

Flexible Type: Methods and Applications of Modifying Glyph's Horizontal and Vertical Weight

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Abstract

Graphic designers create logos or artworks by using various tools such as Adobe Illustrator, InDesign etc. Many times, designers face a major problem where they want to change the visual appearance of the text to fit the design in the current context or to make the design look better, but text editing options provided today are very limiting to the user's creativity. The designers get around this by converting text to outlines and then modifying each glyph like a separate graphic. This leads to text no longer being live (essentially unlinked) and the edits for each glyph can be time consuming.

The poster presents methods for modifying glyph's horizontal and vertical weight. Later, the poster aims to provide the application of such modification to generate multiple styles by modifying glyph's overall Weight, Width, CapHeight, xHeight, height of Ascender and Descender etc.

CCS Concepts

• *Computing methodologies* → *Computer Graphics*;

1. Introduction

The term "Horizontal Weight" refers to stroke weight of vertical stems or curves of a glyph. Similarly, the term, "Vertical Weight" refers to stroke weight of horizontal bars or curves. A glyph's outline can be represented as Bezier paths containing various lines and curves segments. The poster provides methods for intelligently analysing the glyph outline based on the direction of various line or curve segments and modifying points of each line or curve segment based on the segment direction to generate horizontally and/or vertically weighted modified glyph [Fig 1].

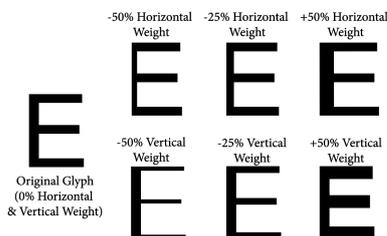


Figure 1: 'Horizontal and Vertical Weight' Example

If the glyphs are scaled, then stroke weight also changes accordingly which leads to glyph distortion and unacceptable alterations [Fig 2].



Figure 2: 'Horizontally Scaled Glyphs' Example

We are proposing methods to modify glyph's Horizontal and Vertical weight without using additional information other than glyph outline. With the individual control of Horizontal and Vertical weight, one can scale the glyph while maintaining the original stroke weight. The power of such modification extends to modify glyph's overall Weight, CapHeight, xHeight and height of Ascender or Descender. It also helps in generating new composite glyphs where two or more glyphs are scaled while maintaining the stroke weight on a given point size.

2. Previous Work

Most of the previous works done on modifying glyph outline are based on already stored information within the outline data [Knu82] [Ado95] [OTV16]. As per the Multiple Master technology, to generate a semi-bold style, at least two styles e.g. 'Regular' and 'Bold' are required. Other techniques involve the scaling of the glyph and then modifying the glyph outline manually to adjust the stroke weight.

3. Methodology

To modify the Horizontal Weight of a glyph, the x-coordinates of all the points are modified with a 'delta' value as per the direction of each line or curve segment as shown in Figure 3. The 'delta' value will be subtracted from x-coordinates of points of segments which are in Upward (Up, LeftUp, RightUp) direction and 'delta' will be added to points of segments which are in Downward (Down, LeftDown, RightDown) direction.

To modify the Vertical Weight of a glyph, the y-coordinates of points are modified based on the direction as shown in 4. If direction of a segment is in Left direction (Left, LeftUp, LeftDown) then y-coordinate of the segment is modified by subtracting the 'delta' value else if the direction is in Right (Right, RightUp, RightDown) then the y-coordinate is modified by adding the 'delta' value.

The resultant outline of modified glyph may have overlaps or kinks which can be removed by using theorem of intersecting lines [Ado95].

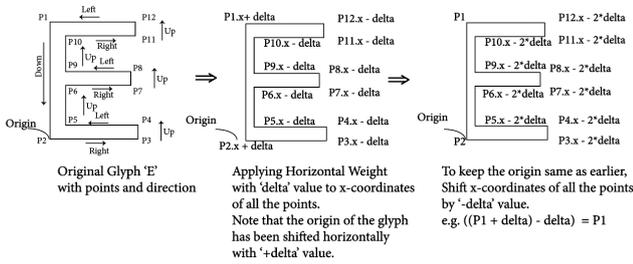


Figure 3: Method 'Horizontal Weight' modification

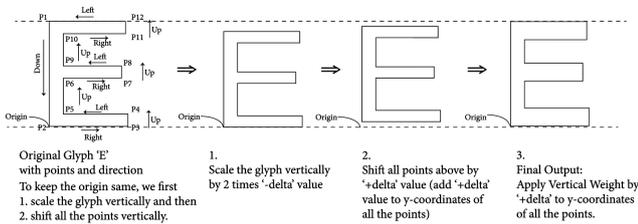


Figure 4: Method 'Vertical Weight' modification

4. Applications

4.1. Overall Weight Modification

Overall weight modification using both Horizontal and Vertical weight modification. [Fig 5].



Figure 5: Glyph's overall weight modification

4.2. Width Modification

Scale the glyph horizontally and then apply the Horizontal Weight to compensate the loss in stroke weight. [Fig 6]



Figure 6: Glyph's width modification

4.3. CapHeight Modification

Scale the glyph vertically and then apply the Vertical Weight to compensate the loss in stroke weight. [Fig 7]



Figure 7: CapHeight modification

4.4. xHeight, Ascender, Descender Modification

For xHeight modification, vertically scale the glyph-points which lie in-between xHeight line and baseline and then apply the 'Vertical Weight' to compensate the loss in stroke weight. Similarly, Ascender and Descender height modification can be achieved. [Fig 8].



Figure 8: xHeight, Ascender, Descender modification

5. Conclusion

The methods can be extended to modify contrast and generation of new composite glyphs. Such methods are not only applicable to the Latin glyph outline but also applicable to other locale specific glyphs and vector graphic objects.

References

[Ado95] ADOBE: Designing multiple master typefaces. 1, 2
 [Knu82] KNUTH D. E.: 'the concept of a meta-font', visible language. 3-27. 1
 [OTV16] Opentype font variations, <https://docs.microsoft.com/en-gb/typography/opentype/font-variations>. 1