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Adding visual features to improve accessibility of text

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Adding visual features to improve accessibility of text

ABSTRACT

A significant percentage of humans suffer from reading difficulties caused by dyslexia. While the difficulties may differ across different individuals, some common problems include seeing letters as backwards or upside down; having trouble distinguishing between letters with similar shapes, e.g., b, p, q, and d; and conflating running letters, e.g., an r next to an n misread as an m. These difficulties are sometimes traced to an apparent inability to recognize a letter and its misoriented form, e.g., “b” and “upside-down b,” as distinct objects.

Techniques of this disclosure introduce a uniformly oriented visual feature (e.g., a tick mark) to each letter of the alphabet. By doing so, the orientation of each letter is indicated which can benefit a dyslexic reader. With the direction of the letter anchored by the tick mark, a reader finds it easier to orient, leading to a smoother, less exhausting reading experience.

KEYWORDS

- Typeface
- Accessibility
- Font orientation
- Dyslexia
- Reading disorder

BACKGROUND

A significant portion (between 5-17%) of the world population suffers from dyslexia. Common reading problems amongst dyslexics include seeing letters as backwards or upside down; having trouble distinguishing between letters that have similar shapes, e.g., b, p, q, and d; conflating running letters, e.g., an r next to an n (“rn”) misread as an m; etc. Reading online is

especially difficult as the rules of typeface design are not dyslexic friendly and such difficulties in seeing letters are often ignored in website design or in publishing software applications and electronic books. Thus, a dyslexic person may receive a lower quality reading experience.

DESCRIPTION

The origins of at least some of the reading difficulties faced by dyslexics is traced to an apparent inability to recognize inverted, mirror-reflected or rotated letters as objects that are different from the original letters. For example, to a dyslexic individual, the letter “b” and “mirror-reflected b” represent the same object, which results in a b-versus-d confusion. In a similar manner, an inability to recognize as different objects “b” and “upside-down b” results in a b-versus-P confusion. Having to comb through text disambiguating each letter is a tiring and discouraging process, and can be comparable to the difficulty faced by a non-dyslexic reader learning a new script.

The qujck brown fox jumps over the lazy dog.

Fig. 1: Adding an orientation-reinforcing tick mark to each letter of text

Techniques of this disclosure anchor the orientation of a letter by adding a tick mark uniformly to all characters in a text. An example sentence is shown in Fig. 1. The angle of the tick mark can be varied based on the font that is being modified. For example, a forty-five degree slant to the tick mark, as shown in Fig. 1, works well with most fonts.

The tick mark may be placed in any of the four quadrants, as long as the angle and magnitude are uniform across all characters being modified. In the example of Fig. 1, the tick mark is in the lower-left quadrant; however, it can alternatively be placed, e.g., in the upper-left

quadrant. The quadrant, angle, and other parameters of the tick mark can be varied with font and script (Roman, Cyrillic, etc.) and a suitable tick mark may be determined using tests.

The tick mark reinforces orientation by identifying clearly a starting point to the letter, e.g., in the example of Fig. 1, the tick mark signals the location of the lower-left corner of the letter. The similarity between “b” and “mirror-reflected b,” which leads to a b-versus-d confusion, is broken by addition of the tick mark. Dyslexic individuals no longer see upside-down or mirror-image letters, since the letters’ orientation is anchored by the tick mark. The tick mark clearly signals the start of a new letter for readers who face difficulties with letters running together. For example, “rn” does not resemble “m” when the letters “r,” “n,” and “m” are prefixed by tick marks, per the techniques of this disclosure. When given text is to be used in documentation for a mixed (dyslexic and non-dyslexic) audience, the version that includes tick marks is readable by non-dyslexics and retains professional look.

Although illustrated herein using Roman script, the techniques of this disclosure apply to other scripts, e.g., Cyrillic, Greek, etc. The techniques apply to any language based on a given script. The techniques apply to any software program, application or product that features or uses text, including operating systems for wearable devices, mobile devices, and desktop or laptop computers, as well as in internet browsers. When used in a computer application, a menu-option or other switch can be provided to enable users to switch on or off tick marks in the letters, thus enabling switching between dyslexic-friendly and normal font.

CONCLUSION

Many reading problems faced by dyslexics can be traced to an apparent inability to properly orient the letters of an alphabet. The orientation of a letter is generally important to identify it, e.g., a “mirror-image b” is easy to confuse with a “d.” In certain scripts, e.g., Roman,

Cyrillic, etc., there are at least a few letters which when rotated or reflected about an axis have the same shape as another letter. The techniques of this disclosure introduce a tick mark at a uniform location and orientation in all letters of the script, thereby breaking the symmetry that allows transformation of one letter to another by rotation, reflection, or other simple operations. The techniques thereby allow a dyslexic reader to quickly disambiguate letters of a text, enabling a speedier, less exhausting reading experience.