

Towards an Ontology of Typeface Design

Author **Po Choy, NG** | ng.pochoy@connect.polyu.hk
 Co-author **Clifford Sze-Tsan CHOY** | mccliff@polyu.edu.hk
 Affiliation **School of Design, The Hong Kong Polytechnic University**

The ontology proposed here includes four major components, namely: **Topology**, **Skeleton**, **Anatomy**, and **Synthesis**. It is a conceptual model resembling to that of language in which the pragmatic, semantic, and synthetic relationships are concerned. We argue that the semantics and synthesis of typefaces can be transformed by **geometric** and **rhetorical operations** at any component-stage iteratively, which eventually constitutes different forms and semantics.

This research should contribute: (1) a knowledge framework of typeface design which provides a new perspective and theoretical foundation for future research, (2) a corpus of design knowledge and design tools for designers and communicators, and (3) a useful knowledge model for the pedagogical purpose.

1 TOPOLOGY

The Topology of a typeface character defines the connectiveness and continuity of characters in two dimensional conceptual space. It does not define any physical dimension but only the conceptual connections and relative positions between the nodes and edges of the character.

1.1 Conceptual representation for Skeleton and support character recognition

It is only a conceptual reference for the skeleton, it is not yet realized in the geometric space as a visible form for character recognition.



These three topologies which maintain the similar connective relations are considered as the same though they render as different form.

1.2 Consists of geometric properties based on relative relations

Although it is an abstract representation, it suggests certain geometric properties such as orientation and relative spatial relations.



Due to the difference between the relative orientation or the spatial relations, these three topologies are considered as different.

1.4 Different topologies or edge properties could signify different perceptual feelings



The topology of "A" is relatively more complicated than those of "I". The topology of A has more upward feeling compared to those of "B" or "C".

1.5 Topology can be modified by Rhetorical Operations to signify different semantics

To signify different meaning or feeling, Rhetorical Operations could be applied to modify the topology through the relevant transformations



2 SKELETON

Skeleton is the underneath structure which the strokes or outlines of typeface should be built upon. It is the realization or visualization of the topology of a typeface design; it is the guideline that defines the central axes of the strokes.

2.1 Represent as vectors without dimension

It is a group of vectors without thickness or anatomical feature, it only defines the paths of the strokes.



2.2 Ideal Model

Topology will be interpreted as skeleton based on an Ideal Model by default. However, it could be transformed into skeletons of different forms.



2.3 Can be modified by Geometric Transformations

Different styles of the same font family could be created which include oblique, condense or extend type and so on.



2.4 Can be modified by Rhetorical Operations

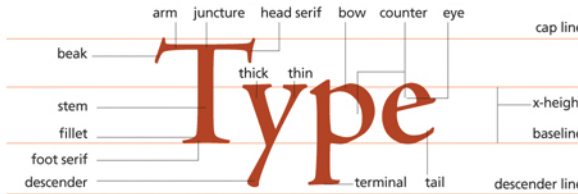
To express different emotions or semantics, some rhetorical operations, through conversion as geometric transformations, can be applied and interpreted the topology as different skeletons.



3 ANATOMY

The anatomy defines the forms, structures, relations and properties of typeface design as a whole as well as those of the segmented components.

It can be divided into global features, local features in which the former group affects the overall characteristics of typeface design while the latter group only shows its characteristics through a segmented component. Besides, different categories of Anatomical Features can be classified as Anatomical types.



3.1 Local feature

3.1.1 Anatomical Features

They are the components found in different segments of typefaces which show distinctive characteristics.

3.1.2 Inherent feature

This is an intrinsic feature that can be found in typefaces.

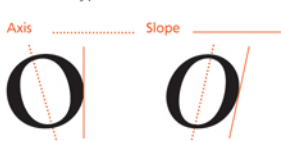
3.2 Global feature

Global feature can be divided into three groups as listed below:

3.2.1 Metrics

This is the structural framework or set of guidelines that conducts the composition of typeface design. eg. x-height, baseline as shown above.

Axis Slope



3.2.2 Metrics



3.2.3 Interrelated feature

They can be found by comparing two or more features or properties of the same or different typefaces.

Connectivity



Regularity



Curvature



Contrast

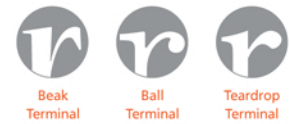


Counter



3.3 Anatomical Type

3.3.1 Terminal Type



3.3.2 Serif Type



4 SYNTHESIS

Synthesis is the combination of the three components described above in which the Topology will be converted into the Skeleton which provides the framework for strokes and Anatomy to build upon and finally rendered as the outline for a specific typeface design.

4.1 Typeface Design Model

In this model, the topology, skeleton, and anatomy are the core components of typeface design in which the related features, properties, and relationships are well specified.

4.2 Typeface Design Methods

These operations are specific methods that work with the Typeface Design Model described.

The Design Patterns are schematic approach to utilize the design operations.

Geometric Operations

Scaling
Translation
Rotation
Reflection
Shearing
Etc.

Rhetorical Operations

Metonymy
Antithesis
Allusion
Ellipsis
Hyperbole
Etc.

Design Pattern

Stroke
Serif
San serif
Calligraphic
Logo type
Etc.

4.3 Synthetic Process

Throughout the synthetic process, design methods will be applied to the conceptual model described above for generating new typeface design.

