would navigate the corresponding search results to find the product using filters and sort options. In the current amazon interface, they would be using filters and sort and in the new interface prototype, they would be using "Refine search" and sort options. The efficiency would be measured using the time taken to find the products.

For example, the search results from search with term "Bluetooth Headphones" would be used in both the interfaces and the task could be to find the "Bose QuietComfort Noise Cancelling Wireless Bluetooth Headphones" from the search results. Five similar cases would be taken for the experiments and the **average time taken to find the product from search results** would be recorded and used as a metric for evaluation. The experiment can be extended to more number of the products if the results are inconclusive and if multiple iterations are needed.

2.2 Hypothesis

The **null hypothesis is that there is no significant difference in efficiency between the current interface and the new prototype.** An **alternate hypothesis is that the new prototype is significantly different from the current interface.**

The evaluation would be a **within-subjects experiment**, where each participant would be evaluating both the interfaces and the **interfaces would be assigned to the users in the random order.**

The user would be navigating to find the given product in the search results from both the interfaces and the average time taken for finding the product

would be recorded as data below.

| user | Current Interface | New Prototype |
|-------|-------------------|---------------|
| User1 | X seconds | X seconds |
| User2 | X seconds | X seconds |
| User3 | X seconds | X seconds |
| | | |
| UserN | X seconds | X seconds |

Table 1—Empirical evaluation - Time taken for finding product

The above data would be analyzed using **pairwise t-test** to run a hypothesis test. If the null hypothesis could be rejected based on the test, The new interface prototype would be concluded to be better than the current interface.

One of the important lurking variables could be the order in which the interfaces are shown to the user. This could be avoided using the randomized order for each user. Other lurking variables can be the familiarity of the current interface with the users. This could be avoided by recruiting users with different expertise in using the e-commerce search.

3 PREDICTIVE EVALUATION

A predictive evaluation would be used to evaluate the **card prototype for the interface**. The core idea of this prototype is to use the product feature itself as a filter along with the filter pane. This would be very helpful for the users who don't have a prior idea on the feature of the product they are looking for but they can learn it based on the similar products shown in the results.

The predictive evaluation would be conducted using the cognitive walkthrough. The main objective of this prototype is to help users explore similar products using the search results rather than finding a particular product and hence the prototype contains feature-based filtering in addition to the actual filters rather than replacing them. The prototype is given below for the context.

CARD 1

| Filters | Product 1 | Brand A | Sort |
|----------|---|---------------------|--------------------------|
| Brand | <input checked="" type="checkbox"/> Product 1 | Rating 5 Size 10 | Price \updownarrow |
| Size | <input checked="" type="checkbox"/> Product 2 | Rating 5 Size 20 | Rating \updownarrow |
| Category | <input checked="" type="checkbox"/> Product 3 | Rating 4 Size 10 | Relevance \updownarrow |

Brand A
is
Product 1
is
Clicked

CARD 2

| Filters | Product 1 | Brand A | Sort |
|----------|---|---------------------|--------------------------|
| Brand | <input checked="" type="checkbox"/> Product 1 | Rating 5 Size 10 | Price \updownarrow |
| Size | <input checked="" type="checkbox"/> Product 4 | Rating 4 Size 20 | Rating \updownarrow |
| Category | <input checked="" type="checkbox"/> Product 5 | Rating 5 Size 30 | Relevance \updownarrow |

only Brand A
Products
displayed
Size 30 is
Clicked in Product 5

CARD 3

| Filters | Product 5 | Brand A | Sort |
|----------|---|---------------------|--------------------------|
| Brand | <input checked="" type="checkbox"/> Product 5 | Rating 5 Size 30 | Price \updownarrow |
| Size | <input checked="" type="checkbox"/> Product 6 | Rating 4 Size 30 | Rating \updownarrow |
| Category | <input checked="" type="checkbox"/> Product 7 | Rating 5 Size 30 | Relevance \updownarrow |

only
Brand A
and
Size 30
is
displayed

I would assume myself to be the novice user and try to navigate through the search result with the **goal of narrowing down the search results i.e. finding products from a particular brand, particular price range, and good rating.** To achieve the goal, I would start with the search results and the **tasks will be to find any product with that particular brand/price range/rating and then clicking those features from the center pane** which should refine search results with the products of my interest.

Each feature based filter applied on the initial search result page as well as **on the subsequent search results page would be the operators** used to achieve the task of exploring products of interest. The assumptions about the interface's ability to narrow down the search results but also allows the user to explore the products within his interested criteria would be evaluated by predicting the user's action after each of the filter applied and the refined results from the interface. The other assumption that the new interface would eliminate the clutter of completely unrelated products will also be evaluated by predicting the responses after each action of the user.

The evaluation would focus on **the user's ability to navigate interface efficiently to narrow down the results to explore products of his interest** rather than achieving the predetermined goal.

4 EXECUTION PLAN

Qualitative Evaluation and Predictive evaluation would be taken up for execution in the next assignment. The textual prototype mentioned in the evaluation plan of **Empirical evaluation would not be practically feasible to execute given the current state of the prototype.**

The qualitative evaluation survey would be conducted through a peer survey and the classmates would be the users participating in the survey. The associated paper prototype is more of a usability change from the current interface and more suited for qualitative evaluation and the survey would be easier to execute and provide clear feedback on the qualitative aspects of the prototype.

The card prototype is more suited for the cognitive walkthrough predictive evaluation, as the prototype focuses more on novice users. Also, the exploration aspects of the interfaces would make it interesting to carry out a cognitive walkthrough. Although there is a possibility of confirmation bias, since I carry out the evaluation myself, evaluating the interface with a novice user's perspective would avoid the bias.