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Exploring A Cursive Design for a Mixed Script Typeface

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Abstract

In this paper the author explains the design ideas and the development of a cursive typeface that spans Devanagari, Tamil and Latin scripts. The letterforms are designed to resemble text that is written by hand on paper with a marker pen. The paper also discusses what makes a typeface resemble handwriting and explains techniques used to add features into the design to realise that resemblance. Strategies to present a homogeneous appearance of the letter forms across the three scripts are also discussed and illustrated. The result of this research, is a multi-script typeface that will be suitable for casual communications, or a secondary voice in formal communications.

Key words: *Cursive, Secondary Voice, Devanagari, Tamil, Latin.*

1. Introduction

Spoken form of communication predates writing. When we speak, our message is communicated through many other elements that accompany the words. The tone of our voice, our facial expressions, our hand gestures for example, convey additional information to the listener. These elements serve as auxiliary information to the message that is communicated. When we put the message into words, the auxiliary information is lost.

Over the years, typeface designers employed several techniques to substantiate the text for the missing elements¹. Some of the common techniques used include the ones that people are familiar with today: regular, bold and italics type styles. Regular is the default style that is used in body text while italics style is typically used for soft emphasis of words or phrases within the text. Bold faces, however, are mostly used for titles and sub-headings and less in body text. These techniques are so common that they are available as standard features in word-processing and document layout software in the last few decades.

Sometimes, small blocks of text are set in an entirely different typeface. Quotes or call-outs, for example, may employ a less formal or casual style. These casual typefaces may also be used in other areas where the message is communicated in an informal tone, or what we call *voice* in typographic terminology.

This paper discusses the *Annai* typeface which is being designed by the author, specifically for such informal communication in Indian languages. *Annai* is more cursive in nature, closely resembling hand strokes as opposed to type-written text used in formal documents.

2. Cursive typefaces in Indic scripts

Cursive typefaces for scripts used in India are not very common. None of the general purpose desktop or mobile operating systems ship a cursive typeface for an Indic script with the system. There were some fonts seen in proprietary formats designed by individuals before Unicode was widely adopted. However, the features of these typefaces and the number of characters in the script that they covered were limited. Thus, making them unusable in many scenarios.

The closest we can get to when we need a type for casual text is to take a typeface that was designed upright and slant it mathematically. This is what the italics feature in word-processing applications do when it can't find an italics font designed to match the roman one. As a result, we get a mechanically italicized font with varying degree of distortions from its original roman form.

The problem gets worse when we need to present the text in different scripts. Unless we have a single typeface that was designed to maintain some degree of consistency across scripts, mechanically italicizing different typefaces and stacking them together may not deliver a desirable outcome for a homogeneous presentation.

For example, different typeface designs may need different degrees of slant angles in order to maintain spacing and unique characteristics of the design. Distorting the outlines of a typeface in any form, that is not catered for in the design, does injustice to the design.

In a cursive style, the letters in the text are written in a conjoined or flowing manner, generally to speed up writing. The joins indicate that the letters are written in one go, without lifting the pen. Formal cursive, in Latin, is generally joined. All the letters in a word are written in one go. However, casual cursive combines joins and pen lifts. Text in Indic scripts, in general, are not joined. Be it Northern Indian scripts that have forms based on a reed pen with a 35 to 40 degree cut flat nib, or Southern Indian scripts that were written on palm leaves with a stylus⁴. The manuscripts in both these families of scripts show that each unit of text is written upright and in discrete forms.

Italics in Indic type design is generally non-existent. It is an idea borrowed from Latin that is easily accessed today by the availability of italicization feature in word processing software. However, with rich set of features available in modern type layout technologies, like OpenType and Apple Advance Typography (AAT), it is possible to design cursive forms of Indic typefaces that closely resemble hand writing. The features available in the layout technologies allows typeface designers to use different forms of letters based on their position in a word or the shape of the letters adjacent to them.

3. Design goals of *Annai*

Annai was conceived with the goal of creating a cursive typeface across multiple scripts. Latin, Devanagari and Tamil scripts were chosen for a start. The intended use of *Annai* was for informal text. However, it can also serve as a second voice in formal text. Especially in quotes or callouts that need a different voice.

The strokes used in the design of the letters were chosen to closely resemble the strokes made with a marker pen, when the letters are written on paper. The strokes may vary in thickness, but the variations need to be consistent.

Cursive typefaces in Latin, are usually designed with a forward slant. Although the main scripts in *Annai* are Indic, a slanted design was explored. The slant angle was picked so that the letters from all the scripts will look even. They may not join with adjacent letters. However, as much as possible, each character needed to appear as if it was written without lifting the pen.

The outlines for each script needed to be matched in order to facilitate the use of all three scripts side by side on the same document. This was a challenge as each script has its unique characteristic that should not be compromised.

4. Homogeneity

The three scripts chosen for *Annai* significantly vary in the flow when they are written by hand. Devanagari has more vertical stroke movements with a horizontal headline, called *shiro-rekha*, that joins words. Tamil has plenty of loops with some vertical strokes while Latin goes through a wavy flow. To realise a single typeface that appears homogenous across the three styles of writing can be a challenge. However, since the characters from the scripts do not intermix, in other words the letters are not mixed in a single word, homogeneity can still be realised without compromising unique stroke movements in each script.

The strategy used to realise this is to mimic all the stroke movements as if they were written by the same person with the same marker. Common patterns are identified across the scripts where stroke movements can be matched. Some of these areas are explained below.

4.1 Vertical strokes

All of the three scripts have vertical strokes going from top to down or bottom to top. Terminals, the end point of a stroke, that ends at the bottom or top, appear in all the scripts. Making these strokes even, was the first step taken to introduce consistency. The

figure below shows some of the characters and components in each script where consistent vertical strokes can be applied:



Figure 1. Characters and components from Tamil, Latin and Devanagari showing consistent vertical strokes.

4.2 Marks

Dots are marks that are common across many scripts. It can be found almost all Indic scripts. In *Annai*, Latin has dots above the lower-case letters ‘i’ and ‘j’. In Devanagari, dots are used for *anusvara* and *nukta*. Tamil uses a dot for its *pulli* to denote a pure consonant. All of these dots can make use of the same shape. Some letters that uses them are shown in Figure 2:



Figure 2. Consistent forms of the dot used in Tamil’s *pulli*, Latin’s dot on ‘i’ and Devanagari’s *anusvara* and *nukta*.

4.3 Loops

While loops are common across the scripts, their appearance vary in size and curvature. Unlike vertical strokes and marks, it may not be possible to use re-usable components in loops as it was done with vertical strokes and dots. Loops in Tamil are drawn clockwise from the top. In Latin they are also drawn from the top but counter clock wise. In Devanagari however, they are drawn starting from the top going downwards. Although the appearance of the loops in each of the script may not be the same, some degree of consistency can be realised by matching the space inside similar looking loops. Figure 3 shows examples.



Figure 3. Loops in Tamil *nna*, in Latin small case 'o' and Devanagari *va*.

4.4 Terminals

Terminals were the best places to enforce consistency. Terminals are also areas where the effect of a marker pen can be conspicuously shown. Since all the scripts have in bound and out bound terminals, they were all given the same weight and texture to resemble the same marker pen. Examples of terminals can be seen in figures 1,2 and 3:

5. 'Cursiveness'

Gerrit Noordzij in his book "The stroke, theory of writing", describes stroke movements as follows: 'In handwriting a stroke in which the writer draws the front toward his hand is called a *downstroke* and the portion of a stroke that has the front returning is called an *upstroke*'. Noordzij further differentiates stroke constructions as Interrupted and returning (Figure 4). The returning construction has a *downstroke* and an *upstroke*. The entire construction is made in one stroke without lifting the pen, which means without interruption. It is written more quickly and shows characteristics of informal writing.

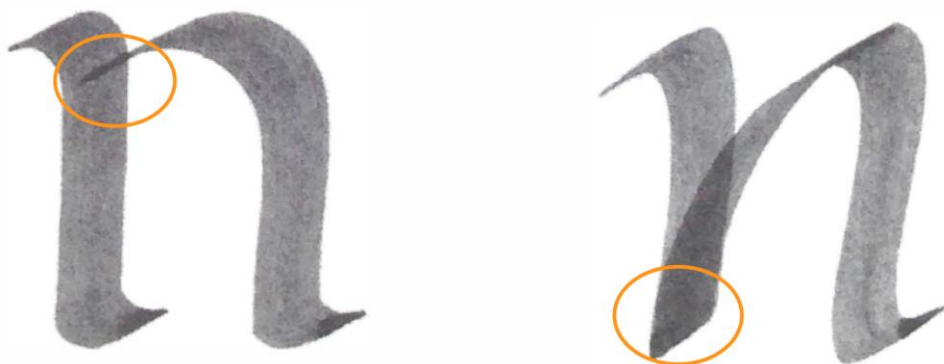


Figure 4: Interrupted construction (left) and returning construction (right). Source: Noordzji, 2009.

Noordzij further explains that not all combinations of writing instruments and material accommodate returning constructions. Some instruments may not allow a smooth upward stroke like the one seen on the right side of Figure 4.

The marker pen chosen as the instrument for the strokes in *Annai* does allow reasonable upward strokes when used to write on paper. However, continuously writing all of the letters in a word without lifting the pen may not be as smooth as using a ball-point pen. Using this as a basis, each letter is drawn to resemble a single stroke as much as possible. However, the letters themselves will not connect with one another. This lends well to the hand-written forms of Devanagari and Tamil where the letters are mostly written without connecting to the next one.



Figure 5. Letters drawn with a single stroke. Tamil vowel-sign *aa*, Latin ‘n’ and Devanagari *ka*. Devanagari’s head stroke is usually drawn after the letters of a word are written.

The speed at which returning strokes are made also determines the shape of the final letter. This quicker the writing, the lesser the *downward* and *upward* strokes overlap. All the letters in *Annai* should not only demonstrate that they were written by the same person using the same pen, they should also demonstrate that they were written with the same speed. This can be established by paying attention to the degree of overlap in the strokes as shown in Figure 5.

6. Stress marks

To closely represent a pen stroke, the horizontal and vertical stems marginally vary in thickness between the terminals. The terminals appear with knob-like endings that resembles stress, as shown in Figure 6.

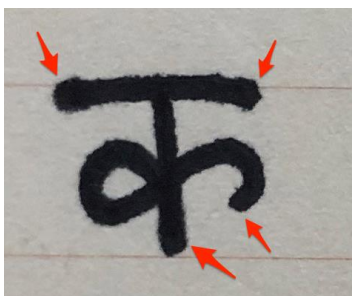


Figure 6. Devanagari letter *ka* written with a marker pen on paper. Arrows show the terminals with knob like endings.

Points of stress can vary based on the modulation of the letterforms. In Latin and Tamil, these can be added at all natural stroke endings. In Devanagari, however, little can be done to add stress on a glyph-by-glyph basis at the start and end points of the head-line (shiro-rekha). This is because the head-line is usually a single stroke that runs across several glyphs. If each letter is designed with stress marks on the head-line, as shown in Figure 6, then these marks will conspicuously appear between all the letters in a word. This outcome may not be desirable. Thus, in a typical Devanagari typeface, the head-line is placed with a uniform thickness so it seamlessly joins with that of adjacent glyphs.

In *Annai*, an idea is explored with a combination of design and underlying layout techniques that are commonly used for complex scripts. The images in figures 7 and 8 show an example of the design idea. It leaves an impression that the head-line is a stroke on its own and not something that is added to every glyph in the typeface.

Figure 7. Start and end strokes showing ascending and descending knobs representing stress marks

Figure 8. Knobs reappear at the terminals of the head-line when the word is split in the middle

This idea requires glyph substitution techniques. It can only be made possible with the underlying layout technology. The most common layout technology is OpenType which was developed jointly by Microsoft and Adobe. It is available in almost all major operating systems today. However, there is no readily available feature in OpenType that will allow for contextual forms for the starting and ending glyph in a word in an Indic script. This feature is reserved specifically for naturally cursive scripts like Arabic. The feature shown in Figures 7 and 8, can only be done with custom layout code. This can be complex.

Another layout technology that is available is from Apple Inc. Called Apple Advance Typography (AAT), this technology is only available on Apple platforms like the

Machintosh, iPhone, iPad, AppleTV and the Apple Watch. Unlike OpenType, contextual forms can be applied to glyphs in all positions in a word. The stress-marks can be added to the head-line using this feature.

7. Adding stress marks to the head-line

There are two techniques that can be used to add the stress-marks on either side of the head-line.

One technique is to borrow the idea of contextual forms in Arabic letters, where there are different forms for the letter based on its position. The idea is to design two additional forms for each Devanagari letter with a head-line so that the appropriate form can be substituted at the start and end positions of a word. Not all letters will need the two additional forms. Letters that do not start a word will not need the *start form*. Likewise letters that do not end a word will not need an *end form*. This is the simpler approach. However, the number of glyphs that needs to be added to the font will significantly increase. Maintaining consistency of the form can become a challenge as changing one form may necessitate a change in the other two forms as well.

Another technique is to add just two special purpose glyphs for the knobs. One to be inserted at the start of the head-line stroke and one to be inserted at the end of the stroke. These glyphs can then be inserted before the first letter in the word and after the final letter in the word. There is a feature in AAT, called contextual substitution, that allows this kind of substitution to be added.

When the knobs are inserted at the start and end of a word using this technique, even when the word is broken by inserting a space in the middle, the knobs automatically get inserted. The ending knob gets inserted to the end of the word on the left and starting knob to start of the word on the right, giving users a delightful experience.

8. Conclusions

Annai project started with a need to fill a space. The need for a casual, cursive typeface that spans across scripts, specifically Indic scripts. Although Devanagari and Tamil were chosen for this typeface, the techniques used in this development can be applied to other scripts as well. Indic typefaces will need layout technologies for proper rendering. The

typeface stretched the layout technologies to add features that made the resemblance closer to handwriting. More such experiments can be done.

These design approach introduced verity to Indic typography. Adding a second voice, for example, helps the text communicate with more auxiliary information. Having more such types can help draw more readers and writers who will want to consume and contribute content in the languages of India in a variety of ways.

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