02JSKOV - Human Computer Interaction

Written Exam – 2020-02-10

Closed-book exam: no notes or other material are allowed. Allowed Time: 60 minutes.
The responses should be easy to read (<u>write clearly</u>!) and reasonably short (around 5-10 lines long).

1.

Consider two identical versions of a web page which differ for the following buttons, only:

(a)   (b)
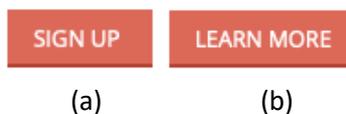
After conducting an online A/B test, where each visitor is randomly shown one of the two versions of the page, and counting how many people actually sign up on the website, we get the following data:

	"SIGN UP" Button	"LEARN MORE" Button
People did sign up	20	45
People did not sign up	80	70

With this information, write a null hypothesis, run the Chi-Square Test, and properly report whether the change of the button has had an impact on the sign-up rate.

Possible solution

We would like to reject the following null hypothesis by applying the Chi-Square Test.

<u>Null hypothesis:</u> the "Learn More" button will lead to no significant change in the number of visitors signing up on the website versus the "Sign up" button

<u>Alternative hypothesis:</u> the "Learn More" button will lead to significant more visitors signing up on the website

Observed in experiment:

	"SIGN UP" Button	"LEARN MORE" Button	Totals
People did sign up	20	45	65
People did not sign up	80	70	150
Total visitors	100	115	215

Expected if the null hypothesis is true:

	"SIGN UP" Button	"LEARN MORE" Button	Totals
People did sign up	(65/215)*100 = **30,23**	(65/215)*115 = **34,77**	65
People did not sign up	(150/215)*100 = **69,77**	(150/215)*115 = **80,23**	150
Total visitors	100	115	

Chi-Square:

$$\chi^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i} = \frac{(20 - 30{,}23)^2}{30{,}23} + \frac{(45 - 34{,}77)^2}{34{,}77} + \frac{(80 - 69{,}77)^2}{69{,}77} + \frac{(70 - 80{,}23)^2}{80{,}23}$$
$$= 3{,}46 + 3{,}01 + 1{,}50 + 1{,}30 = 9{,}27$$

Degrees of freedom: $df = (2 - 1) = 1$

According to the Probability Table, $p < 0.005$. By setting 0.01 as a threshold for the p-value, we can reject the null hypothesis and sustain the alternative one. The "Learn More" button leads to more visitors signing up on the website.

2.

Define what a "storyboard" is, how it can be realized, its benefits and drawbacks.

Possible solution

A storyboard is a hand-drawn comic that represents user scenarios, with an emphasis on how the system supports the user in the development of a task. It is typically realized with a few panels (a sequence of sketches) and it always include people and the environment. It doesn't show detailed user interfaces, but it shows a satisfying end result.
Benefits: it emphasizes how an interface accomplishes a task, focuses the conversation and feedback on user tasks, gets everyone on the same page about the goal, and it avoids nitpicking about user interface details.
Drawbacks: dynamic behaviors are difficult to depict, and stories with multiple concurrent users are difficult to effectively show.

3.

Describe what is a "heuristic evaluation" and how you would conduct it with multiple evaluators testing a single webpage.

Possible solution

A heuristic evaluation is a structured design critique of a user interface conducted by a small group of experts who apply a set of well-known heuristic criteria, e.g., the 10 Nielsen's rules. Its goal is to find the main usability problems in a design.
To conduct a heuristic evaluation for a single webpage, first of all, you need to define which set of heuristics (or principle) you are going to use. Then, you give those heuristics to a group of experts (3-5 people), who will use the heuristics independently and individually to look for problems in the webpage. Each expert will match one or more heuristics to the webpage, and she ranks the severity of the violation, if any. At the end, the experts share their findings (notes and ranked list of problems) so that they can be used to fix or re-design the webpage.

4.

List the categories in which contemporary Voice User Interfaces can be divided, with a major advantage or disadvantage for each one.

Possible solution

Contemporary Voice User Interfaces can be divided in:

- Screen-first, i.e., devices that were born as touch-screen devices in which the manufacturer adds voice interaction in the operating system or through some apps. Example: Android smartphone with Google Assistant. Some major disadvantages: poor use of space while speaking, missing affordances.
- Voice-only, i.e., devices without a screen, in which audio and voice for input and output. Example: Amazon Echo Dot. A major advantage: hands-free operation
- Voice-first, i.e., voice-only devices with a screen, like the Amazon Echo Show. A major disadvantage: the GUI is less capable than the one in screen-first devices.