APPENDIX B

Gestalt laws of grouping

1. The Gestalt law of simplicity indicates that humans tend to organize objects into the simplest representation. In a web page, the simplest representation of content is DOM tree elements. Fig. 3 shows one of the news' page of "cbc.ca/news/". In this figure, the middle image between the texts contains multiple elements (i.e., the text "FOR BREAKING NEWS", an image, and video). However, they have different types and styles, they are considered as a

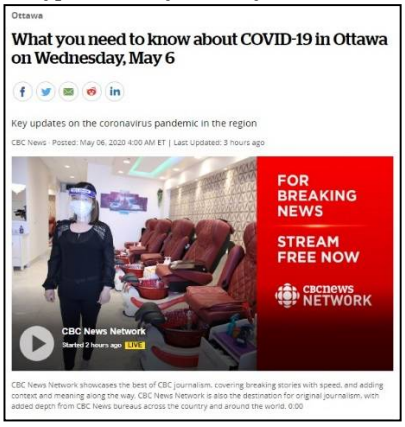

Fig. 3. Gestalt law of simplicity ("cbc.ca/news/")

single image rather than several unrelated ones.

2. The Gestalt law of closure states that humans tend to perceive incomplete shapes as complete ones. Because child DOM elements overlap their parent elements, many of the rendered objects are not completely shown in the final web page. For example, in Fig.4 ("ualberta.ca/admissions-programs"), the middle part of the background image is covered by a search box, but it is not regarded as a hole. Instead, it is believed that the background image is complete [2]. That is, the render object remains as a complete rectangle. Herein, it constructs all render objects as complete rectangles rather than irregular shapes according

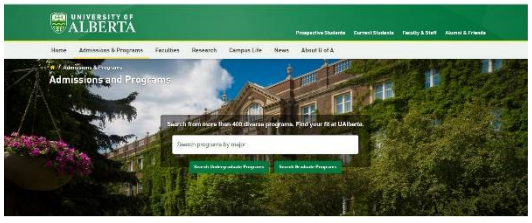

Fig. 4. Gestalt law of closure (Webpage of "ualberta.ca/admissions-programs/)

to this law.

3. The Gestalt law of proximity illustrates that humans tend to group close objects together while separate distant objects apart. Based on this law, render objects are merged into different blocks by distance [2]. Using the sign up page of Instagram (https://www.instagram.com /accounts/emailsignup/) as an example shown in Fig. 5, the four boxes regarding sign up ("Mobile Number or Email", "Full Name", "Username", and "Password") are related and

Fig. 5. Gestalt Laws of Proximity

regarded as a group.

4. The Gestalt law of similarity describes that humans perceive similar objects as a single group. Similarity among render objects is divided into three parts: background similarity, foreground similarity, and size similarity. Background similarity compares both the color and the image; foreground similarity includes textual and paragraph styles; and size similarity checks if the two render-bocks share the same width or height [1]. Again, see [1] for a more precise set of definitions. As shown in Fig. 6, the six objects are grouped into three groups in terms of styles. The top two objects are in one group, the next two objects are included in a second group, and the bottom two objects belong to a

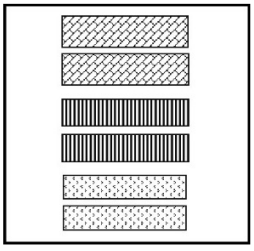

Fig. 6. Gestalt Laws of similarity

third group.

5. The Gestalt law of continuity indicates that humans tend to group together objects that are aligned. This law is straightforward during the translation: if any render object is not aligned with its siblings, then it belongs to a different group [2]. As shown in the example of University of Alberta's homepage (Fig. 7), the paragraphs in the orange rectangle ("Student Information", "Register", "Student Union", etc.) are left-aligned, indicating they are related

Fig. 7. Gestalt Laws of continuity

content.

6. The Gestalt law of common fate argues that humans are prone to include the objects with the same motion trend in

the same group. For example, the lower ribbon with the red background color in Fig. 8 (the homepage of global health in the Amazon, “amizade.org”) hangs at the bottom and does not move with scrolling the page, but other content moves accordingly.

Fig. 8. Homepage of “amizade.org”

REFRENCES

[1] Z. Xu and J. Miller, "A New Webpage Classification Model Based on Visual Information Using Gestalt Laws of Grouping," Cham, 2015, pp. 225-232: Springer International Publishing.

[2] Z. Xu and J. Miller, "Estimating similarity of rich internet pages using visual information," *International Journal of Web Engineering and Technology*, vol. 12, no. 2, 2017.