Final Exam

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COMP 3301, Dec 20, 2016

Part 1: Summary of "How Colors in Business Dashboards Affect Users' Decision Making"

Business dashboards help users to identify trends, patterns, and anomalies for making effective decisions. Dashboards use colors to differentiate objects, attracting users' attention. However, unrelated to the task colors cause distractions. The article investigates how the misuse of colors in business dashboards affect users' decision making using eye-tracking technology, described below.

Eye-tracking technology measures a subject's eye movements during reading. The eye movements reflect the internal information processing. During reading, eyes move rapidly to shift attention to different parts of a display. Then, for a period, called "fixation", eyes stay motionless while the brain interprets the information. Fixation is characterized by three measurements, which are (1) the fixation count - total number of fixations on an area; (2) fixation duration - total fixation time on an area; and (3) first fixation time - start time of the first fixation on an area.

Humans involve two types of cognitive processes during decision-making tasks. The first process, incidental, comprehends the material, while the second one, essential, does not. The processes are related to two basic modes of thoughts in the human mind, "System 1" and "System 2". System one operates impulsively representing the brain's fast, automatic, and intuitive approach. System two allocates time to process complex cognitive activities being the mind's slower, analytical mode.

Dashboards with color misuse activate System one processing first, then System two. However, viewer of the proper dashboards focuses on System two only. A long eye fixation indicates the cognitive overload. The fixation duration leads to the first hypothesis: dashboards with color overuse cause higher fixation time in viewers comparing to dashboards with proper coloring.

First fixation time is used as a measure of attention. Eye-tracking software marks specific area of the dashboard identifying the viewer's eye movements. If a viewer looks at a non-relevant area at the start of the viewing time, then the area attracted the viewer's immediate attention. Low first fixation time leads to the hypothesis 2: dashboard with the color misuse cause a low first fixation time on tasks non-relevant areas, and high first fixation time on task-relevant areas, comparing to dashboards with proper coloring.

For the testing, the study recruited 30 information systems students with background in design and statistics. The students answered one questions about

dashboards with color misuse, and another question about dashboards with color misuse.

The analysis of color overuse in dashboards revealed no statistical difference between groups: 92% of the subjects answered the task correctly. However, the fixation duration and count for the task showed that subjects using the dashboards with color overuse spent six more seconds for decision-making comparing to the other group (28 vs. 22).

Task performance during the analysis of color misuse showed no statistical difference as well: 88% of the subjects answered the task correctly. However, the fixation duration and counts between two groups resulted in a significant difference. Subjects testing the color overuse spent 45 seconds to complete the task, comparing to 27 seconds for the proper dashboard. The study indicates that viewers testing dashboards with color misuse focus on task non-relevant areas first, activating System one first, followed by the task-relevant areas, which activate System two. In contrast, viewers of the proper dashboards visit the task-relevant areas first, activating System 2 processing directly.

The article has investigated the effect on decision-making in dashboards with color misuse. The study revealed that color misuse does not decrease the performance, however it does increase the processing time. Thus, organizations dont need to redevelop their dashboards unless the cost of redevelopment is less than the cost of the extra decision time.

Part 2: Passages for Editing

1. With the need to discover and reconcile variant forms of the same record, authority work will become more critical in the future.
Notes: the sentence in its original form is ambiguous. "Authority work" is a term describing a work done by librarians to establish control over names, geographic entities, and uniform titles. The original sentence both provides definition and states the need in one part, making "the need" critical in the future, instead of the authority work. Thus, defining the problem first, and then stating the solution clears the ambiguity.

2. The architecture of the system has to be change because the first option is not practical. The changes include threads for the dictionary and client response components.
Notes: The second sentence is unclear and not linked with the first sentence. Since the passage assumes that the system has to be change because of the first

option, the sentences have been restructured in such meaning.

3. The age of the mobile internet is dawning rapidly demanding more efficient solutions like disparate online resources integrated in new ways.
Notes: "day by day" is not necessary, as the world "rapidly" assumes it. The statement's part about efficient solutions is not clear whether the mobile internet requires solutions like disparate online recourses, or because of disparate online resources. I rewrote the sentence stating "disparate online resources integrated in new ways" as it is an efficient solution rather than the cause of problem.

4. Concerning answer locality, usual tools tolerate lower first guess accuracy by returning multiple responses and allowing users to interact with the system to localize answers.
Notes: The sentence is ambiguous whether usual tools "allow the user to interact with the system to localize answers." or tools tolerate first guess by it. Apparently, user interaction is a part of the toleration as users localize tool's responses.

5. Evaluation is an important phase of a system development.
Notes: the word "phase" repeated twice. Evaluation can be written without "phase", as it's already defined in a sentence as a phase.

6. Barthes [4] investigated least-squares solving. Linear regression appeared to be a better approach.
Notes: Passive voice is removed from the first sentence.

7. [The company] performed costing for each option.
Notes: passive form is removed, though the object performing action is required.

8. The sudden growth of the World Wide Web (WWW) has triggered a lot of work to occur, including web services.

9. One of the tools automatically creates a short version of the document. A new version contains most of the original content.
Notes: the sentence is broken into two parts.

10. The Max-Sites algorithm controls the density.

Notes: Sentence is restructured; however additional related information should be added.

11. Social engineering attacks are non-scalable, even Nigerian 419 spam once the first spam is distributed.
Note: repetition is removed.

12. Ransomware, or backing up attackers data, offers another moneymaking strategy. However, bank passwords are still the best consumer-controlled asset.
Notes: the sentence is broken into two parts.

13. To solve the problem, where clusters are not distinct, old methods, such as weighted least-squares, employ robust statistics with good separation results. Unfortunately, rich structures in the input may be flattened and damaged, and therefore, a new approach is necessary.
Notes: The sentence is broken into two sentences. The ambiguity with weighted least-squares is cleared, defining it as a method instead of an example of statistics.

14. Nowadays computer systems are based on hardware and software: hardware architecture makes a physical separation, while software divides functionality into a hierarchy.
Notes: The sentence is too long. The meaning of the computer systems is lost on hardware definition. The sentence is broken into two parts.

15. Active mapping algorithm was chosen for the final test run.

16. Single-source shortest path is the most basic of the many variations of Dijkstra's algorithm.
Notes: "there are" structure is removed.

17. Many suggestions for improvements were put forward as a result.
Notes: the repetition is removed.

18. Meryl Robertson designed the NeoSort algorithm as fast, easy to implement, and low in memory usage. However, NeoSort has a chance of returning incorrect orderings. The algorithm's qualities make it suitable for resource-

limited devices such as mobile phones.
Notes: The passage is ambiguous whether Meryl Robertson is fast or the algorithm. The ambiguity is cleared by listing the qualities as algorithm's ones. Another ambiguity is related to incorrect ordering. It's unclear whether the last sentence is about the algorithm or orderings. The sentence is restructured stating it's relevance to algorithm's qualities.

19. When a player is online, his data is uploaded to the main site.
Notes: information from the parenthesis is included in the sentence.

20. Edge-preserving image processing is useful in many applications, including detail manipulation, tone mapping, and abstraction. The processing decomposes an image into structure and details. The bilateral filter separates details from structure. Satisfactory results depend on pixel intensity. Despite humans can easy recognize structures, computers have troubles extracting it. Preserved textures, instead of smoothed, may lead to unsatisfactory results.
Notes: Examples of processing are included in the first sentence, resolving the ambiguity whether the examples are of the image processing or its application. Ambiguity in the third sentence is resolved stating that the conversation is about image processing, not applications. Fifth sentence is restructured. Sixth and seventh sentences are combined to remove repetiting. Two last sentences are combined.