White Paper

01/10/2017 Complete version [English]

Black[Foundry]

Typography: Writing the Future City

3 Perspectives on New Urban Experiences

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Introduction

Grégori Vincens, co-founder, Black[Foundry] Jérémie Hornus, co-founder, Black[Foundry] The Black[Foundry] team Gilles Betis, founder and CEO, OrbiCité Ricardo Alvarez, researcher, MIT Senseable City Lab Kristen Davis, CEO and founder, CinqC

Black[Foundry], a Paris-based type design company dedicated to creating, refining and producing fonts for a connected world, asks how leading-edge typography can enhance how information is relayed to citizens to improve the quality of urban life.

Where will typography be essential in new technologies like autonomous mobility?

How will brands and services use new display technologies to get their messages across?

How can regional governments serve their residents in the age of big data?

Black[Foundry]'s principals draw on years of experience in font making and computer programming to create fonts for old and new media, and they have pioneered new means of collaborative design and font distribution and management.



"Today's city is the postmodern city: untamed, shrew, capricious, ever-changing; actually, it is not a city but a text; a text written by millions of unknown writers, unaware that they are writers, read by millions of readers; each reading his or her own personal and subjective story in this ever changing and chaotic text, thus changing and recreating it and further complicating it." Self Organization and the City, (2000) Juval Portugali

Words — spoken, printed, scrawled on walls or tapped out on a smartphone — define a city as much as its physical form. They help residents and visitors find their way around, explore the necessities and pleasures of life, and interpret the rules and regulations that govern commercial, municipal and social interactions.

Typography is the primary interface between this information and the city residents who benefit from access to it. The building blocks of that interface are fonts, typefaces of a certain style and size that render a text or icon recognizable to us. They bring our printed matter, screens and signage to life. In short, fonts are our most basic tool of communication.

In an increasingly digital world, our communications are occurring at the intersection of typography and technology. One enables the other, and vice versa.

"Typography is ubiquitous. It is essential to communicate and gives information its shape." Grégori Vincens, Black[Foundry] co-founder

With the adoption of the printing press in the 15th century, typography design developed from an art to a science; fonts needed to be readable as well as universal. In the pre-digital era, typefaces were created to serve static media such as formal documents, books and informational and promotional signage — what we might call, in today's terminology, devices with very low refresh rates.



→ Today's variable fonts need flexibility to adapt to the environment, the available light and the quality of display. Gerrit Noordzij, a Dutch typographer, developed a method of analyzing letterforms based on the contrast between thick and thin strokes, rather than putting variants into separate categories. In his model, called a Noordzij Cube, versions of a variable font form a continuum along three axes. A variable font can also be described in categorical terms. With the move from a culture of print to a culture of screens, fonts are required to work harder than ever. Dynamic fonts can adapt to their context (screen size, light level, resolution) and become responsive by adapting their design features such as weight, contrast or spacing between letters. The high-performance typefaces of the future must be read and understood by both humans and machines, able to support many languages and systems of writing, and go beyond the alphabetical signs by accommodating new modes of contemporary communication like icons, pictograms or emojis.



The digital and connected world has opened new channels of continuous communication, and liberated workers from their urban offices to telecommute. At the same time, the ability to communicate from a distance is placing a greater value on human interaction in communal spaces. In response, city districts that had once been devoted to a single purpose (businesses or residences) are now being aggregated and integrated, reconfiguring the city yet again. Modern multi-use developments, apart from the city yet still within it, combine apartments, hotels, offices, restaurants and retail and entertainment options.

How can anyone, whether longtime residents or first-time visitors, navigate the dynamic postmodern city, Portugali's "ever-changing and chaotic text"? How can local governments, businesses and service providers meet their evolving needs and improve quality of life?

The key lies in using typography as a tool to bring order and meaning to the wealth of contextual information and data that is now available to us—rendering it intelligible and useful. Fonts can help attune our

→ Typeface design elements, clockwise from top left: [A] A typeface, left, is the representation of the characters that we see, while a font, right, is the physical or digital file that contains the description of the typeface; [B] the tools of the type designer have their roots in calligraphy and include, from left, the brush, the broad nib pen and the pointed pen. [C] Typeface designers work within the parameters of a glyph, which is an individual character or symbol; [D] font design often starts with a skeletal form. top, then contrast is applied to flesh out the form in order to achieve the desired typographical effect.

→ Typefaces can be divided into two main categories. Display typefaces are meant to convey an emotion or larger idea independent of content and are thus less constrained by quantitative issues. They seek to make an impression on the reader. Text or functional typefaces are meant to convey information. Ideally, the font itself should be invisible to the reader; legibility and recognition speed are paramount.



senses to the sounds, the sensations, even the smells of the city, and translate abstract concepts into information that can be consumed in a linear fashion.

Like the modern city, typography is much more than its physical form. A well-chosen font can evoke a mood that expresses a city's identity and the promise it makes to residents, tourists and businesses. Picture, for example, how the simplicity of the London Underground signage typeface (Johnston sans) contrasts with Guimard's calligraphic Paris Metro signage.

The United Nations forecasts that 6.4 billion people will be living in cities by 2050, 2.5 billion more than today, and 5.65 billion more than in 1950, when just 746 million people lived in urban areas.^[1] Business, infrastructure, transport networks and city managers are challenged as never before in their efforts to communicate with residents who use many different languages and scripts. The rise of ultra-cheap smartphones and data plans is bringing "the next billion" digital newcomers to cities, especially in the developing world: less-educated people who are more comfortable communicating with images and icons on screens instead of text on paper, but for whom typography is no less important.^[2]

At Black[Foundry] we explore this vision and propose future applications of typography through three usage cases — autonomous mobility, connected shop windows and urban data visualization.

 United Nations Department of Economic and Social Affairs. 2014 revision.
"World Urbanization Prospects"

2. Bellman, Eric. 2017. "The End of Typing: The Next Billion Internet Users Will Rely on Voice and Video." The Wall Street Journal. (Aug. 7)

Enjoying the Ride: User Experiences in Autonomous Mobility

The act of piloting a vehicle requires a clear and readable flow of information to the driver. At Black[Foundry], we have worked with major automotive companies, including PSA Peugeot Citröen and Renault Group, to design custom cockpit fonts and icons that enhance safety and provide a better user experience. The challenge in Renault's case: Create one "on brand" font for three brands (Renault, Dacia and Alpine) that can be licensed and produced in 127 countries and is seamless and scalable.



with text and pictograms in the Read typeface designed by Black[Foundry]. The multi-script human-machine interface (HMI) typeface is designed for scripts used in all 127 countries in which the group does business and includes a full set of pictograms and icons. It reinforces brand perception across three model ranges (Renault, Dacia and Alpine), and has been optimized for screens. Read will be used in other applications and media outside the vehicle environment.

↓ → A Renault Group instrument cluster

21 ℃	Parking A	Parking Assistance	
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The result is the "Read" font: 135,000 individual glyphs in languages including Arabic, Chinese, Cyrillic, Greek, Japanese and Korean. In contrast to the four discrete fonts it replaced, Read (REnault/ Alpine/Dacia) reflects Renault's Latin heritage, and is inspired by script and calligraphy. It is optimized to work inside and outside of the vehicle environment.

For the project, we developed custom programs and tools to bring consistency, accuracy and speed to tasks including kerning, accent positioning and spacing. Mindful of vehicle unit cost and efficiencies for Renault Group's global supply chain, designers and programmers were able to reduce significantly the average size of a font to six megabytes from 20.

Now, we are investigating how typography can enhance a future of shared, connected and autonomous urban mobility, in which the focus is shifting from driver-vehicle interactions to communication between passengers and their interior and exterior environments. Much of these interactions will be carried out on screens, now liberated from the conventional dashboard or cockpit, or in a more immersive way, via heads-up displays, 3D or projections.

Stripped of human controls and the need for driver inputs, the interior of a vehicle becomes a space of almost infinite possibilities. Advanced typography design will shape how that space is used. Before the journey, it will help passengers choose their destination; en route, it can deliver information about outside events or conditions, and help create interior moods to facilitate various experiences and interactions, whether businesslike, casual, playful or even romantic. A user-friendly, adaptive and reliable transportation system gives users more choices on how and where to live, is more attractive to visitors and tourists, and sets a path for sustainable future growth. Today, once-discrete modes of urban transport are being redefined and aggregated as "mobility." In the coming years, connected networks of self-driving vehicles will be circulating on city streets and waterways and in the skies, picking up passengers and delivering goods and services.

→ In typographic terms, hinting is the set of instructions built in to digital fonts to optimize their display on a grid of pixels. Good hinting is critical for readability, especially when type is small or displayed on low-resolution screens. It can be done automatically through algorithms or manually; manual hinting can correct problems with auto hinting. Please select your preference

Please select your preference

Please select your preference manual hinting



3. McKinsey & Company, 2014. "Connected Car, Value Chain Unbound." (September) These advanced mobility systems are enabled by a vast amount of data, to create intelligent traffic management systems and allow autonomous vehicles to interpret their surroundings to move safely and efficiently through the everyday hazards of the city. Self-driving vehicles "learn" their environment and formulate their reaction to it by gathering and processing exterior and interior data through a vast network of computers, cameras and sensors like radar and lidar, and wireless connections. A single connected vehicle has been estimated to produce 25 gigabytes of data in an hour.^[3] By comparison, an HD streaming video uses about 1 gigabyte in that same time.

It is now essential for drivers to have access to this information for operational purposes, but in autonomous vehicles it can enable other kinds of conversations with passengers.

→ As vehicles grow more autonomous, new interior paradigms are emerging. Passengers will face each other or outward to view the environment. Entertainment and personal communication will increasingly take place on screens, which will appear in greater quantities and in new places and forms, without worries about distracting the driver.



— Typefaces and fonts can convey a "voice" of assurance and safety to passengers who might be seeking information about weather conditions or particularly heavy traffic. For example, Frutiger, a font developed in the 1970s for Charles de Gaulle airport, has low contrast, simple shapes and is well rendered and hinted. It gives the reader a sensation of comfort and calm.



— Typefaces, fonts and symbols, including icons and emojis, will need to be able to shift languages seamlessly to accommodate mobility customers in a multicultural city. In this case, font design involves much more than a new set of characters (even a very large set like Korean, with over 10,000 glyphs); it becomes an interface for connection and engagement of passengers from different cultures. In this way, fonts can personalize the way we interact with the city and create a welcoming environment.

— Type must also adapt to a range of display technologies, including users' smartphones, heads-up displays, 3D and holograms, and even translucent screens that might replace conventional windows. Motion, too, needs to be taken into account; as a vehicle moves through space on a curve, our ability to discern detail on the edges of our field of vision decrease. In one example, an overlay of essential services, restaurants or street addresses could be superimposed on windows in the form of translucent screens with embedded fonts.

- Conscious of demands on data storage in electric and autonomous vehicles, font file size can be minimized by a factor of four so that space can be dedicated to other uses, such as graphics and video.



→ Text engines can create fonts readable in both two and three dimensions, as well as from different angles and perspectives, to meet the demands of autonomous mobility. Type must be readable on different display technologies, including smartphones, augmented reality viewers, heads-up displays, holograms, and even translucent screens. At the same time, the vehicle's motion creates issues of depth perception and the ability to discern details.

Through the Looking Glass: What if every window became a screen?

Despite quantum leaps in technology, a time traveler from the 19th century would find little new in the commercial displays of today. The modern urban street is a jumble of promotional and informational signage, in which colors, light, images, animations and sound compete for consumers' attention. Displays at eye level tend to be smaller, compact and purely informational, perhaps advertising a service, listing opening hours or restaurant menus, or announcing a sale inside a particular store. Others are much larger, spanning a building or rising several stories high, and are meant to promote a brand through traditional advertising techniques.



Yet even the most sophisticated video screen or three-dimensional billboard remains a fixed, physical display device. Information flows in one way: from businesses to customers in an impersonal and scattershot fashion. At Black[Foundry] we have a different vision in mind, that of two-way communication enabled by typefaces that perform in a connected world.

Leveraging our digitally connected society through sophisticated data-gathering techniques and algorithms, businesses now know more about their customers' habits and preferences than they often do themselves. Using customer relationship management systems, they can target and tailor their messages, and deliver them through digital channels straight to a smartphone screen. Advertising and marketing is location-specific and time-sensitive.

Consumer behavior, too, has undergone a radical shift. Increasingly, commerce is conducted online, where prices are flattening and choice is expanding. Shoppers can compare products in seconds on their laptops, tablets or smartphones, reading reviews and searching for the lowest prices. Recommendations from friends via social media are a powerful driver of buying decisions.

Reflecting these transformations, urban commercial spaces — often in high-rent districts — are also serving as brand identifiers and builders, a kind of hybrid between advertisement and sales emporium. Stylish, Instagram-ready concept and pop-up stores introduce or reintroduce brands by trying to create an emotional bond through discovery and experiential means. Point-and-click

→ Transparent screen display technology combines hardware, software and typeface design. In the form of a shop window, whether standing alone or connected to a retail outlet, such screens can bring the E-commerce experience into the real world. QR codes and tender-free transactions facilitate purchasing, and last-mile delivery systems remove the hassle of lugging home groceries or other goods.

In this climate, the initial point of entry for customers — the shop window — remains an anachronism. Advances in typography and display screens can create a dynamic, flexible interaction between customer and merchant. In what we call the "connected shop window," hardware, software and typography combine to allow businesses to speak directly to consumers while enhancing the experience of shopping in-store. In turn, customers will be empowered to participate and share their experiences, preferences and advice.

— As weather and light conditions change during the day, the contrast will adjust automatically for optimal readability, guided by sensors located in the window frame. In a similar fashion, pedestrians might see a different font than cyclists traveling at speed, as sensors detect motion and then adjust the typeface accordingly for size and readability. A calming typeface might appear during rush hours, while a more urgent font could be displayed when foot traffic is light. Weekend leisure time might call for a more playful display.

- Restaurant menus could appear on a transparent window screen or "sandwich board." Items can be easily added, moved or deleted, according to the stock on hand.



→ Hardware, software and type design combine in a menu displayed on a transparent screen, in which a text engine creates display fonts. Items can be easily added, moved or deleted, according to the stock on hand or daily specials. (Font Bello by Underware) — The kind of information being delivered might determine the typeface; font styles for messages aimed at forging an emotional connection to a brand would differ from those of a more practical nature.

- Connected windows could also seamlessly perform public services, displaying emergency messages from law enforcement, for example, or warning of extreme weather conditions. They could adapt to changing signage rules and regulations.



— The connected window can also serve as a real-time E-commerce platform, bringing the online, at-home shopping experience into the public sphere. Starting with the premise that privacy will be protected by design, sensors will be able to access consumers' histories and preferences from their smartphones and then customize and personalize the display. Consumers who require further information or assistance can get it from a dialog window that pops up on their smartphones. Biometric technologies such as facial scanning can identify individual customers and link to their preferences and social media to personalize the display.

→ Brand-specific emoji fit seamlessly into text messaging. Smartphones and social media have given consumers more leverage in the buying process, while at the same time allowing businesses to gain insight into their habits and preferences.

Every City Tells a Story: Visualizing Urban Data Through Typography

"The most important thing about printing is that it conveys thought, ideas, images, from one mind to other minds." The Crystal Goblet, or Why Printing Should be Invisible, Beatrice Warde. (1932)

Picture a traveler heading to Paris for the first time, perhaps for the 2024 Summer Olympics. Their anticipation at visiting a foreign city might be accompanied by questions. How will I get around? What is there to do in my free time besides the sights listed in the guidebooks? Will I be able to communicate with local residents? In short: How can I create a connection with the city and get the most out of it?



Typography can create this connection, as the interface between humans and the urban environment. Imagine this same traveler preparing for their journey by downloading a digital tool kit that plugs them directly into a visualized data set for Paris and the Olympics. He or she is greeted by a unique font that reflects the city's typography tradition and literary culture. The typeface speaks with a welcoming and distinctive voice that announces "this is Paris." It adapts quickly to the visitor's language, device screen and degree of visual acuity.



→ User-and object-generated data can be visualized as augmented reality, helping city dwellers and visitors navigate their environment. Typography is the interface that gives this data utility and value.

→ Certain fonts have come to be identified with their environment. From top, the Paris Metro typeface developed in the Art Nouveau period; The London Underground logo uses Johnston Sans; sans serif type (originally Standard and now Helvetica) on a black background and numbered roundels signify the New York subway system. Conversations among Parisians and Olympic visitors, separated and searchable by subjects of interest, flash across the screen. One tab features up-to-the-second data on air quality, microclimates and transit changes, formatted visually and in text. Others might have local sales pegged to the Games or meetups for fans of a certain sport.

Once in Paris, a network of cameras and sensors start to feed into the visitor's smartphone, overlaid with the city's own icons and emoji. The information is rich, but not overwhelming, and the visitor can customize various feeds at any point. As the traveler wanders around the city, taking and posting geo-tagged photos and comments, digital waypoints connected to transit hubs, landmarks and recommended addresses send alerts, offering a specialized news feed about the area in return for feedback or a check-in. That information is added to the stream, enriching the understanding of fellow visitors, local residents, businesses and city government. The traveler's story becomes part of Paris's story, expanding the hive mind of the city.

Urban data grows richer in possibilities as we rapidly sensitize ourselves and our environment. Cisco predicts that there will be an estimated 50 billion devices connected to the Internet by 2020, eight for every woman, man and child on the planet.^[4] Many of those are mobile sensors contained within smartphones or personal computers already talking to each other and generating data through social, communications and computing networks.

Yet the vast majority of connected devices are everyday objects common to cities as varied as Buenos Aires, Paris or Singapore —vehicles, industrial machinery, cameras, street furniture, and household appliances that are equipped with sensors and actuators—the so-called Internet of Things. The data generated by such objects is often shunted off into specialized, task-specific silos.

Black[Foundry] believes a full, rich and relevant story of the city — any city — can be fully told only by weaving together both systematic and user-generated information and visualizing it through typography design.

Our creation process for a distinct urban font is much more than designing characters. It starts with landscape scanning, working with native speakers and type designers to understand the context in which the font will be seen and the degree to which brand personality can be injected without compromising the type's longevity and legibility. Images and impressions of the city are captured on a mood board. City planners and communications teams are invited into the process to determine current and future investment in display technologies.

Several characters in each font are developed and then tested to ensure it can adjust dynamically to display variations in language, content and format across a myriad of technology configurations. Those include large-scale digital billboards, embedded digital street

4. Cisco Internet Business Solutions Group, 2011. "The Internet of Things: How the Next Evolution of the Internet Is Changing Everything." (April) signage, small displays on wearables and smartphones, and augmented reality devices that use volumetric display technologies.

A full, high-performing city typeset will eventually include a signage font, a text font, arrows and other symbols, pictograms, and even a set of emoji. Always, the goal is to connect and engage with different cultures.







→ The process of designing a city-specific font starts with landscape scanning to determine context and intended use, and the creation of a mood board, top left. Type designers then draw several characters, which are tested for readability and compatibility with digital and analog media displays.

The value of typography in the future

"The 19th century was a century of empires, the 20th century was a century of nation states. The 21st century will be a century of cities."

Wellington Webb, former mayor of Denver, Colorado

The city of the future will be a place of constant invention and reinvention, where most of the world's wealth is created, where new ideas, social and political innovation will emerge, fueled by rapid technological change. It will have much more to say, telling an ever more complex story that is contextualized by masses of data from objects and people.

Typography—as a building block of communication and an interface between people and their environment—will strengthen these ideas, concepts and actions. It will evolve and adapt to the technological city, helping its citizens to fully realize their hopes and dreams.

Mobility, commerce, culture, government: These are the diverse strands of the city's fabric. Expressing them as a coherent typographybased identity can infuse a sense of community, belonging and pride. It conveys the idea that a city is attractive and welcoming to visitors. In developing its identity by thinking holistically about the story it tells to the world, a city determines what kind of cultural, societal and technological innovations will propel it into the future.

"A font is a small software program, a series of tables of data and metadata, interacting with other pieces of software: text and rendering engines. The city will increasingly be made up of a multitude of surfaces where these interactions will take place."

Jeremie Hornus, Black[Foundry] co-founder

What makes a story memorable, or a brand easily identifiable? It is the interplay of content and voice, each complementing the other but not overwhelming it. Black[Foundry]'s fonts are design assets that allow cities to express their singularity, values, culture, history, and the promises they make to residents, visitors and businesses. They are technological assets that empower consistent expressions of that identity and seamless user experiences. This is what we call type + tech.

Black[Foundry] gives a voice to the texts that write the city.

Gregori Vincens, Black[Foundry] co-founder, type designer, designer and teacher, is a french serial entrepreneur and brand addict.

Jérémie Hornus, Black[Foundry] co-founder, is a type designer, with an engineer profile, and teaches type design at ANRT Nancy.

Gilles Betis is an international expert on Smart Cities, Mobility, Innovation and Entrepreneurship, was the founding chairman of the IEEE Smart Cities Initiative and created OrbiCité, a consulting agency dedicated to Smart Cities holistic development.

Ricardo Alvarez is a Ph.D. candidate at the Massachusetts Institute of Technology and a researcher at M.I.T.'s Senseable City Lab, where he studies how digital technologies will transform future cities.

Kristen Davis, project coordinator, is an international disruption expert and founder of CinqC.co. She specializes in media business models and has worked with The New York Times and as an assessor for the Google DNI fund.

Peter Sigal, copywriter, is a freelance journalist based in Paris.

Typesettings: Drive MonoProp Vesterbro Regular Extrabold/Poster