Beyond the Stroke

Filip Paldia and Samuel Čarnoký

BEYOND THE STROKE (CONFERENCE PAPER)

MFA Filip Paldia
Academy of Fine Arts and Design in Bratislava
Visual Communication

M.A. Samuel Čarnoký, ArtD.
Technical University of Košice
Faculty of Arts, Department of Design

Abstract

If Gerrit Noordzij was correct that the foundation of Type Design is in writing, then the vast majority of the typographic shapes must consist of the Strokes.
Noordzij has proposed an evaluation concept of typographic forms through stroke forms based on translation, expansion, and rotation. The concept is visualised in the Cubic diagram.
Nonetheless, this stroke evaluation system has been studied primarily with outline based tools.
This paper studies the typographic stroke with LTTR/INK technology that allows drawing rich stroke shapes.
Experimental results demonstrate the possibilities inspired by Huang's perversion beyond the original Noordzij's Cube and propose a new stroke evaluation parameter—Contrast Tilt.

1. Introduction

In contemporary type design, type designers create letterforms by drawing their outlines and surrounding negative shapes. Bézier curves are traced along the borders of letters black and white. This method is known as the Outline approach. There is also an approach that comes from writing. The far less practised Stroke approach. Crossland explained it as a method where each letter is constructed by specifying points along the path of a pen's stroke and the attributes of the pen's nib at those points.[1]

Noordzij had a strong argument for the stroke approach: "The stroke is the fundamental artefact. Nothing goes further back than the shape of a single stroke."[2] The reason for this statement is that the letter shapes originate in writing.

How many shapes in the typographic universe are made of strokes is a question we don't know[3]. For now, it is fair to say there is a scale between two extremes—type shapes that are explicitly defined by strokes and type shapes that aren't defined by strokes —Outliners. Based on this logic, we can argue that a significant amount of type forms are defined by strokes.

Yet, the stroke approach is rare compared to the outline approach.[1-1] The concept is not new. Pucket said that: "People have been writing about this since the 1960s."[4] The digital technology is available since METAFONT[5] through Prototypo[6] through Parametric pen[7]. Yet, the stroke approach is as rare as physical type design conferences in 2020.

So what are the reason for the outline hegemony and stroke losses? According to Crossland—The outline approach is dominant because it gives instant visual feedback and exacting control; it is direct and visceral[1-2]. In all those decades of nobody has created a tool that makes the concept worthwhile[4-1]. Reasoning why non of the tools made the concept worthwhile to spread could be summarised in a separate study.

In September 2016, at the ATyPI conference in Warsaw, together with Martin Cetkovsky, we presented a Skeleton type design tool proposal[8]. The proposition states the ability to draw rich stroke shapes (by setting translation, expansion, rotation, imprint along with the skeleton) and provides convenient outline output in Bézier curves. In April 2021, we released new technology that is capable of fulfilling that proposal. This innovation is bringing both new possibilities and limitations. In this paper, we are examining the theory of stroke through and through. We are exploring the possibilities of the LTTR/INK stroke engine's capability to generate contrast and interpolate between multiple masters. The results of exploration contain conventional expectations of the Stroke approach.

The main contributions created with this work include:

1. Investigation of possible type forms beyond the known Noordzij's cube[9] and Huang's perversion[10]
2. Description for new dimension system for contrast evaluation Stroke tilt into type design.
3. The exploration of a new technology capable of generating stroke contrast based on elliptical shapes
4. The development of a multiple master system capable of generating stroke contrast with the stroke engine tool.
5. Description of the technology use limits—parametrisation

This paper is structured as follows—Section 2 describes the framework of Skeleton type design and terminology; Section 3 documents the exploration with examples and discusses the achieved results; Section 4 summarises our work and presents future expectations, plans, and dreams.

2. Terminology

We adore debates about type design. Until they lead to passionate disputes where involved parties find that they refer to a different problem. What could be more embarrassing than this? Maybe stuck in kinky pyjama and "I love pussycat" cup on the street in front of an accidentally locked door without keys.[11] To avoid embarrassment due to the mess in terminology, let us ensure that all skeleton type designers speak the same jargon.
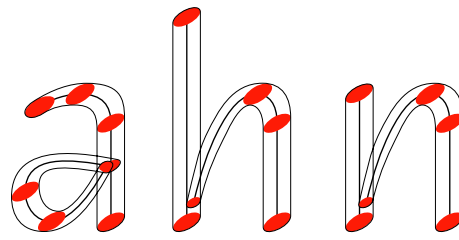
2.1 Skeleton type design

Skeleton type design is an approach to type design that combines the Stroke approach and the Outline approach (or Contour approach) to drawing type forms. Skeleton type design leverages Stroke heartline as a construction—a skeleton—that mounts stroke shapes and non-stroke shapes (Outliners) into a type form.
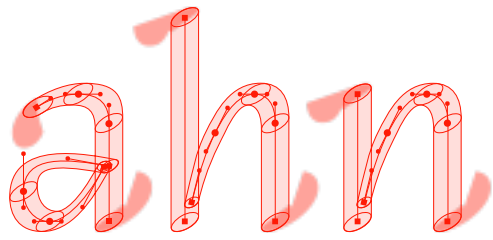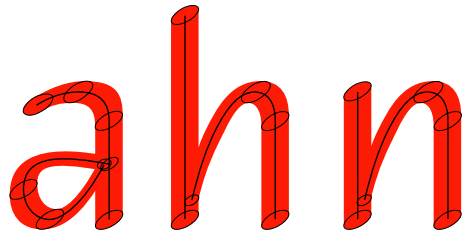
2.2 Stroke

Stroke (in type design) is a letter shape created by writing or drawing with a physical or digital stroke tool.

2.5 Outliner (Outline shape)

The outliner is a letter shape created by drawing with a digital stroke tool, typically Bézier curves.
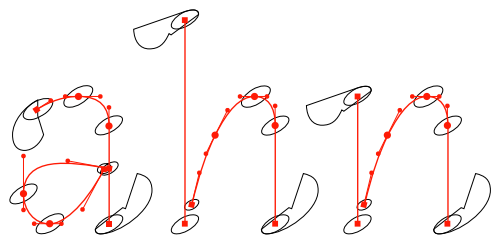
2.3 Skeleton

Skeleton (in Skeleton type design) is an element of graphical user interface that defines a path of the tool imprint and position of anchored outliners.
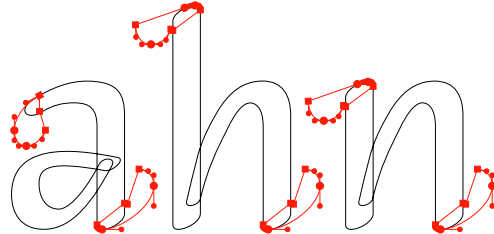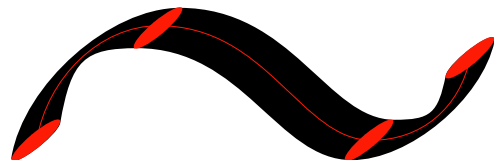
2.6 Translation

Translation is the contrast produced by the broad-nibbed pen. In Skeleton type design the translation effect is achieved by any imprint shape that differs from the circle[12]—for example, ellipse, rectangle, polygon.

2.7 Expansion

Expansion is the contrast usually produced with a pointed pen or brush, whereby increasing the pressure makes the two halves of the pen part, thus causing a gradual thickening of the stroke. In Skeleton type design, the expansion effect is achieved by various scales of the Imprint.

2.4 Imprint

Imprint in Skeleton type design is a shape of a digital tool tip that draws a stroke shape by rendering along a Skeleton.

2.8 Rotation

Rotation is the contrast produced by the rotation of a pen. In Skeleton type design the rotation effect is achieved by various angles of imprint.
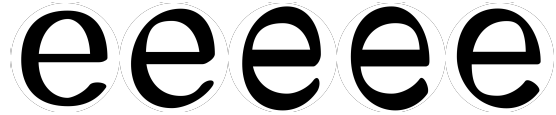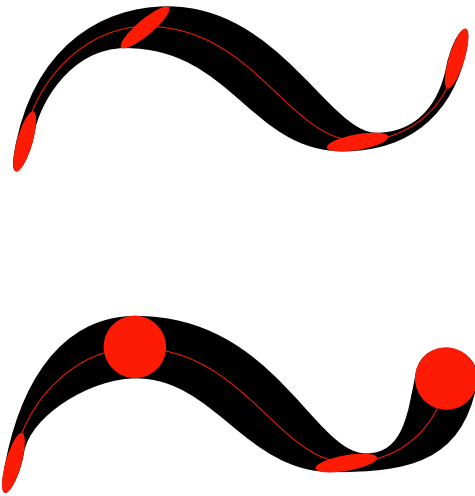
2.9 Tilt

Contrast Tilt is a default contrast angle related to the writing medium or related to a skeleton. By tilting the contrast, we can achieve the so-called reversed contrast.

We are proposing contrast tilt as another examination stroke parameter.

3. Experiments

As claimed, the Stroke approach is supposed to help draw the contrast. This experiment aims to examine the theory of stroke through and through without limits of what we have seen before.

The experiment was inspired by Wei Huang's perversion of Noordzij's cube[13] and! BACKASSWARDS! by David Jonathan Ross[14].

We have taken this approach as a starting point and explored how wild the perversion can go. Based on the exaggeration of Huang's perversion, we are proposing a new dimension for Noordzij's contrast evaluation scheme—Contrast tilt for each type of contrast: Translation tilt, Expansion tilt, Rotation tilt.

The following content can cause feelings of disgust, in worse cases, mental damage. Further reading is your own responsibility.[11-1]

3.1 Initial setup

For a better understanding of how theories and thoughts look in practice with our tooling, we have decided to separate the observed aesthetical parameters into individual axes. Which resulted in four axes with sixteen masters as follows:
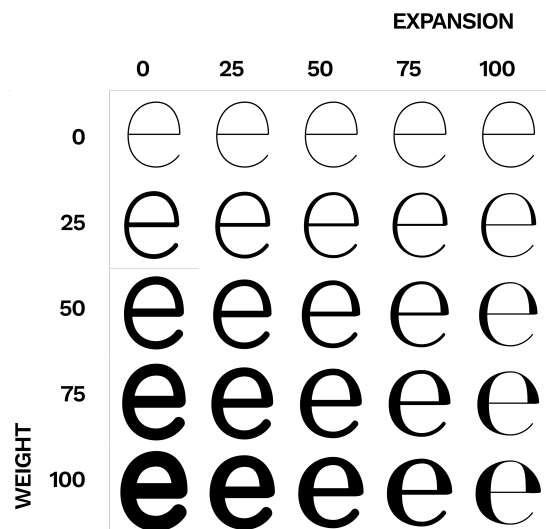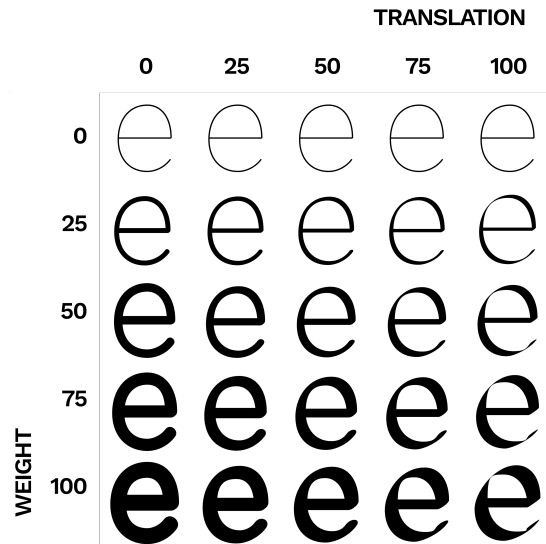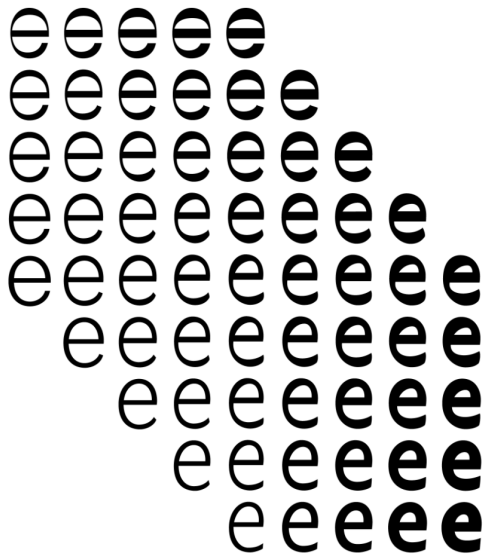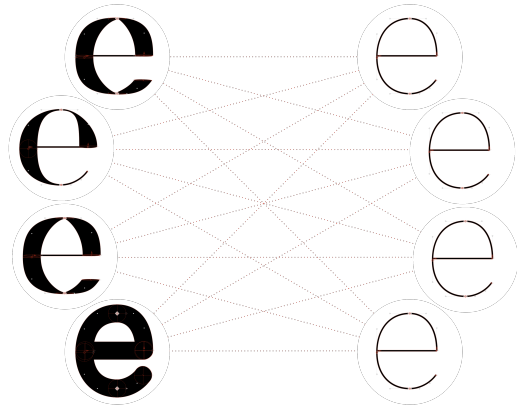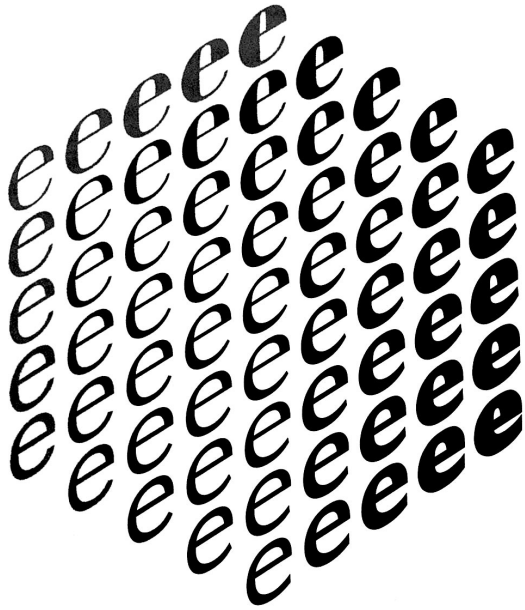
1. Two contrast axes translation and expansion (we have omitted the rotation axis since the differences aren't significant enough)

2. One weight axis that is presented on Noordzij's cube as a diminishing of contrast[15]

3. One contrast tilt axis is indicated by Huang's perversion of Noordzij's cube[16].
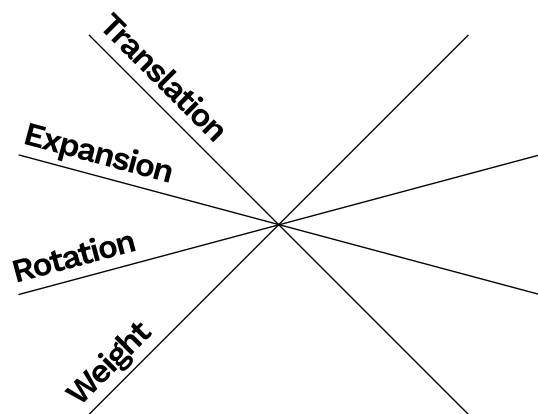
We use Glyphs[17] as the main drawing editor, LTTR/INK for drawing strokes with or without contrast, and Variable Font Preview[18] for observing stroke contrast interpolation results.

3.3 1st Iteration

We have interpolated the masters and compared sequence results with Noordij's cube and Huang's perversion sequences.

TRANSLATION

	0	25	50	75	100

(vertical label: WEIGHT — 0, 25, 50, 75, 100)

EXPANSION

	0	25	50	75	100

(vertical label: WEIGHT — 0, 25, 50, 75, 100)

From the comparison, we have found out that the translation contrast is rotating correctly. Furthermore, we have achieved a greater perversion of 90 degrees in translation contrast than Huang. That made us excited, so excited, that we used the rotating translation instead of a disco ball.
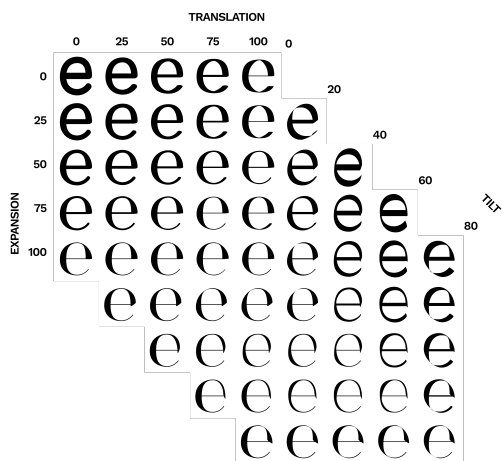
However, the expansion contrast doesn't provide a convenient result. Party has ended, and we have to look closer at what's the problem. The reason behind it is that the expansion tilt contrast is not changing correctly.

EXPANSION TILT

3.3 2nd Iteration

In the second iteration, we omitted the necessity of evaluating contrast axes with the weight axis to focus only on the contrast tilt simulation.

We took into consideration that we have applied the rotation only on the translation axis. As a result, we modified masters to define horizontal expansion correctly.

We have re-interpolated the expansion masters and compared sequence results with Noordij's cube and Huang's perversion again.

The achieved result was closer to our expectations. We have achieved reversed expansion contrast.
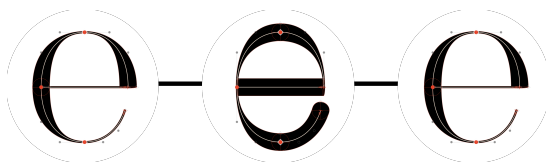
However, the expansion of the instances doesn't provide the aesthetics of tilted expansion for the corresponding angle. To find the reason behind the effect we must look more in detail.
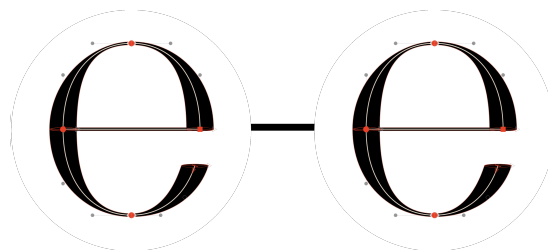
EXPANSION TILT

The reason behind the effect is that the interpolation, in this case, is linear. From this moment, we have forgotten entirely about the tilting translation contrast party and focused solely on the expansion tilt axis.

3.4 3rd Iteration

This iteration was focused exclusively to explore what is happening when we are trying to achieve proper expansion contrast tilting. Therefore we have reduced the number of masters necessary for expansion contrast tilt.

We have tried three variants with different masters setups.

We have also reviewed the Kalliculator demonstration[19] to compare the results.
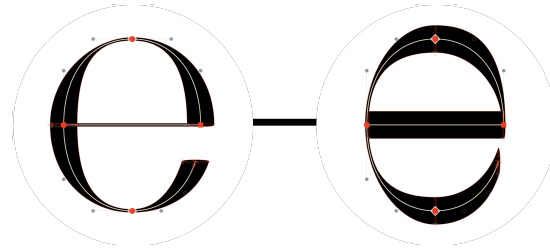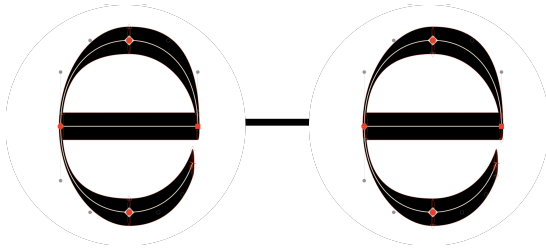
Despite the observation of enjoyable unusual shapes, the output of interpolation on the expansion tilt axis didn't achieve a halfway of the Kalliculator result of the expansion parametrisation.

To achieve a similar output to Kalliculator, we would need to redraw the skeleton for each angle of the expansion tilt. Hence, the LTTR/INK is not capable of such parametrisation.

4. Conclusion

We have presented the Skeleton type design approach that leverages Stroke heartline as a construction—a skeleton—that mounts stroke shapes and non-stroke shapes (Outliners) into a type form.

We have examined the Stroke theory and explored its perversions by a series of conducted experiments.

We have leveraged the latest technology of the LTTR/INK stroke engine that allows drawing rich stroke shapes (by setting translation, expansion, rotation, imprint along with the skeleton), Glyphs as the main drawing editor, and Variable Font Preview for observing the stroke contrast interpolations results.

We highlight the following contributions:

1. Proposal of new dimension—Contrast tilt for each type of contrast: Translation tilt, Expansion tilt, Rotation tilt—in Noordzij's cube and type form evaluation scheme based on the exaggeration of Huang's perversion[13-1]

2. Investigation of possible type forms beyond the known Noordzij's cube and Huang's perversion, based on the contrast tilt proposals

3. The evaluation of a new technology capable of generating stroke contrast based on elliptical shapes—LTTR/INK

4. Discovery of the LTTR/INK technology limits in the parametric interpolation of the expansion contrast tilt.
   Proposals for the LTTR/INK stroke engine improvements, especially in high contrast shapes and stability of stroke interpolations.

5. Exploration of a possible framework for multiple master skeleton-based fonts.

We aim to focus future work on:

1. Further exploration of tilt possibilities full expansion and rotation axis; experimentation of different skeleton shapes interpolation for multiple master fonts.

2. Experimentation of skeleton type design as a fusion of Stroke approach and Outline approach

3. Proposal of skeleton type design framework and best practices based on the experimentations.

References

1. Dave Crossland, Why didn't METAFONT catch on?, University of Reading, UK, TUGboat, 2008, https://www.tug.org/TUGboat/tb29-3/tb93crossland.pdf↵↵

2. Gerrit Noordzij, The Stroke: Theory of Writing, Hyphen Press, 2005, https://www.goodreads.com/book/show/487140.The_Stroke ↵

3. We are not aware of a study that would try to analyse the amount of stroke shapes in a selected font library. ↵

4. James Puckett, TypeDrawers Forum, 2016, https://typedrawers.com/discussion/1463/how-skeleton-based-type-design-could-shake-up-digital-type-design-workflows/p1, accessed 2021-12 ↵

5. Metafont https://web.archive.org/web/20110927042453/http://www.tex.ac.uk/ctan/systems/knuth/dist/mf/mf.web] accessed 2021–12↵

6. ByteFoundry, The new Prototypo is here!, https://www.kickstarter.com/projects/prototypoapp/prototypo-streamlining-font-creation/posts/1347003 2015 The authors mentioned a Hybrid engine that integrates strokes and outlines ↵

7. Loic Sanders, La paresse http://www.akalollip.com/blog/?p=4219 2014 An experiment with parametric pen ↵

8. Filip Paldia, Martin Cetkovsky, How skeleton based type design could shake up digital type design workflows, ATypI 2016, https://youtu.be/5YFKSV4GzRw?t=9 accessed 2021-12 ↵

9. Gerrit Noordzij's cube is a cube diagram that visualises typographic evaluation concept of typographic forms through stroke forms based on translation, expansion, and rotation. ↵

10. Huang's Perversion is a perversion of Noordzij's cube's logic that is achieved through a 90-degree counterclockwise rotation in the angle of the counterpoint and a reversal in the direction of rotation. ↵

11. It is not expected to write scholarly papers with humour. However, we haven't found a good argument why not.↵↵

12. The circle imprint is rendering a so-called monolinear stroke that has literary nil translation contrast. Hence, we excluded circle from the translation type of contrast. ↵

13. Wei Huang, Our Masthead, West Space Journal, 2013, http://journal.westspace.org.au/article/our-masthead/, Explores type forms through a perversion of Gerrit Noordzij's cube

Logic. Framework of how to achieve Reverse stroke contrast ↵↵

14. David Jonathan Ross, BACKASSWARDS!, TypeCon Portland, 2013, https://djr.com/backasswards, Attempt to Reverse stroke contrast , see also Our Masthead by Wei Huang ↵

15. from our vantage point this is the weight since letter forms sequence demonstrates the increasing amount of blacks ↵

16. Huang rotated the contrast of 90 degrees counter-clockwise in the angle of the counterpoint ↵

17. Glyphs is a Mac font editor. We are using Glyphs 3 https://glyphsapp.com/ ↵

18. Variable Font Preview is a plugin for Glyphs 3 that previews what a variable font will look like with any axis settings. https://markfromberg.com/projects/variable-font-preview/ ↵

19. RoboFont, kalliculator in RoboFont, 2012, https://vimeo.com/49797030, Video demonstrating Kalliculator's way of generating contrast. , 01:10 demonstrates expansion tilt ↵