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### PUSHING THE BOUNDARIES OF VARIABLE FONTS TECHNOLOGY

#### **Executive Summary**

The digital experiences we interact with everyday are increasingly becoming more responsive: they are now designed to load large amounts of data extremely quickly. Data can be used both to make these experiences more engaging as well as more intuitive for their end-users. With the aim of applying these principles to the textual elements of such experiences, this project focuses on the exploration of the innovative potential of Variable Fonts, a peculiar kind of typeface which contains multiple fonts within it. As opposed to the static instances of traditional typefaces, Variable Fonts can dynamically shift their appearance.

As a pilot project the extended team ideated a «Synaesthetic support to improve the reading experience» with a specific application in captions and subtitles. The concept revolves around the idea of giving a physical shape to emotions, in order to see them through a second level of readability: not just the semantic meaning of a sentence, but also their expressed feeling. In doing so, six basic emotions were associated with the axis of a variable font: Happiness, Sadness, Anger, Anxiety, Surprise and Boredom. The base of these six emotions is a neutral font, which could be seen as the "emotion-free" variable.

The project envisions the application of this technology within the subtitling industry. The typeface itself was thus designed to become a core asset for an AI-powered system that translates the emotional qualities of speech into letter shapes. More specifically, the variable typeface is designed to complement the watching experience of the viewer, who might not have access to sound because of contextual (e.g. noise) or physiological limitations (e.g. deafness or hearing impairments). Based on the qualities of the voice of the actors or speakers, the visual characteristics of the typeface can automatically change.



Synestype design space interpolation.

## Key words

Variable Fonts, Emotions, Affective Computing, Type Design



Synestype system

#### Project description written by the Principal Academic Tutor

"Pushing the boundaries of Variable Fonts technology" has been conducted as a research-and-development project focused on the exploration of the innovative potential of variable fonts. The students followed step-by-step a human-centered design approach. They conducted desk research and on-field enquiries collecting information about potential non-obvious uses of the variable font format. This market research highlighted the potential market sectors that could effectively welcome the technological features of variable fonts and adopt new and potential applications of them. The students then developed several project concepts which reflected the data collected during the enquiries. The chosen concept for an innovative use of variable font technology is

«Synaesthetic support to improve the reading experience» with the application of specific features that variable font offer in captions and subtitles.

Tech and media giants such Netflix, Instagram, TikTok and Amazon rely on text and type as integral component of their audience's digital consumption. However, traditional digital types currently used in subtitles fail to convey a dynamic representation of the emotional content of the scene. However, tertiary/expressive qualities of experiences can be scientifically measured, and therefore engineered to be used as data input for the design of a variable font. Starting from this scientific basis, the students designed and developed a variable font to become a core asset for an AI-powered system, which ultimately translates the emotional qualities of speech into visual distortions of letter shapes custom made for this purpose. The students defined the range of emotions to represent and interpolate acquiring it from scientific literature in psychology, and applied type-engineering principles and type design practice to customize the font sotware codes. A true scientific process integrating humanistic studies, information design and software engineering. The students also prepared an on-line format for the dissemination of

their research, by running a blog and a social network page in which they periodically posted relevant news and information for the typography and type-engineering community.

## Team description by skill

For the majority of the project duration, the team of CAST Rad was composed of five members: four design students (Luca Desogus, Riccardo Chianella, Sofia Cretaio and Ludovica Polo) and one architecture student (Lorenzo Serra Bellini). Whilst profiles were generally more design-oriented, the addition of seminars held by the academic and external tutors throughout the entire duration of the project contributed to develop competencies that were sufficient to dive into all the aforementioned activities. All the team members contributed to the type design process, equally distributing the designing of the axes of the variable font.

At the same time, a system of sub-roles was outlined in collaboration with the Tutors to facilitate the workflow among the students: market analysis, user research, type engineering and media communication management were the main areas, while each student supervised the progress of a specific stage in the project process. CAST Rad (Research and Development) is the corporate name with which we, Alta Scuola Politecnica students, conducted our research.

When introduced in 2016, Variable Font technologies announced a revolution in the typeface world. However the "Variable Fonts experience" is presently still limited to a few settings within Adobe creative software. It is more of an "option" than an experience per se. There is little awareness at all levels of the market on what this groundbreaking solution could address. Existing documentation seems to be too generic (and perhaps even slightly simplistic) on the problems they could solve. For this reason the main goal of the project is to explore the potential of Variable Fonts and venture in unexplored fields of technological inquiry.

In addition to the main objective of identifying a potential use case scenario for Variable Fonts to inaugurate disruptive innovation in the type industry, our project was divided into a set of sub-goals.

•Exploration and definition of contexts in which Variable Fonts could emerge, as well as the elaboration of design narratives based on the opinions of relevant stakeholders from the market (demand pull);

•Contamination and spread of information about Variable Fonts across media channels, targeting different target groups and systematizing dispersed information into a single digital environment (knowledge spread);

•Design of a valuable typeface (or system of typefaces) that deploys a Variable Font technology. Ideation and definition of the solution into a potential business model (technology push).

•Implementation of the typeface both from a typography and an engineering perspective, from sketching to coding, following an iterative human-centered and stakeholder-centric design process (application).

# Understanding the problem

Variable Font technologies really do announce a revolution in the typeface world. They open up type design to unexplored fields of application. However, if they can bring such granular, pervasive innovations, why is nobody talking about them? It's already been five years since their release, yet all the Variable Fonts we have seen so far are constrained within those softwares used by designers to craft visual assets, and we barely hear about them elsewhere. We do not see them in our urban environment; we do not use them in our text editing software; we have barely read about them in scientific research. Variable Fonts are a solution in search of a problem. To this date, the actors in charge of finding an application for Variable Fonts are only designers. Adobe users can in fact download Variable Fonts from an online source and subsequently use them as regular typefaces. When used, they can tinker with their parameters (via a set of interactive sliders) and eventually adapt them to their taste. No additional choice is given, and most importantly, no guidance about possible contexts of use. Therefore, they are currently presented as dubious alternatives to already-existing font families, where instead of having infinite variations, users can only pick from a limited selection of "weights" or "styles".

The strategy that seems to be adopted right now is the one of creating an illusion of choice. Perhaps the possibility to choose between infinite weights when using a typeface might sound appealing to some of the designers and creators who are devoted to typography—we cannot argue that some graphic designers are already using variable fonts in engaging ways. However, to most creators who have little or no type sensibility, Variable Fonts do not represent a good tradeoff, or at least something that is worth investing in. And when we, at the beginning of the project, it was time to identify a use case in which Variable Fonts are actually leading a revolution, we were surprised enough in realizing that even the most relevant stakeholders in the visual communication market had no clue on what they were or what they could do.

Synestype stems from a precise problem: the one of "limited" typography in which letters only convey a phonetic sound. From the perspective of the typeface market, it also addresses for the lack of awareness around what variable fonts can be used for.

## Exploring the opportunities

Following a literature review and a state-of-the-art analysis, the team generated a series of possible concrete applications or design concepts. These were developed by following a shared vision: Variable Fonts will enable more fluidity in perception, recognition, and memory but their integration within daily lives will still have to be considered only as an extension of senses and cognitive abilities, and not as a substitute.

The team explored opportunities in using variable typography as a form of data visualization. Different types of data were explored: from public and socially-involved topics, to navigation and localization services, to information for cognitive enhancement. The latter stream was eventually selected to be developed further into a use-case-specific typeface: Synestype.



*CastRAD Instagram post & Blog: each post or article focuses on an aspect of the project: research, market analysis, type design or type engineering.* 



Testing of the variable axes of the typeface using the online software Gauntlet by Dinamo



Application of Synestype to live subtitles (scene retrieved from the series 'Unbreakable Kimmy Schmidt', Season 1, ep. 1)

As a pilot project and first step towards the aforementioned human-centric vision, the extended team ideated Synestype as a «Synaesthetic support to improve the reading experience» with a specific application in captions and subtitles. Even though we are currently living in the attention economy, our attention threshold has dropped a lot since the spread of apps and social networks. As a matter of fact, text has been used only to speed up how we can consume digital content (for example, by reading subtitles so that we can consume video content even when we are in a noisy place). Text has become a basic component of digital consumption, and many companies such as Netflix, Instagram, TikTok and Amazon have worked to make text-based tools more accessible and inclusive for any type of user.

## Generating a solution

For this reason, attention is now given not only to the primary function of text (convey the main piece of information), but also to a deeper goal (convey emotional valence of the message). The project turns variable fonts into a tool to convey such secondary qualities of text. By drawing from notional in evolutionary anthropology on the classifications and visual representations of emotion, the solution is designed to cover all essential emotional states.

The final result is Synestype, a responsive variable typeface that converts the numerical value of emotion recognition algorithms through speech analysis into letterforms that improve the reading experience of subtitles. Synestype can count on the unique value of enhancing the emotional content of video-based content, especially in cases in which viewers do not have access to (optimal) sound-contexts in which sound is blocked from the device (e.g. watching an auto-playing video from a social media platform's feed), contexts in which the emotional information conveyed through sound is insufficient to be understood (e.g. when watching a movie in a different language) or contexts in which the user has no ability to perceive sound (e.g. deafness or auditory impairments). For this reason, subtitling services are to be considered the lead adopters of Synestype, followed by the owners of any text-based digital experience we interact with in our daily life: social media platforms and online newspapers, for example, will benefit from the typeface to establish greater emotional engagement, too. The unique value proposition of emotion-sensitive text also opens up infinite possibilities for targeted advertising and augmented reality.

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