

Grocery Signery: The Scenery Behind NYC Storefront Signs

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Abstract

Grocery Signery: The Scenery Behind NYC Storefront Signs

Grocery stores shape the everyday food experience of New Yorkers and offer a view into the city's cultural and linguistic diversity. Unlike upscale restaurants, they are rooted in local life, making them a powerful lens through which to explore multicultural identity in urban space. This project investigates how grocery store names and signage reflect neighborhood identity and communicate cultural values.

Using data visualization, it maps linguistic and visual patterns across city neighborhoods alongside demographic indicators such as race, age, and income. By analyzing name structures and signage aesthetics—such as color, typography, and language—the study reveals how design choices express identity and reflect the communities they serve. In doing so, the project positions grocery signage not only as functional design, but as a form of cultural storytelling within the evolving landscape of New York City.

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Introduction

Have you ever been drawn into a grocery store simply because of its sign? The name, typography, or color may resonate in a way that feels personal—yet what evokes recognition or familiarity for one person may be unremarkable to another. These subtle differences in perception are shaped by cultural background, personal memory, and visual literacy. In a city as diverse as New York, where food cultures from around the world exist side by side, grocery store names and signs offer more than functional wayfinding; they provide cues about identity, heritage, and economic positioning within their communities.

Unlike upscale restaurants, which often target specific demographics, grocery stores serve local populations and reflect everyday food practices. Their signage—through font, color, and naming conventions—communicates both cultural origin and the role a store plays within the neighborhood. Some evoke tradition and nostalgia; others project modernity or luxury. These design choices form part of a broader visual and linguistic landscape that shapes how residents navigate and connect with their urban environment.

This study analyzes grocery store signage across the five boroughs of New York City to understand how cultural identity, language, and market strategy are expressed through visual design. Using datasets from the New York State Department of Agriculture and Markets, the project extracts store names and geographic data, which are linked to Google Street View images to analyze color and typography. Linguistic elements are categorized to identify recurring name structures and semantic clusters, while visual features are interpreted through AI-assisted detection methods. Demographic data—such as race, age, and household income—are overlaid

to explore correlations between neighborhood context and signage trends. Differences between chain stores and independent businesses are also considered.

The findings reveal how grocery store signs function not only as markers of commerce but as visual artifacts that encode cultural narratives. By documenting and analyzing these patterns, the project offers insights for researchers interested in urban diversity, visual communication, and food culture. It also provides a framework for understanding how customers relate to visual cues in the retail landscape, and how store owners might better align signage with community identity and market position. Ultimately, this project contributes to a deeper understanding of how the everyday visual language of storefronts shapes the multicultural experience of city life.

Treatment

Background

Grocery Stores as Cultural Spaces

Grocery stores play a significant role in urban life. According to a U.S. market research survey, people make an average of six grocery store trips per month and visit at least two different stores per week.¹ Beyond simply providing food, grocery stores create an experience that begins the moment a customer decides to step inside. Factors such as price, location, quality, variety, and cleanliness influence these decisions, shaping not just what people eat but also how they engage with food as part of their lifestyle.

A 2021 study by Accenture suggests that, after the COVID-19 pandemic, customers increasingly sought in-store shopping experiences. While online grocery delivery has grown, 75 percent of surveyed consumers still prefer shopping in physical stores.² This trend is particularly significant for small, local grocery stores, many of which lack delivery services but serve as cultural hubs within their neighborhoods.

An article from *YES! Magazine* highlights how, for many immigrants in urban areas, grocery stores feel like home—not just because of the familiar smells that evoke childhood memories,

¹ Rodgers, Emily. 2024. “Grocery Shopping Stats: Where, When & How Much We Spend.” Drive Research. <https://www.driveresearch.com/market-research-company-blog/grocery-store-statistics-where-when-how-much-people-grocery-shop/>.

² Accenture. 2021. “Consumers Crave a Different Grocery Experience.” <https://www.accenture.com/content/dam/accenture/final/a-com-migration/r3-3/pdf/pdf-162/accenture-retail-grocery-pov-2021.pdf>.

but also because they provide a space where one can hear their mother tongue spoken.³³ These stores offer a sense of authenticity and comfort that upscale restaurants, even those serving “authentic” cuisine, cannot fully replicate. Unlike high-end dining, which may be out of reach for many, grocery stores reflect the everyday food culture of local communities.

In a culturally diverse city like New York, grocery stores from various backgrounds reflect the communities they inhabit. They offer access to traditional foods while also inviting people from different backgrounds to explore new culinary experiences. Some local travel guides now include grocery stores as must-visit destinations, highlighting their appeal not only to ethnic communities but also to those unfamiliar with these food traditions.⁴

However, an article from *The New York Times* raises a critical perspective: the label “ethnic grocery store” may no longer be appropriate, as the boundaries between ethnic and mainstream foods are increasingly blurred.⁵ The number of such stores and shelf sections has grown rapidly in recent years, and American consumers are becoming more familiar with flavors beyond Western cuisine.

New York’s reputation as a “melting pot” or “salad bowl” extends beyond its people—it is also reflected in its food landscape. Grocery stores embody this cultural blend, serving as spaces where culinary traditions intersect and evolve, enriching the city’s diverse food culture.

³ Chen, Michelle. 2022. “A Taste of Home: How Ethnic Grocery Stores Create Community.” YES! Magazine. <https://www.yesmagazine.org/social-justice/2022/12/22/grocery-community-ethnic>.

⁴ Donna. n.d. “The Grocery Store Tourist: What You Can Learn About a Culture with a Visit to the Supermarket – NomadWomen.” Nomad Women. Accessed March 10, 2025. <https://www.nomadwomen.com/supermarket-tourism-a-visit-to-the-supermarket/>.

⁵ Krishna, Priya. 2024. “Don’t Call It an ‘Ethnic’ Grocery Store,” *The New York Times*, (June). <https://www.nytimes.com/2024/06/11/dining/asian-grocery-stores-america.html>.

Branding and Signage in Food Retail

The first step before entering a store is often noticing its sign. Store signage and naming go beyond simply marking a location—they communicate the store's identity, shape customer perception, and influence the decision to step inside.⁶ Studies in semiotics highlight the role of signs in psychology, humanities, and social sciences, emphasizing how design elements—such as typography, text, shape, and color—convey meaning.⁷ These components function as a form of two-way communication between the sender (store owner) and the receiver (customer), shaping how the store is perceived in the public sphere. Additionally, research suggests that the aesthetics of design influence perceived product value⁸, which extends to how customers assess a store's pricing, cultural significance, and overall appeal based on its signage.⁹

Beyond visual design, a store's name significantly influences customer psychology. Research indicates that consumers are more inclined toward products with names that are easy to pronounce and recall—a phenomenon known as the "fluency effect." This effect suggests that familiar or elegantly crafted names can enhance a product's appeal, making customers more likely to engage with it. For instance, studies have shown that renaming fish dishes with more appealing terms on restaurant menus increased customers' willingness to try them. This principle

⁶ Bhowmick, Dipanjan. 2022. "Impact of brand design on consumer perception and decision making." ResearchGate.

https://www.researchgate.net/publication/364045611_Impact_of_brand_design_on_consumer_perception_and_decision_making.

⁷ Gandla, Rakesh, Lalith K. Vemali, and Rakesh Gandla. 2023. "Semiotics and Brand Perception: How Symbols and Signs Influence Consumer Behavior." Woxsen University.

<https://woxsen.edu.in/research/white-papers/semiotics-and-brand-perception-how-symbols-and-signs-influence-consumer-behavior/>.

⁸ Ulusoy, Noyan, and Zeynep Onur. 2023. "Visual Signs at Sociable Place Entrances: User Perceptions and Preferences." SAGE, (May). <https://journals.sagepub.com/doi/10.1177/21582440231174418>.

⁹ Shi, Aiqin, Faren Huo, and Guanhua Hou. 2021. "Effects of Design Aesthetics on the Perceived Value of a Product." PubMed Central. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8359925/>.

extends to store naming, where thoughtfully chosen names can shape customer perceptions and foster a sense of comfort and intrigue.¹⁰

In branding design, signage is a component of a broader visual identity system. Typography and color choices play pivotal roles in defining brand personality, affecting readability, memorability, and emotional associations. Typography conveys the character of a brand, while color influences brand perception and emotional response. Together, these elements create a visual language that resonates with target audiences and reinforces brand identity. A well-crafted brand enhances customer experience, establishes a recognizable identity, and contributes to a store's success.¹¹

Interestingly, branding does not always require a formalized system to be effective. Research indicates that brands perceived as “local” can attract customers particularly Western consumers who associate local aesthetics with authenticity, craftsmanship, and quality.¹² Even without professional design training, many small business owners intuitively make typography and color choices that convey a handmade or authentic feel, reinforcing their store's identity and deepening customer trust.

Language plays a pivotal role in signage communication, particularly in diverse urban environments. Research indicates that bilingual signage can positively influence customer behavior by enhancing perceptions of service quality, authenticity, and inclusiveness. Such

¹⁰ Johnson, Matt. 2020. “The Surprising Consumer Psychology of Product Names.” Neuroscience Of. <https://www.neuroscienceof.com/branding-blog/consumer-psychology-product-naming-marketing>.

¹¹ Ladies Who Design. 2024. “Typography in Branding: How to Craft a Visual Identity People Remember.” Medium. <https://ladieswhodesign.medium.com/the-role-of-typography-in-branding-creating-memorable-visual-identities-14066ac18e99>.

¹² Batra, Rajeev, Venkatram Ramaswamy, Dana Alden, Jan-Benedict E. Steenkamp, and S. Ramachander. 2000. “Effects of Brand Local and Nonlocal Origin on Consumer Attitudes in Developing Countries.” Journal of Consumer Psychology 9 (no. 2): 83-95. <https://deepblue.lib.umich.edu/bitstream/handle/2027.42/142164/jcpy83.pdf?sequence=1>.

signage not only facilitates better understanding but also fosters a sense of belonging among diverse customer bases.¹³

Furthermore, verbal language is integral to brand storytelling. While visual identity captures attention, verbal identity—comprising brand names, taglines, and tone of voice—deepens engagement and conveys the brand's personality and values. Together, visual and verbal elements create a cohesive brand experience, making linguistic considerations essential in store signage and overall branding strategies.¹⁴

Relevant Theoretical Frameworks

The concept of linguistic landscapes illustrates how language use in public spaces reflects cultural diversity and societal dynamics. This field explores how language manifests in real-world contexts, influencing human perception and behavior.¹⁵ Language reflects cultural values, traditions, norms, and inherited experiences, shaping how individuals and communities communicate. Each person carries a cultural background that influences their choice of words, which, in turn, forms part of their identity.¹⁶ In a societal context, language serves both as a means of group formation and as a way to express identity outwardly. The power of linguistic landscapes is especially evident in multilingual urban environments, where language is embedded in everyday life—one clear example being storefront signage in grocery stores, where language connects people to food and culture.

¹³ Mantel, Susan P., and James Kellaris. 2023. "Bilingual Signs: How Language Influences Shoppers." Research Gate. https://www.researchgate.net/publication/376730486_Bilingual_Signs_How_Language_Influences_Shoppers.

¹⁴ Peters, Collin. 2023. "Verbal Identity Is Key to More Inclusive Brand Storytelling." Gensler. <https://www.gensler.com/blog/verbal-identity-inclusive-brand-storytelling>.

¹⁵ Fiveable. 2024. "Linguistic landscapes – Psychology of Language." Fiveable. <https://fiveable.me/psychology-language/unit-10/linguistic-landscapes/study-guide/Knp3SKxynCj1JkbF>.

¹⁶ Presbitero, James. 2023. "Language and Identity: How Multilingualism Shapes Cultures | by Oluwaseun." Medium. <https://medium.com/@zoeoluwaseun/language-and-identity-how-multilingualism-shapes-cultures-87bcee1a32cc>.

Beyond language, gentrification significantly impacts store branding and signage in urban areas. Research on Brooklyn, NY,¹⁷ highlights how shop signs before and after economic gentrification can be categorized into two distinct design groups, reflecting shifts in commercial space and economic dynamics. The concept of "rent gap" in capitalism helps explain how commercial gentrification transforms retail patterns, a phenomenon observed in cities worldwide. A study in Taipei, for example, demonstrates how gentrification has reshaped the environmental characteristics of commercial areas, dramatically altering spaces with diverse populations.¹⁸

In New York City, gentrification has led to shifts in retail landscapes, with local shops in certain neighborhoods being replaced by boutique stores.¹⁹ This transformation changes the role of stores within communities and reduces the presence of locally owned businesses. However, other scholars argue that gentrification's influence cannot be solely attributed to aesthetics or cultural values—multiple factors contribute to these urban changes, and further examination is needed to understand the full scope of its impact.²⁰

¹⁷ Trinch, Shonna, and Edward Snajdr. 2016. "What the signs say: Gentrification and the disappearance of capitalism without distinction in Brooklyn." *Journal of Sociolinguistics* 21 (October). 10.1111/josl.12212.

¹⁸ Chen, Tzu-Ling, and Yong-en Zhang. 2024. "Exploring the composition features of commercial gentrification - a case study of Taipei City." *Cities*. <https://www.sciencedirect.com/science/article/pii/S026427512400605X>.

¹⁹ Zukin, Sharon. 2009. "New Retail Capital and Neighborhood Change: Boutiques and Gentrification in New York City." *Brooklyn College and the City University Graduate Center, City & Community* 8 (March). <https://files.eportfolios.macaulay.cuny.edu/wp-content/uploads/sites/4371/2014/02/16025241/Zukin-Nabe-Capital.pdf>.

²⁰ Kern, Leslie. 2022. "Stop blaming coffee shops and cool boutiques for gentrification." *Fast Company*. <https://www.fastcompany.com/90784763/stop-blaming-coffee-shops-and-cool-boutiques-for-gentrification>.

Research Scope and Approach

Research Questions

This study investigates how grocery store names and signage function as markers of cultural identity and food culture in New York City. The primary research question is:

How do grocery store names and signage communicate food culture and identity?

To explore this, the study examines:

- Linguistic patterns: What common naming structures and word choices appear across different store types?
- Visual branding elements: How do typography, color, and imagery reflect cultural identity?
- Cross-cultural similarities and differences: Do different communities share patterns in branding, and how do these relate to location, demographics, and economic factors?

By analyzing linguistic and visual patterns across different neighborhoods, this study aims to uncover how grocery stores construct and communicate their cultural positioning within New York's diverse urban landscape.

Study Area & Dataset

This study focuses on grocery stores across all five boroughs of New York City :

- Manhattan (New York County): High density, mix of upscale and independent grocery stores, presence of specialty markets catering to various ethnic groups.²¹
- Brooklyn (Kings County): Known for diverse immigrant communities, strong presence of independent ethnic grocery stores (e.g., Caribbean, Jewish, Middle Eastern, Russian).²²
- Queens (Queens County): One of the most linguistically diverse places in the world, home to a wide variety of international supermarkets and specialty stores.²³
- The Bronx (Bronx County): Strong presence of bodegas, Latin American, and African grocery stores, influenced by working-class communities.²⁴
- Staten Island (Richmond County): Lower density of grocery stores but with strong Italian, Eastern European, and South Asian market representation.²⁵

By analyzing grocery store signages and names across these boroughs, the study aims to reveal patterns and trends in cultural representation, examining how food culture and cultural identity reflect on the sign and exploring the layers of other factors like economic and demographic that shape grocery retail branding.

The research utilizes a dataset combination of government records, geospatial data, and visual analysis to examine grocery store signs and name patterns.

²¹ “NYC Population FactFinder.” n.d. NYC Population FactFinder. Accessed March 10, 2025.
<https://popfactfinder.planning.nyc.gov/explorer/cities/New%20York%20City?censusTopics=detailedRaceAndEthnicity>

²² Iqbal, Zainab. 2022. “Inside Brooklyn and New York City’s Arab community.” Middle East Eye.
<https://www.middleeasteye.net/discover/us-new-york-city-brooklyn-arab-community-inside->; Averbukh, Victoria. 2023. “Ethnic Neighborhoods of New York.” L’Idea Magazine.
<https://lideamagazine.com/ethnic-neighborhoods-of-new-york/>

²³ Lubin, Gus. 2017. “Welcome to the language capital of the world: Queens, New York.” World Economic Forum.
<https://www.weforum.org/stories/2017/02/queens-in-new-york-has-more-languages-than-anywhere-in-the-world/>

²⁴ Electric Literature. 2017. “A Cultural Oasis Inside a Bronx Bodega.” Electric Literature.
<https://electricliterature.com/a-cultural-oasis-inside-a-bronx-bodega/>

²⁵ New York City Department of City Planning. 2008. “Going to Market: New York City’s Neighborhood Grocery Store and Supermarket Landscape.” New York City Department of City Planning.
https://www.nyc.gov/assets/planning/download/pdf/plans/supermarket/presentation_2008_10_29.pdf.

Business Registry Stores Data

The primary dataset comes from the New York State Department of Agriculture and Markets, accessed via data.ny.gov. It includes a list of registered food retail businesses, with fields such as store name, address, georeferenced coordinates, and license information. The dataset was last updated on September 9, 2024. This source was used to define the study sample and extract official business names for linguistic analysis. A key limitation is that the dataset excludes informal or unregistered stores, as well as openings or closures not yet reflected in state records.

Visual Data (Google Street View)

To capture visual aspects of grocery store branding, storefront images were retrieved using the Google Street View API, accessed in November 2024. These images allow for analysis of signage elements including typography, color, and visual symbols. While Google updates its street view imagery quarterly, some images may be outdated or unclear due to obstructions, image blur, or unavailable angles.

Geospatial Neighborhood Boundaries

Neighborhood boundary data was obtained from the New York City Department of City Planning in the form of GeoJSON shapefiles for Neighborhood Tabulation Areas (NTAs). This file defines the spatial boundaries used to group stores by neighborhood and demographic profile. The version used was released in February 2025 and reflects data from the 2020 Census. While NTAs are useful for demographic aggregation, they may not reflect more recent administrative or cultural changes within neighborhoods.

Demographic Data

Demographic context was provided through the American Community Survey (ACS) 5-Year Estimates, which offer detailed statistics on population composition by race, age, and income. The most recent version, released in February 2025, includes data from 2022. This dataset was used to analyze how neighborhood-level demographic variables relate to signage trends. A limitation of this data is that it may not fully capture rapid demographic changes or informal community dynamics.

By combining these datasets, the study seeks to uncover patterns in linguistic and visual branding, connecting grocery store identities to the cultural and economic fabric of NYC neighborhoods.

Methodology

Data Collection

This study utilizes three main sources of data: a business registry of food retail stores, storefront images captured from Google Street View, and demographic data from the New York City Department of City Planning. Together, these datasets provide the foundation for analyzing linguistic, visual, and spatial patterns in grocery store signage across New York City.

1. Business Registry Data

The primary dataset was obtained from the New York State Department of Agriculture and Markets, which maintains a public registry of food retail businesses across the state. The dataset was downloaded as a CSV file and filtered to include only entries located within the five boroughs of New York City: Manhattan, Brooklyn, Queens, the Bronx, and Staten Island. Each record included a registered business name and a geographic reference point (latitude and longitude), which enabled both textual analysis and spatial mapping.

2. Storefront Image Collection

To analyze the visual characteristics of store signage, storefront images were retrieved using the Google Street View API, accessed through Google Cloud tools. Due to daily API limitations—such as a maximum of 2,000 requests or a data cap—images were collected in batches using Python. The batch processing was divided by borough to manage API quotas and ensure a smoother retrieval process. Instead of dynamically requesting images during analysis,

all images were downloaded in advance and stored locally to allow for more efficient, offline batch processing in subsequent steps.

3. Visual Feature Extraction

The collected images were processed using the OpenAI GPT-4 Vision model, which was prompted to detect the presence of signage and extract stylistic features. A structured JSON prompt was provided to ensure consistency in the output format. The model was instructed to return the following information:

Please take a look at this image and answer using only JSON format with the following fields:
{ "has_sign": "Yes or No",
 "sign_color": "e.g. Red/White",
 "font_style": "Serif, Sans-serif, Script, Decorative, etc." }
Only return the JSON object — no explanation or commentary."

The prompt was refined iteratively to ensure that responses were consistently formatted and easy to parse. Only the JSON object was returned—without commentary—to simplify post-processing and data merging.

4. Evaluation of Alternative Methods

Prior to finalizing the use of GPT-4 Vision, several alternative tools and models were tested. These included:

- **WhatFontIs.com API**, which returned specific font names but was limited to 200 requests per day and was overly detailed for the general audience.

- **Vibrant.js**, which extracted dominant colors from entire images but often misidentified signage colors due to background noise and lighting variations.
- **YOLO-World**, a zero-shot object detection model used to locate signage based on custom vocabulary (e.g., “storefront sign”). While promising, this method required additional post-processing to crop images and apply separate font/color detection tools, which made the workflow overly complex and less consistent.

Given these limitations, GPT-4 Vision was selected for its ability to perform a one-step extraction of both visual and semantic features from images with minimal configuration.

5. Demographic Data Integration

To contextualize signage patterns within neighborhood characteristics, demographic data was sourced from official New York City datasets. Rather than relying on third-party services such as Google Maps, this study used data provided by the New York City Department of City Planning.

Neighborhood boundaries were defined using GeoJSON shapefiles for Neighborhood Tabulation Areas (NTAs), while demographic variables were drawn from the American Community Survey (ACS). The selected variables included racial and ethnic composition, age distribution, and median household income.

Each grocery store was geographically matched to its corresponding NTA using its latitude and longitude coordinates. This spatial linkage enabled the integration of store-level visual and linguistic data with neighborhood-level demographic context, providing a foundation for analyzing signage and naming trends across distinct cultural and socioeconomic environments.

Resulting Combined Dataset

The final dataset for analysis included the following structured attributes:

- **Store-Level Data:** Business name, geographic location, signage presence, color palette, and font style.
- **Neighborhood Context:** NTA assignment, racial and ethnic composition, median household income, and age distribution.
- **Geospatial Metadata:** Latitude and longitude coordinates, and polygon boundaries used for mapping and spatial analysis.

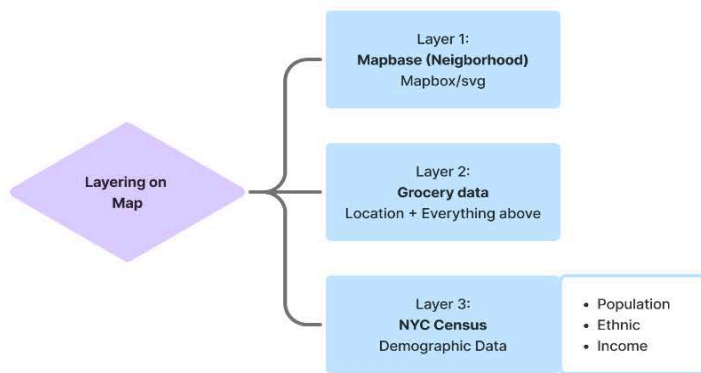
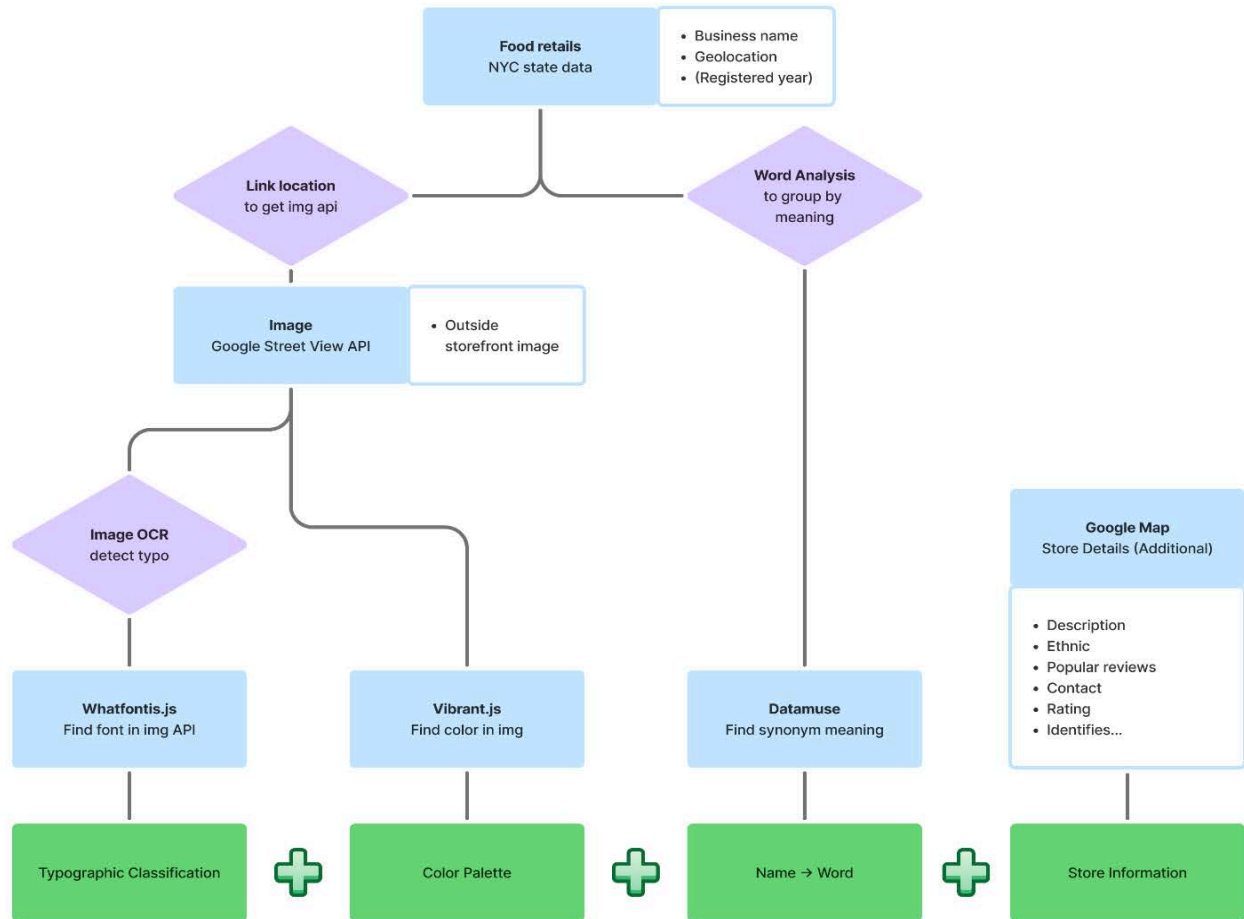


Figure 1. Initial Data Structure: Early workflow using WhatFontIs and Vibrant.js to extract typography and color from storefront images, along with OCR cropping and supplemental metadata from Google Maps.

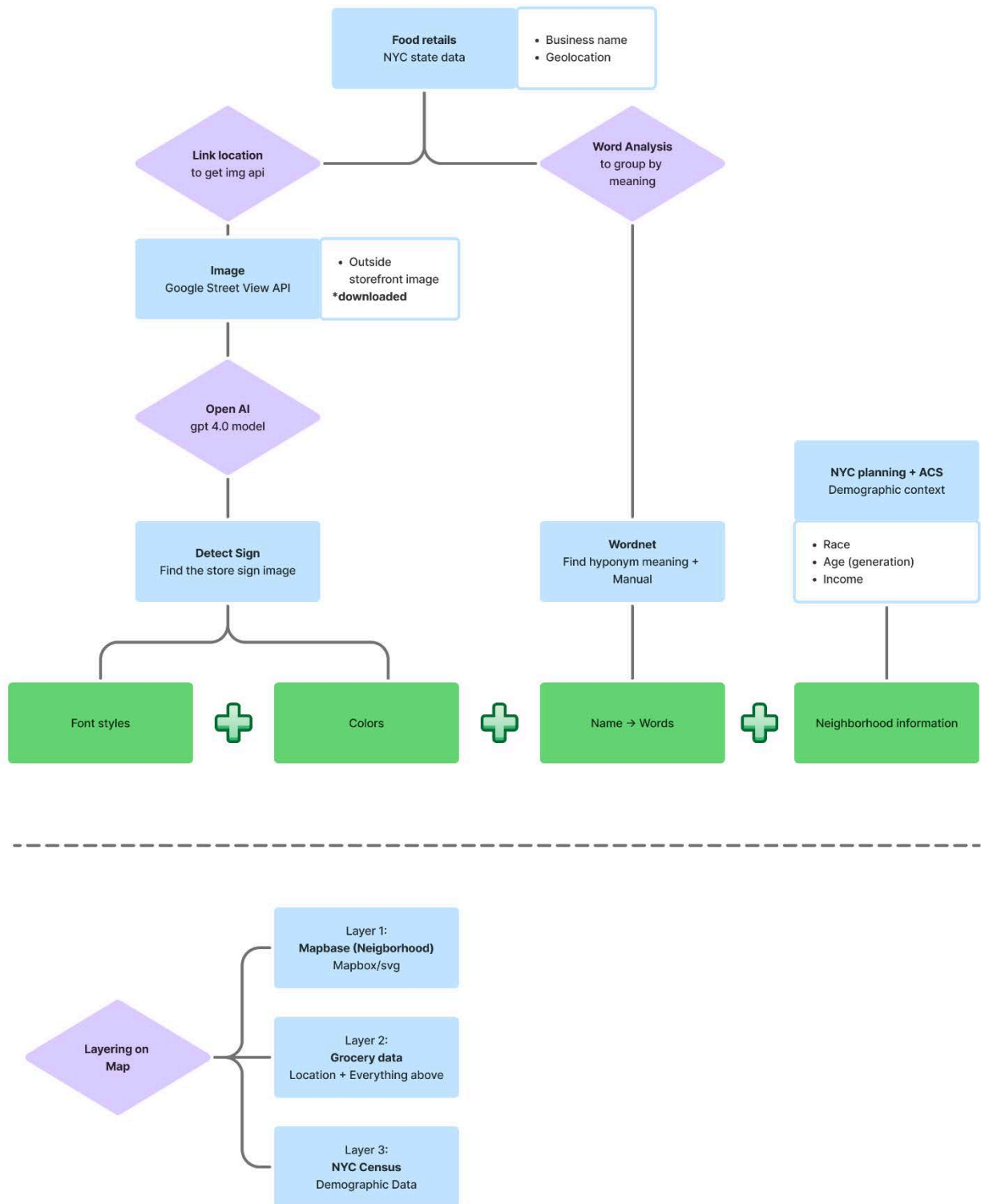


Figure 2. Revised Data Structure: Streamlined structure using GPT-4 to detect sign presence, color, and font in a single step, reducing tool dependencies and improving processing efficiency.

Data Cleaning & Processing

This section outlines the cleaning and preparation of the datasets used in this study, including store names, signage images, and demographic data. All processing steps were conducted to ensure consistency, accuracy, and compatibility across data sources.

1. Cleaning Store Names and Business Records

The original dataset from the New York State Department of Agriculture and Markets contained 11,352 registered food retail businesses. To isolate grocery stores specifically, businesses were filtered based on the presence of relevant keywords in the store name. Establishments were excluded if the business name contained terms such as *café*, *bakery*, *convenience*, *fish*, *seafood*, *meat*, *butcher*, *juice*, *pharmacy*, *drug*, *gas*, *fuel*, *bagel*, *sushi*, *candy*, *snack*, or *chocolate*, unless paired with descriptors such as *grocery*, *deli*, *market*, *minimart*, or *gourmet*.

After initial filtering, the dataset was further cleaned by correcting typographical errors, converting all text to lowercase, removing punctuation, and eliminating empty or incomplete entries. Duplicate records—often resulting from multiple listings at the same address—were also removed. Chain stores (defined as businesses with identical names at multiple locations) were flagged for reference but excluded from the name-based linguistic analysis to prevent data skew. As the business names were already registered using English or Latin-based alphabets, no translation was necessary. After these procedures, the working dataset included 9,219 unique grocery store entries.

2. Processing Store Names into Word-Level Data

To analyze naming patterns, each store name was tokenized into individual words. Chain store names were excluded from this step to better capture localized or independent naming conventions. Stop words in English were removed, but stop words from other languages—many of which may hold cultural significance—were retained. Directional and locational words, including *street*, *avenue*, *road*, and their abbreviations (*st.*, *ave.*, etc.), were also excluded. Common retail terms such as *store*, *market*, and *deli* were filtered out in order to focus the analysis on more meaningful components of the names.

Word frequencies were then calculated, and words that appeared more than ten times were retained for closer examination. Similar words were grouped manually and by hyponym category to reveal broader semantic themes and cultural patterns.

3. Processing Store Signage Images

After collecting storefront images via the Google Street View API, color palettes and typography data were extracted using OpenAI's GPT-4 Vision API. The API was prompted to return consistent JSON-formatted responses indicating whether the image contained signage and, if so, which colors and font styles were present. A subset of the data was manually reviewed to ensure the accuracy of the output.

Color data was cleaned and standardized by grouping similar shades under unified labels. For example, *gold* and *faded yellow* were grouped as **yellow**; *silver* as **gray**; *dark blue* as **blue**; *burgundy* and *maroon* as **red**; *beige* and *tan* as **brown**; and *peach* as **pink**. Vague or overlapping terms such as *multicolored*, *variety*, or *various colors* were reviewed manually. Rather than

grouping them under a single **multicolor** category, each instance was examined, and the specific colors present in the signage were identified and reassigned to their respective color categories. Because most signs featured more than one color or font style, both attributes were stored as arrays for multi-value representation.



Figure 3-6. Samples of Multicolor Store Sign Images

4. Mapping Store Locations to Neighborhoods

Spatial analysis was conducted using QGIS software. Store location points were overlaid on shapefiles of New York City's Neighborhood Tabulation Areas (NTAs), sourced from the NYC Department of City Planning. A spatial join was performed to assign each store to a corresponding neighborhood polygon. These spatial relationships were then appended to the attribute table to enable linkage with demographic data.

5. Cleaning and Preparing Demographic Context

Demographic data was obtained from the American Community Survey (ACS) and aligned with NTAs to provide context for each store's neighborhood. Only columns relevant to the study were retained, including racial composition, age distribution, and median household income.

Race: Categories included Hispanic, White, Black, and Asian. Individuals identifying as two or more races or as "Other" were grouped into a single category, which was omitted from analysis due to consistently low representation (generally less than 1%).

Age: Age ranges were grouped by generational cohort, based on the year 2022:

- Generation Z (ages 10–24)
- Millennials (Generation Y, ages 25–39)
- Generation X (ages 40–59)
- Baby Boomers (ages 60–79)

Income: Neighborhood median household income was grouped into four ranges adapted from NYC Department of City Planning classifications:

- Less than \$30,000
- \$30,000 to \$59,999
- \$60,000 to \$99,999
- \$100,000 and above

Store entries were then spatially linked to their corresponding neighborhood demographic profiles. This integration enabled analysis of signage patterns across communities with different racial, generational, and economic compositions.

Data Analyzing

1. Textual Structure of Store Names

Analysis of store names revealed recurring linguistic patterns that reflect the city's cultural diversity, values, and consumer behavior. All names were registered using the Latin alphabet, allowing for consistent word segmentation and comparison. Many names include non-English words, particularly in Spanish, indicating the influence of Hispanic communities.

Spanish-language elements were among the most frequent, serving as strong cultural indicators:

- *La* (168), *El* (105), *Los* (49), *De* (34), *Mi* (26), *San* (19), *Al* (18), *Del* (14), *Glatt* (14), *Bodega* (11), *Hermanos* (10).

References to New York City and the concept of *newness* were also prevalent:

- *New* (159), *NY* (77), *Apple* (30), *Big* (27), *NYC* (25), *York* (19).

Only 18 stores used the full name *New York*, suggesting a preference for abbreviated or symbolic references.

Health and lifestyle values were commonly expressed through branding language:

- *Fresh* (140), *Farm* (90), *Organic* (84), *Green* (69), *Natural* (41), *Health* (39), *Garden* (36), *Farmers* (21), *Healthy* (17), *Farms* (17).

Convenience-oriented words reflected the fast-paced urban lifestyle:

- *Stop* (90), *Express* (70), *Go* (19), *Quick* (15), *Spot* (13), *Mobil* (12), *EZ* (12).

Competitive and aspirational terms were also popular, with *Star* leading over celestial counterparts:

- *Star* (89), *Super* (49), *Finest* (42), *Best* (41), *Top* (19).

By comparison: *Luna* (12), *Sunrise* (11), *Sunny* (10).

Cultural and religious identifiers highlighted the diversity of food origins and community identities:

- *Halal* (61), *African* (52), *Mexican* (32), *Caribbean* (25), *Kosher* (24), *International* (23), *American* (21), *USA* (18), *Indian* (13), *Mexicana* (12), *European* (10), *Jamaica* (10).

Family references, though present, were more commonly male-oriented:

- *Family* (52), *Brothers* (41), *Mr.* (26), *Friends* (11), *Hermanos* (10), *Brother* (10), *Bros* (10). Terms like *sister* or *daughter* were notably underrepresented.

In some cases, stores combined font styles to create distinct yet readable branding.

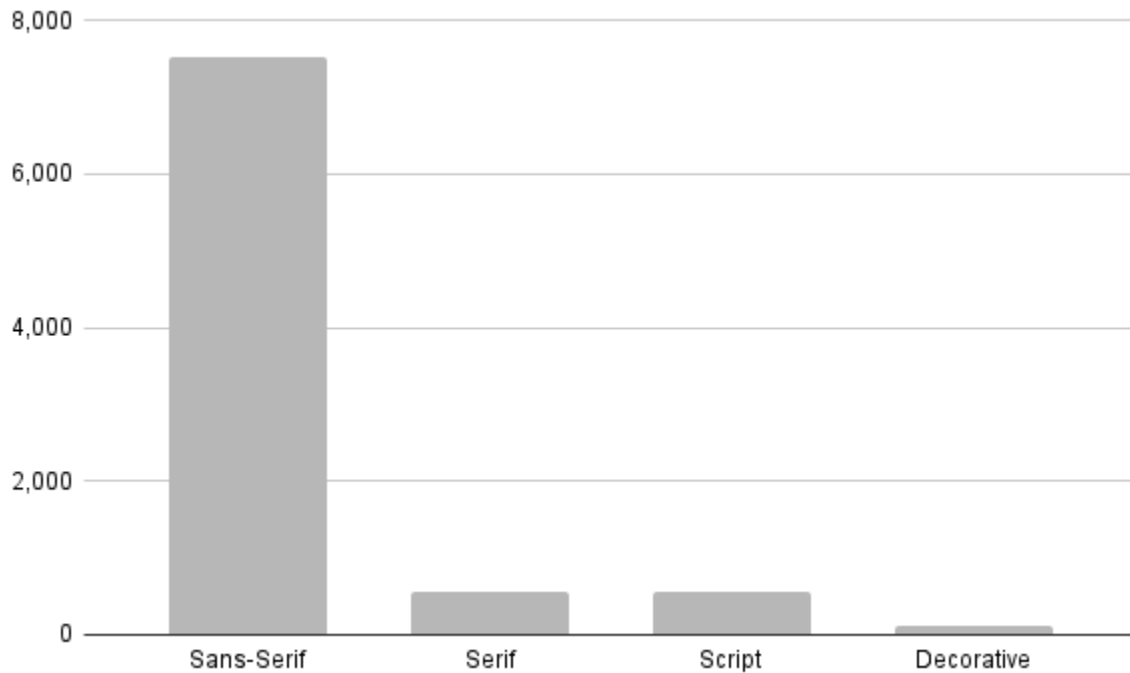


Figure 8. Bar chart of Typography Counts

Color Usage

Color choices were grouped into eleven categories and included both text and background elements. **White** was the most frequently used, likely due to its brightness and versatility. **Red** was the second most common, perhaps used for its visual impact, echoing cues like stop signs. Despite its symbolic connection to freshness, **green** ranked behind **red**, **blue**, and **black** in actual usage.

- **White:** 7,518
- **Red:** 4,604
- **Green:** 1,021

- **Blue:** 990
- **Black:** 982
- **Yellow:** 740
- **Orange:** 123
- **Brown:** 105
- **Purple:** 71
- **Pink:** 42
- **Gray:** 15

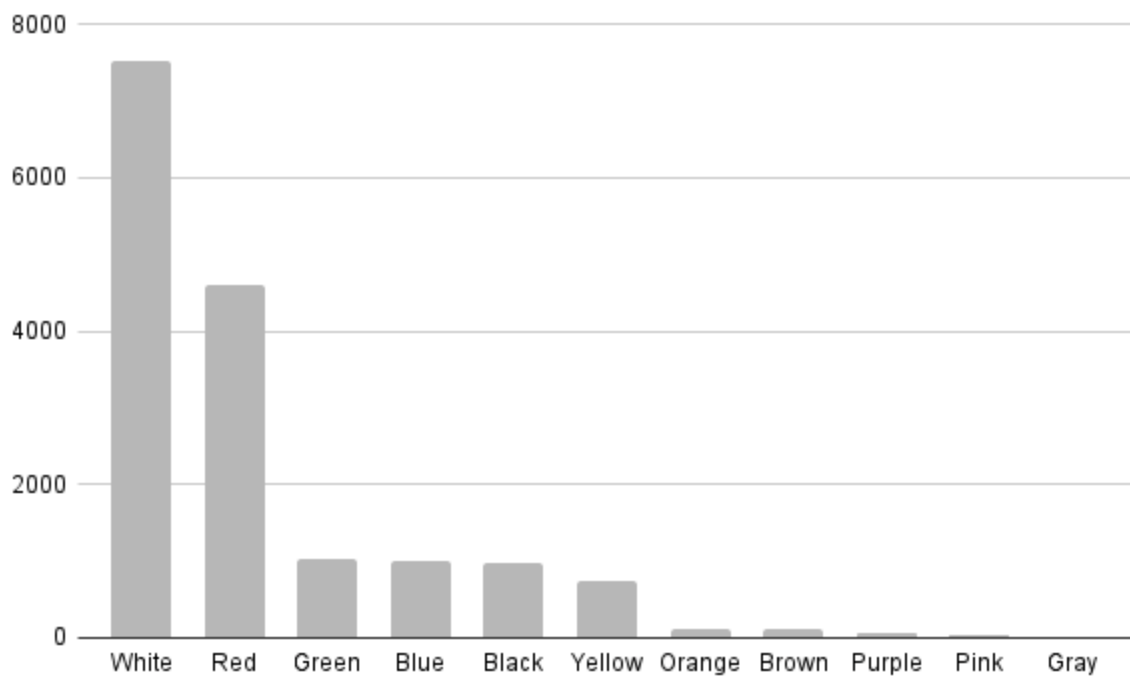


Figure 9. Barchart of Color Count

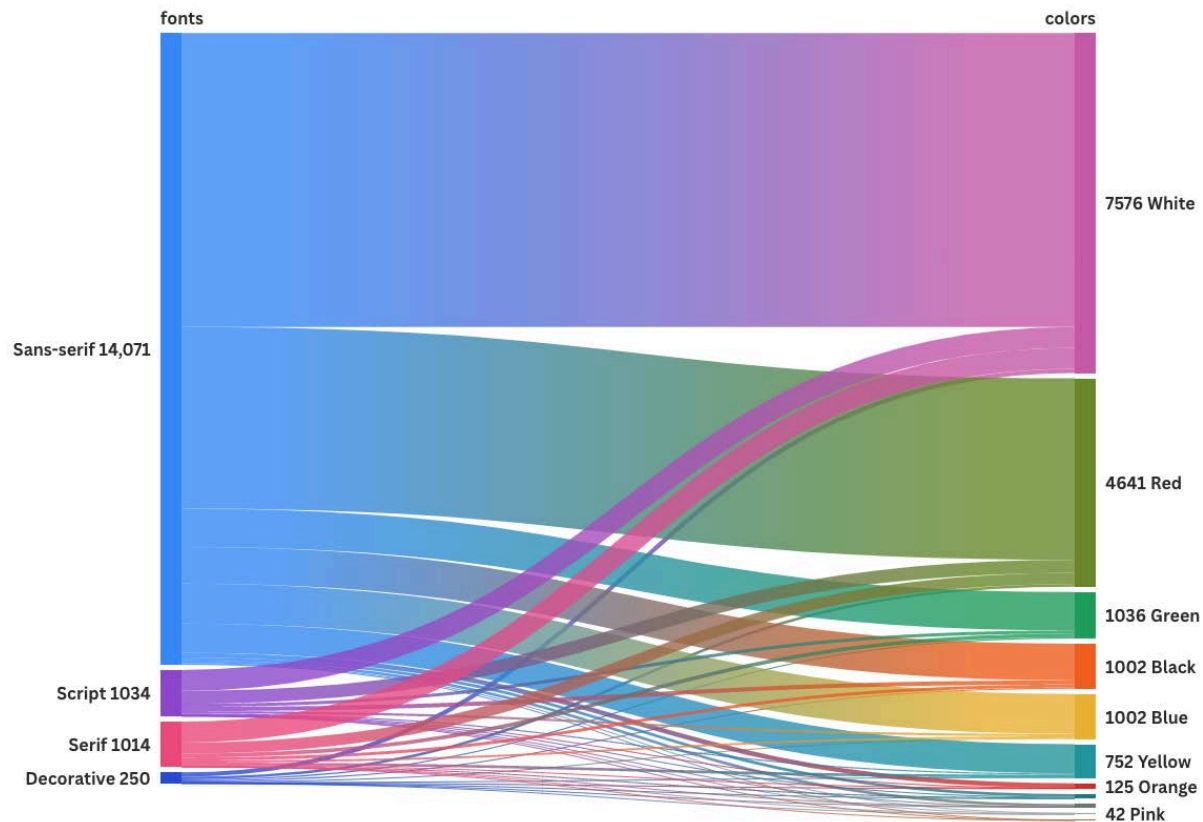


Figure 10. Sankey Diagram to Explore relationship between Font and Color

3. Demographic Group Analysis

The analysis began by exploring the relationship between store signage—both textual and visual—and neighborhood location. However, the volume of data across neighborhoods made patterns difficult to interpret on their own (see Figures 11–13). To add clarity and cultural context, the data was then grouped by key demographic variables: **age**, **race**, and **income**. These groupings provided a more meaningful lens through which to examine how signage reflects the identity and values of the communities it serves.

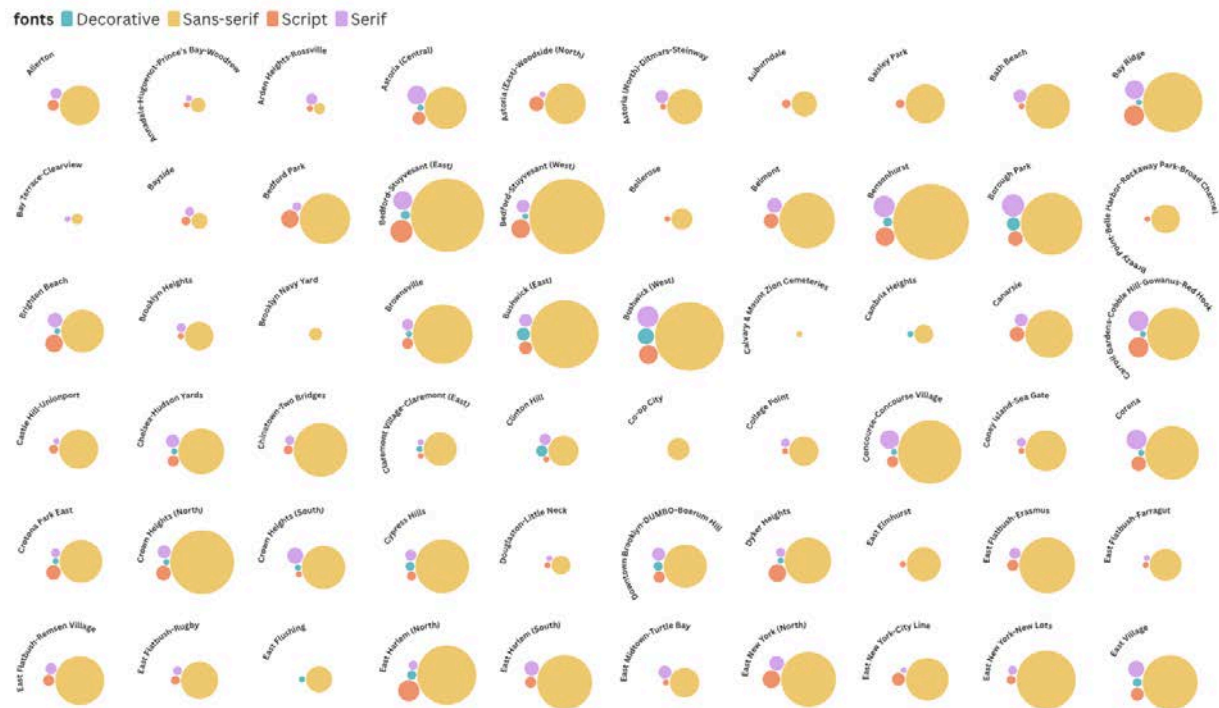


Figure 11. Group Fonts by neighborhoods

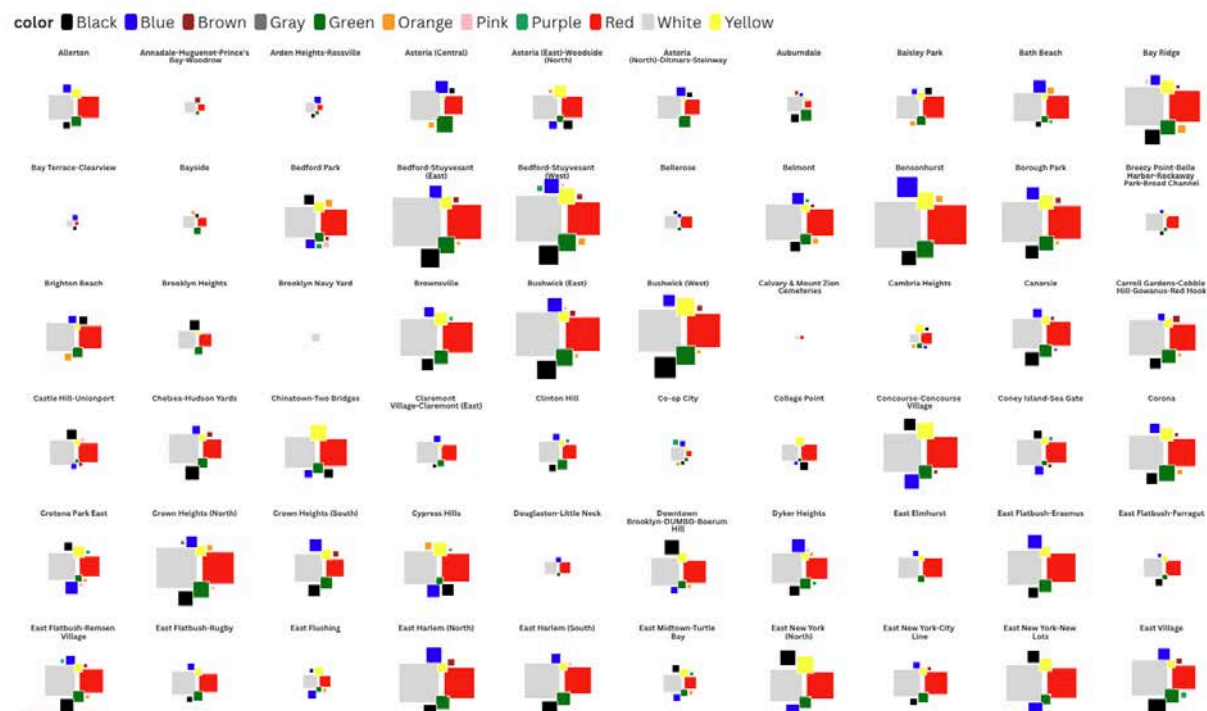


Figure 12. Group Colors by neighborhoods



Neighborhoods were grouped based on the dominant generational age range (ACS, 2022). While signage visuals were broadly similar across generations—possibly due to multi-generational households—linguistic patterns showed slight variation. **Latin words** appeared more frequently in Generation X and Y (working-age groups), while terms like *Fresh* were more common in both **Baby Boomer** and **Generation Z** areas.

Race and Ethnicity

In neighborhoods where over 50 percent of the population belonged to a single racial group, distinct linguistic and visual patterns emerged:

- **Hispanic neighborhoods:** frequent use of *La*, *El*, and other Spanish terms; increased use of **blue** signage.
- **Black neighborhoods:** preference for terms like *New* and *Star*; similar color patterns to White neighborhoods, though with slightly more red.
- **White neighborhoods:** high frequency of *Fresh* and *Organic* in store names; slightly reduced use of red in signage.
- **Asian neighborhoods:** common use of *Trading* and *New* in names; higher usage of **yellow** signage than in other areas.

Income Levels

Income-based patterns revealed additional insights:

- **Lower-income neighborhoods:** Higher frequency of Spanish-language words and brighter colors; Sans-Serif fonts were dominant.
- **Higher-income neighborhoods:** More frequent use of *Organic* in names; greater presence of **Serif** fonts and darker color tones, such as **black**.

Narrative Structure

This project is presented as a web-based data visualization narrative, employing a structured storytelling framework to guide the audience from guided exposition to interactive exploration.

The storytelling approach follows the **Martini Glass Narrative Visualization Structure**, which begins with a linear, curated sequence and transitions into a more open-ended, exploratory experience.²⁶

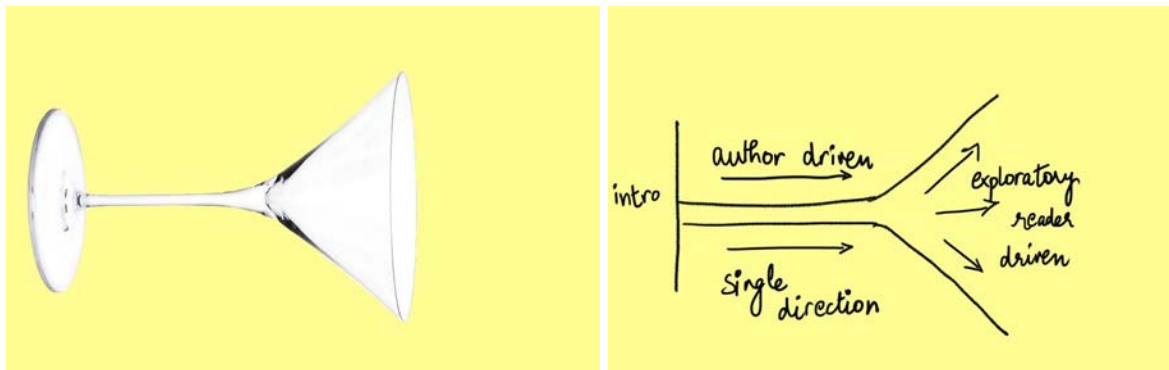


Figure 14. Martini Glass Narrative Structure, from Gurman Bhatia.²⁷

The narrative opens with an introduction to an everyday but often overlooked aspect of city life: grocery store signage. Although these signs are part of residents' daily routines, they are rarely considered consciously. This introductory section aims to reframe the viewer's perspective, drawing attention to how signage subtly communicates cultural identity and shapes urban experience.

²⁶ Segel, Edward, and Jeffrey Heer. 2010. "Narrative Visualization: Telling Stories with Data." *IEEE Transactions on Visualization and Computer Graphics* 16 (no.6): 1139-1148.

https://cpb-us-e1.wpmucdn.com/sites.northwestern.edu/dist/3/3481/files/2015/02/Narrative_Visualization.pdf.

²⁷ Bhatia, Gurman. 2021. "Stories, Structure." gurmanbhatia.com.

<https://gurmanbhatia.com/talk/2021/03/09/stories-structure>.

The second phase of the narrative focuses on analysis. It presents patterns in the **linguistic structure of store names** and the **visual design elements of signage**, including typography and color. This analytical section provides insight into how branding reflects both individual business identity and broader cultural signals.

In the final phase, the narrative integrates **demographic data**, linking signage characteristics with neighborhood-level cultural, generational, and economic patterns. In this exploratory section, users are given tools to interact with the data, navigate through neighborhoods, and draw their own connections between store identity and community demographics.

A corresponding user flow diagram further outlines the structure of the narrative and the progression from introduction to exploration.

Each section will be elaborated on in more detail in the user flow diagram in Figure 4.

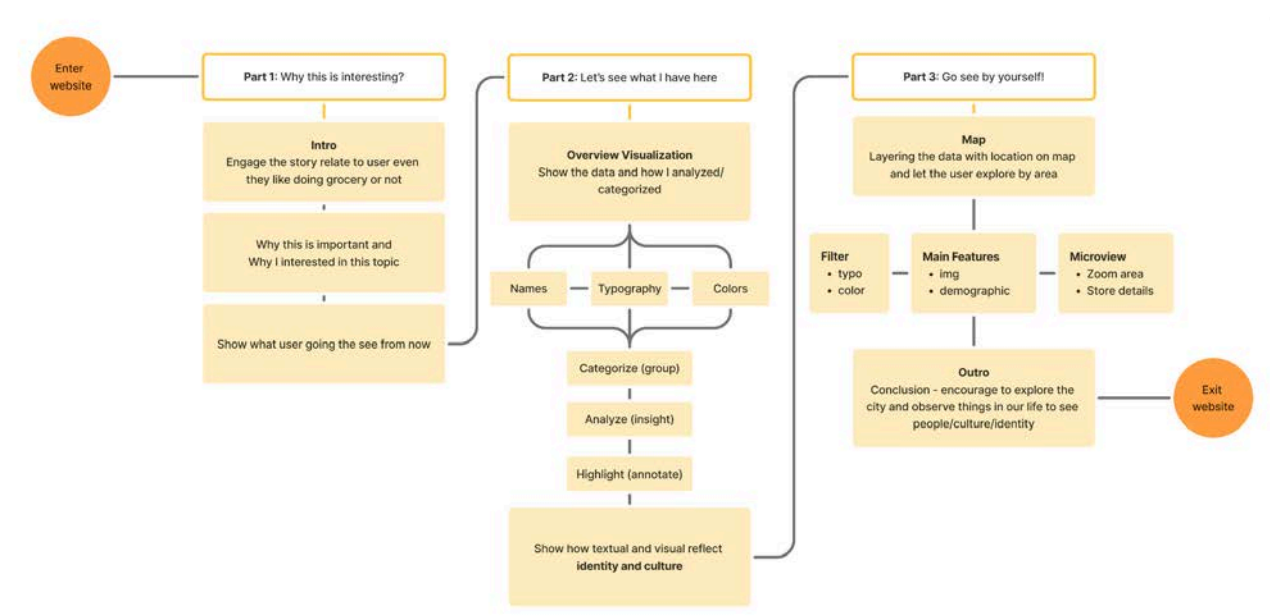


Figure 15. User Flow: A three-part web experience guiding users from narrative introduction, through data exploration, to interactive map-based discovery of grocery store signage and cultural identity.

Design Decisions

This section outlines the art direction and visual design strategies that shaped the project's interface and data presentation. Each decision was guided by the goal of making the data approachable, engaging, and visually aligned with the subject of everyday grocery environments.

Art Direction

The overall mood and tone of the project are designed to be **bright, friendly, and playful**, echoing the familiar and welcoming atmosphere of a neighborhood grocery store. These choices are intended to make data-heavy content more accessible to general audiences, encouraging exploration and curiosity rather than overwhelming the viewer with technicality.

Color Palette

Given the wide variety of signage colors represented in the dataset, the surrounding interface was kept clean and **monotone** to create visual contrast. This contrast helps the colorful sign imagery stand out while maintaining a cohesive overall aesthetic. Decorative UI elements reuse the project's **signs color palette**, with slight adjustments for consistency and balance across the website.



Figure 16. Color palette from signs

Typography Choices

Typography plays a central role in visually representing the diversity of signage styles observed in the dataset. The project combines two typefaces:

- **Skew:** A handwritten, informal typeface resembling local shop signs, used primarily for headings. Designed by Mark Caneso. From ps Type.



Figure 17. Sample use of “Skew” font from Adobe²⁸

- **Obviously:** A bold, wide sans-serif font that reflects the attention-grabbing style of signage, used for subheadings and body text. Designed by James Edmondson. From OH no Type Co..



Figure 18. Sample use of “Skew” font from Adobe²⁹

²⁸ <https://fonts.adobe.com/fonts/skew-variable>

²⁹ <https://fonts.adobe.com/fonts/obviously>

The interplay between these two fonts mirrors the mix of signage aesthetics documented in New York City grocery storefronts. Both fonts are used in the project's title and navigation components to establish a recognizable typographic identity.

Design Elements

To reflect the everyday nature of grocery shopping, the project incorporates **visual motifs from grocery store environments**, such as baskets, shelves, and product displays. Storefront images, collected via Google Street View, are presented as **collaged image cutouts** styled with halftone and pixel effects. This pop-art treatment serves a dual purpose: it pays homage to the cultural visibility of urban signage while mitigating the low resolution of street view imagery.

Additional **graphic shapes**—drawn from sign color blocks and common layout motifs—are integrated into transitions, section breaks, and interface elements. These shapes function as visual cues and create rhythm across the scroll-based storytelling experience.



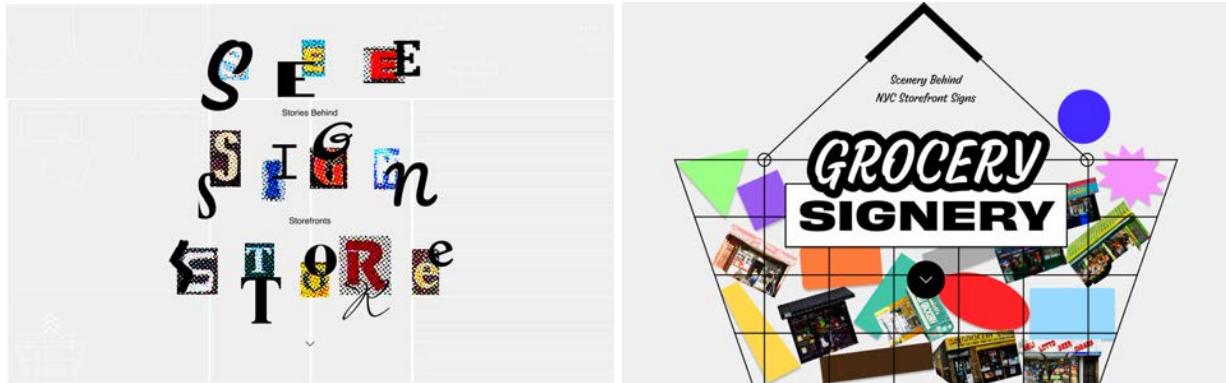


Figure 19–22. Design element development from initial draft to final version (left to right, top to bottom).

Data Representation

Several visualization types were developed to align with the project's playful tone while maintaining clarity and interpretability:

- Word Shelf Display:** Inspired by word clouds, store name words were visualized as individual cards arranged on a horizontal shelf. Each word's size reflects its frequency, while a square border symbolizes its role as a standalone sign. This approach improves legibility over traditional word clouds by avoiding rotation and clutter.
- Image Cluster Explorer:** A complementary visualization displays store sign images corresponding to the highlighted word. This interactive cluster allows users to view store names, signage, and neighborhoods. Images animate dynamically using D3.js as users highlight words—dropping into a basket background, metaphorically representing data being “shopped.”
- Bar Charts with Shelf Aesthetic:** To maintain consistency and simplicity, bar charts were chosen to represent visual proportions (e.g., color usage, font style distribution). These charts reuse the shelf motif, displaying data as colored rectangular units stacked

like items in a store. This visual consistency across introduction, analysis, and exploration sections allows users to interpret data quickly without re-learning the format.

- **Neighborhood Map Exploration:** The final visualization brings all components together in a geographic interface. Users can filter data by font style, color, and demographic context using a shelf-inspired filter bar. Simple button elements are visually positioned on shelf graphics, reinforcing the project's theme. The map uses muted grayscale polygons for Neighborhood Tabulation Areas (NTAs), ensuring that the colorful store icons remain the visual focal point. When users click a neighborhood, a sidebar opens to display more detailed information including textual trends, visual aesthetics, and demographic context—alongside a zoomed-in map of store locations.

Conclusion

This thesis set out to explore how grocery store names and signage in New York City communicate cultural identity, language, and neighborhood dynamics. By analyzing the textual patterns in store names, the visual design of storefront signs, and their relationship to demographic and geographic data, the study reveals how branding in everyday urban environments reflects deeper social meanings. Grocery signage—often overlooked—emerges as a powerful medium for expressing heritage, community belonging, and adaptation within a multicultural city.

The research demonstrated that naming conventions and visual choices are not arbitrary; they are shaped by cultural values, generational trends, and economic shifts. For instance, the presence of Spanish-language terms in store names, the popularity of sans-serif typography, and the strategic

use of color all signal both identity and market intention. These signs operate as part of the city's broader linguistic and visual landscape, particularly in neighborhoods undergoing demographic or economic change.

While this project focuses on the surface elements of storefronts, it raises important questions about what lies beyond the sign. Future research could investigate how store owners make design decisions, how customers interpret signage, and how these visual identities evolve over time. Additional inquiry might also explore other types of storefront signs across the city, or expand the analysis to other street-level visual objects that shape the urban landscape. Researchers could build on this method using Google Street View to examine changes over time, or study the relationship between interior branding and exterior signage—how spatial and audio-visual elements within a store reinforce community identity. Lastly, extending this analysis to other cities would allow for comparative insights into how food culture and visual language intersect across different multicultural contexts.

In closing, this thesis underscores the significance of grocery stores not just as retail spaces, but as cultural artifacts embedded in everyday urban life. Their signs serve as public-facing expressions of cultural identity, reflecting the values, histories, and aspirations of the communities they represent. Through visual design—fonts, colors, language, and naming conventions—storefronts participate in shaping how people experience and navigate their neighborhoods. As urban landscapes continue to evolve, these seemingly ordinary details offer lasting insight into how communities see themselves and how they wish to be seen.

Appendix



Figure A1. Project Landing Page

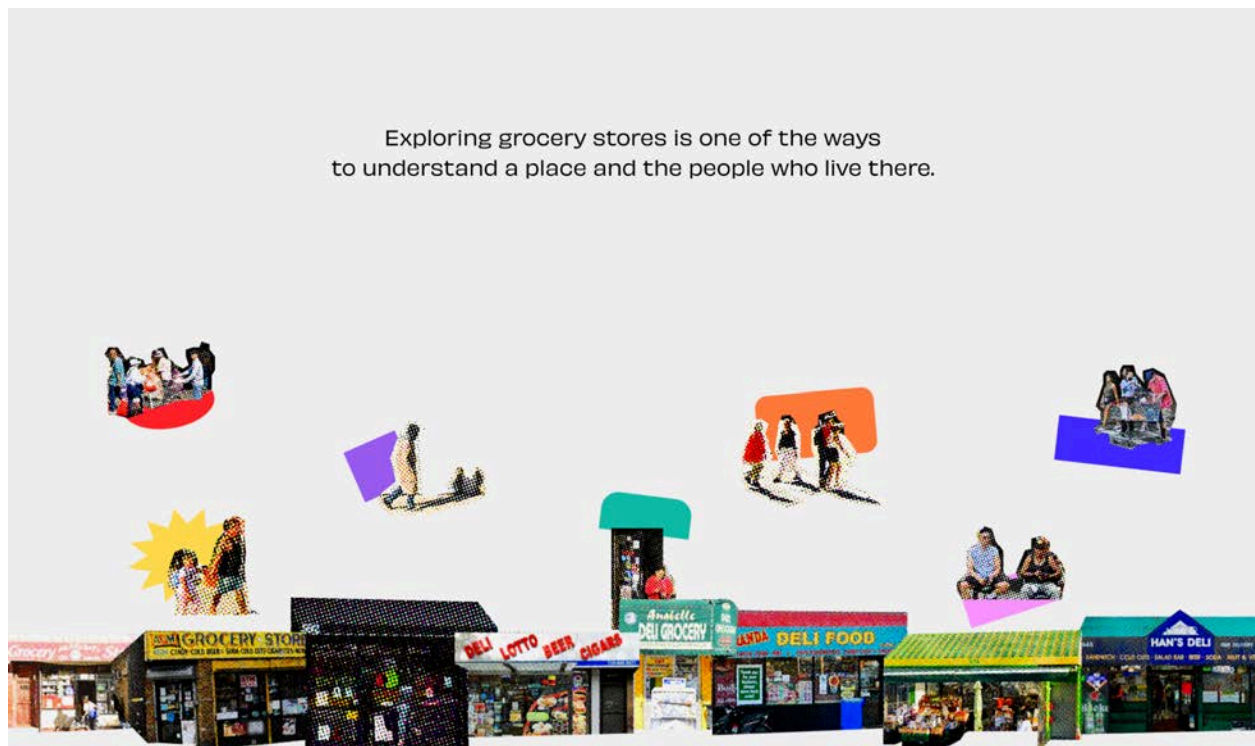


Figure A2. Introduction part with store image collages with geometric graphics.

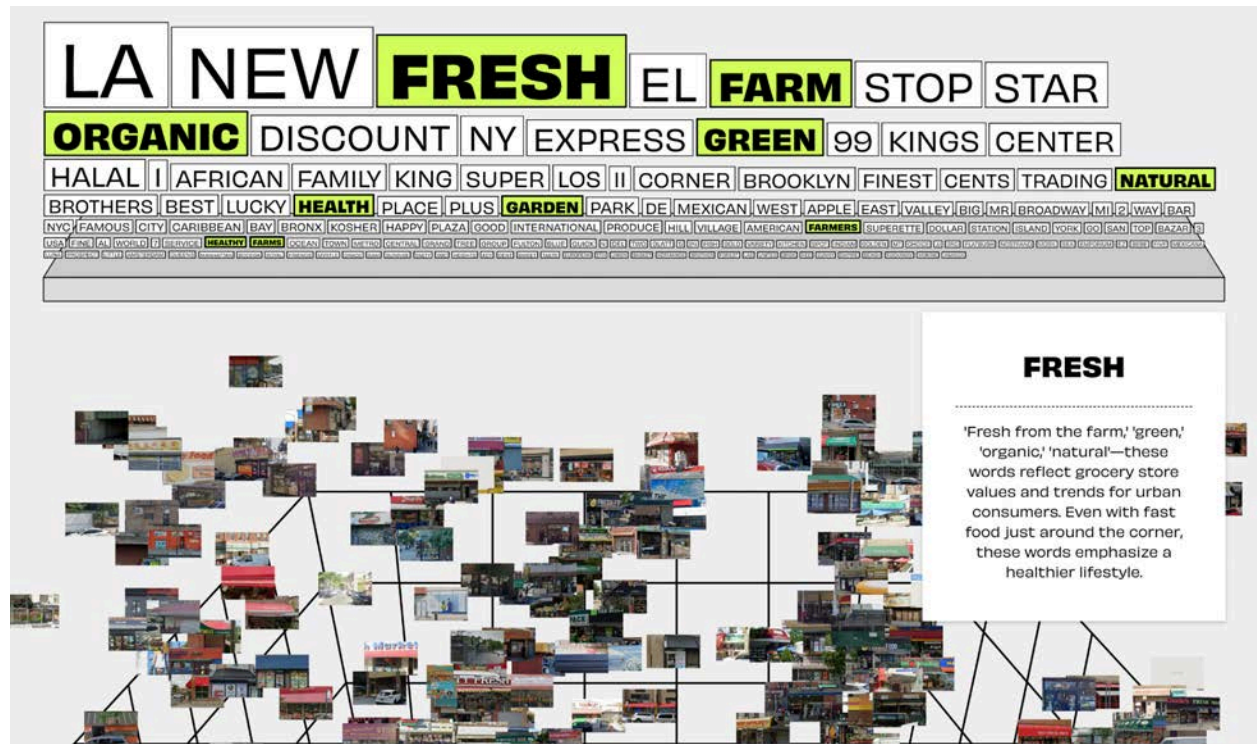


Figure A3. Textual part – Overall word pattern

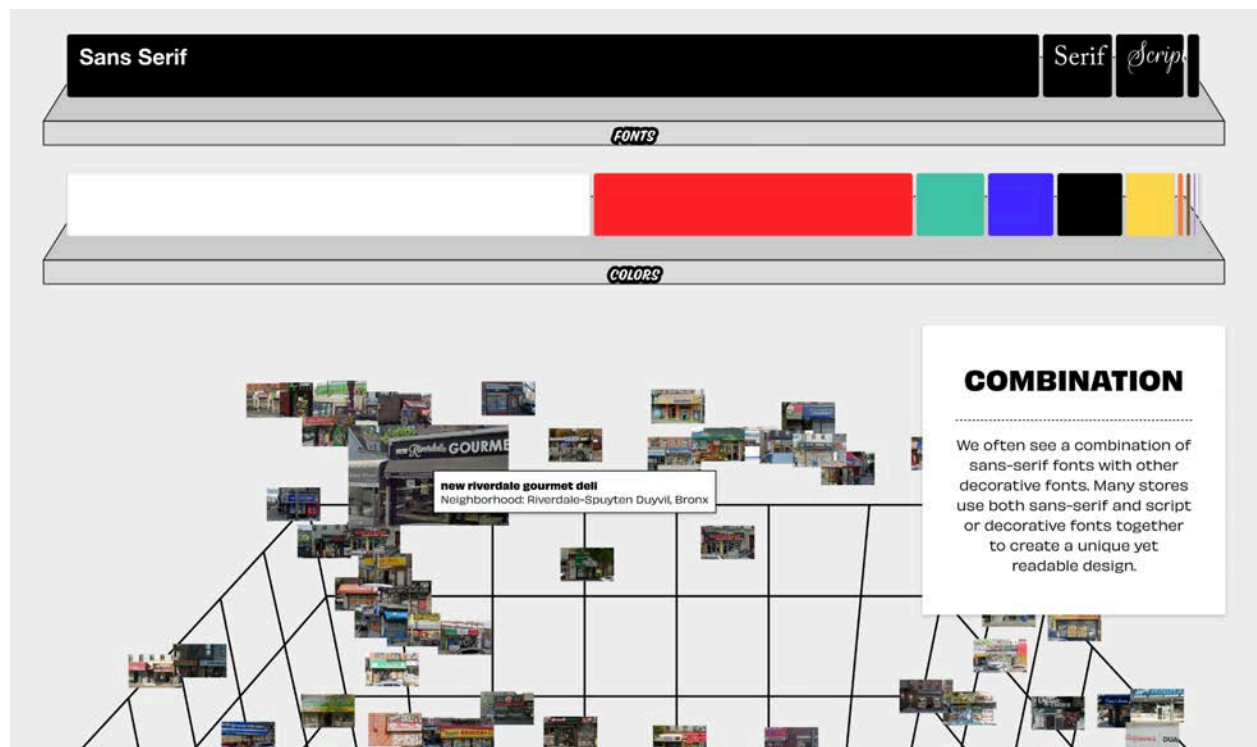


Figure A4. Visual part – Overall font styles and colors.

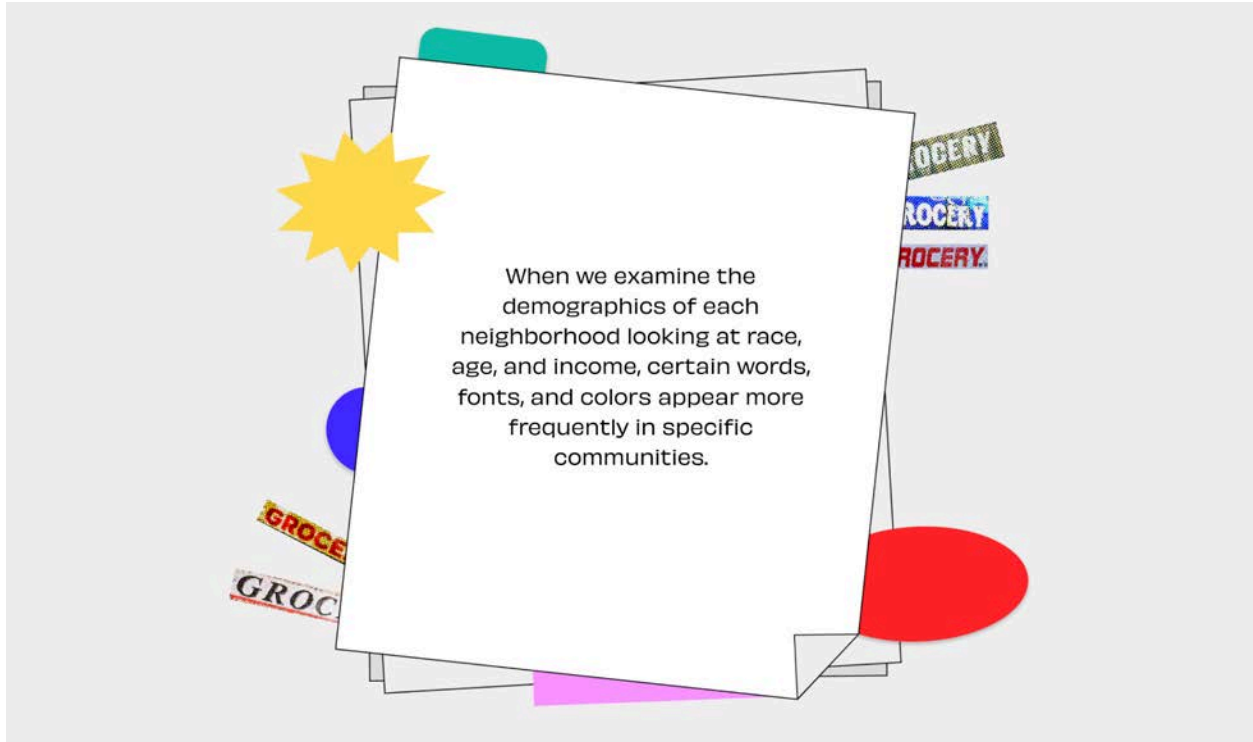


Figure A5. Section break

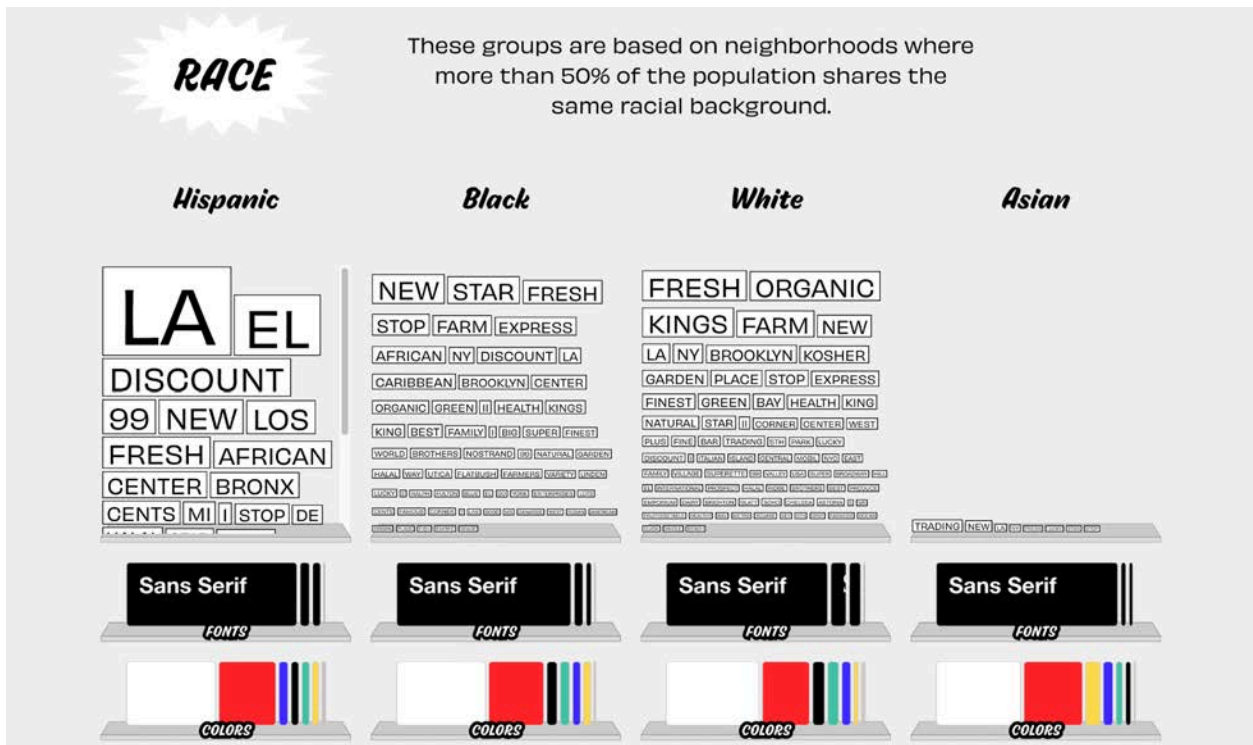
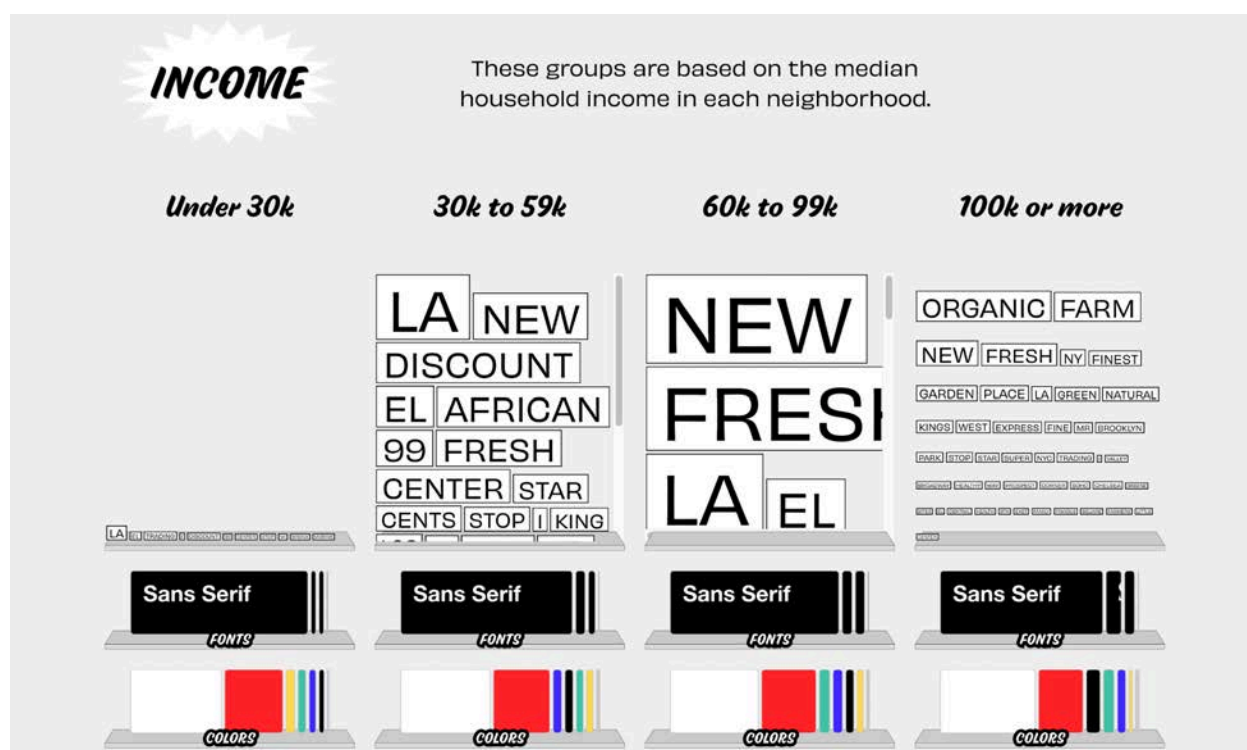
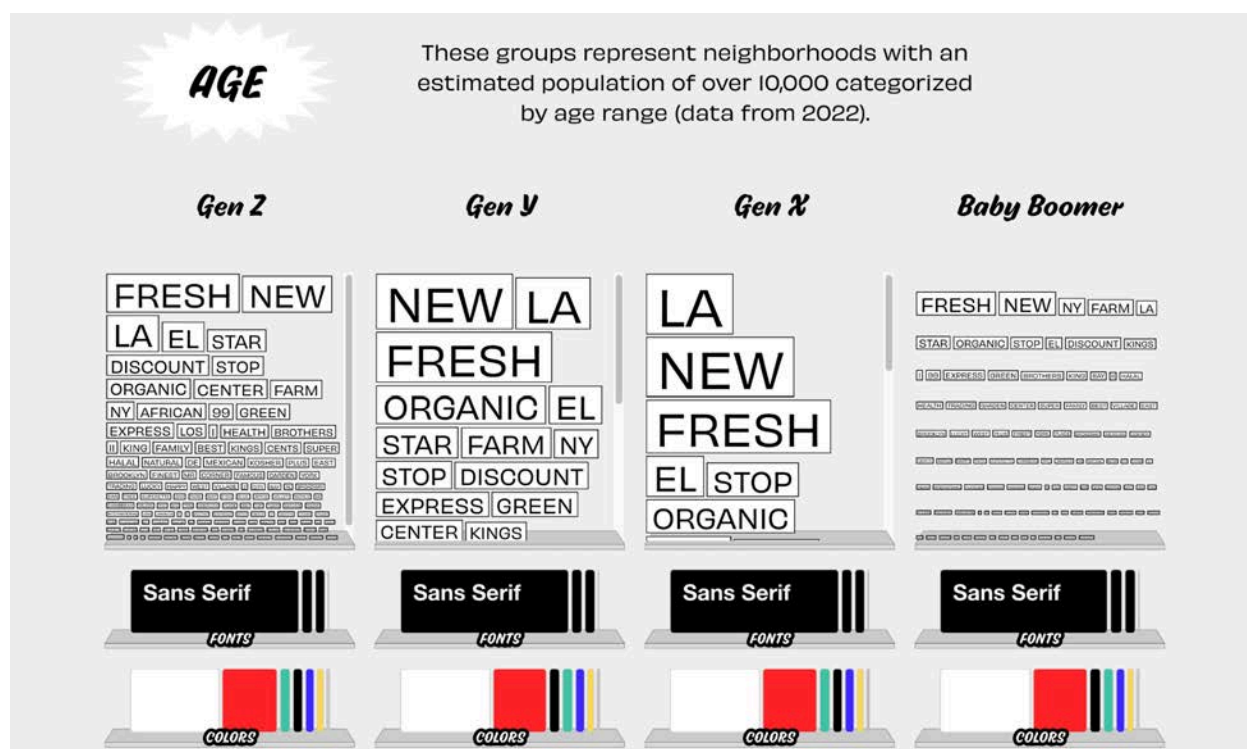


Figure A6. Demographic context: Race



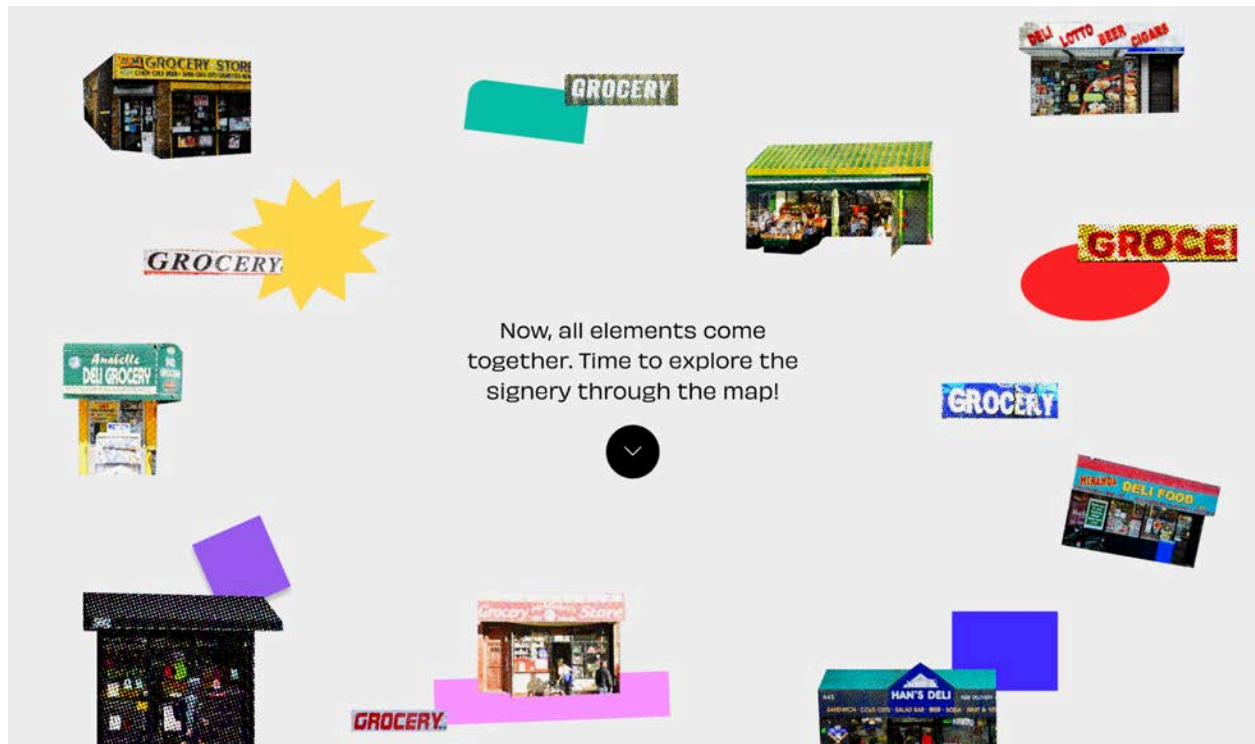


Figure A9. Section Break

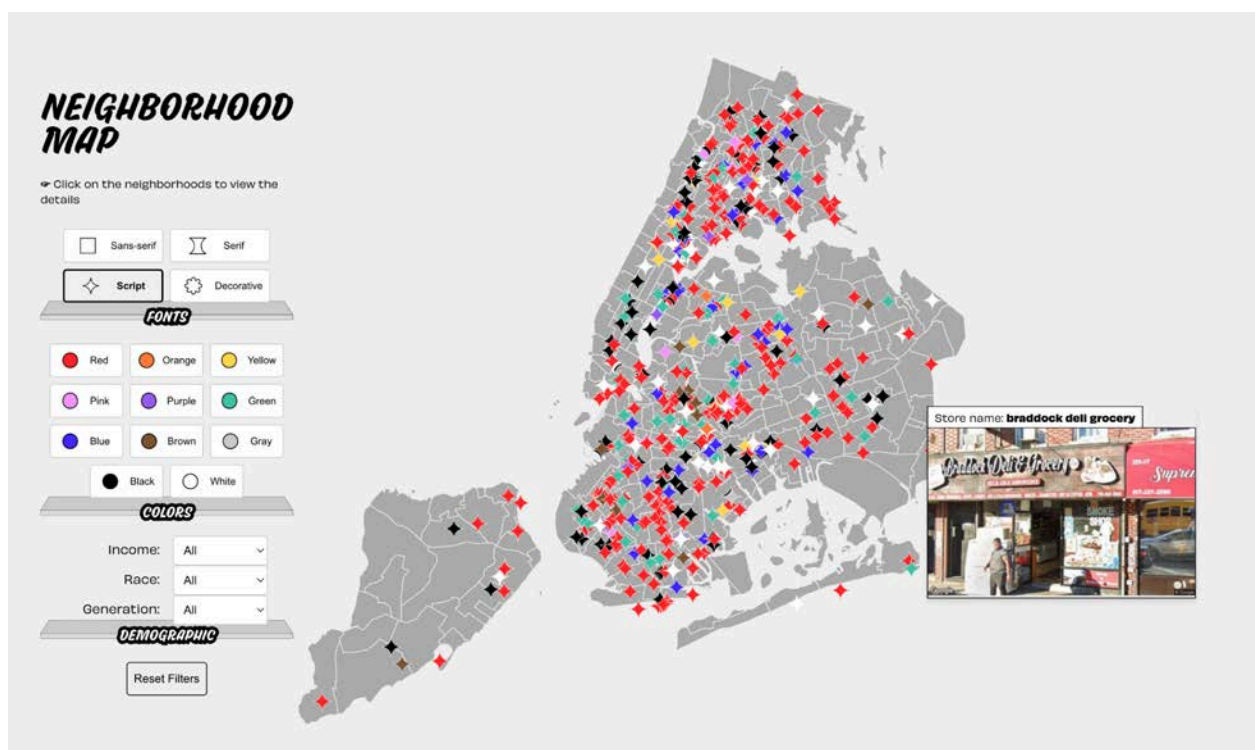


Figure A10. Neighborhood Map – Explore store pattern by filter on interactive map

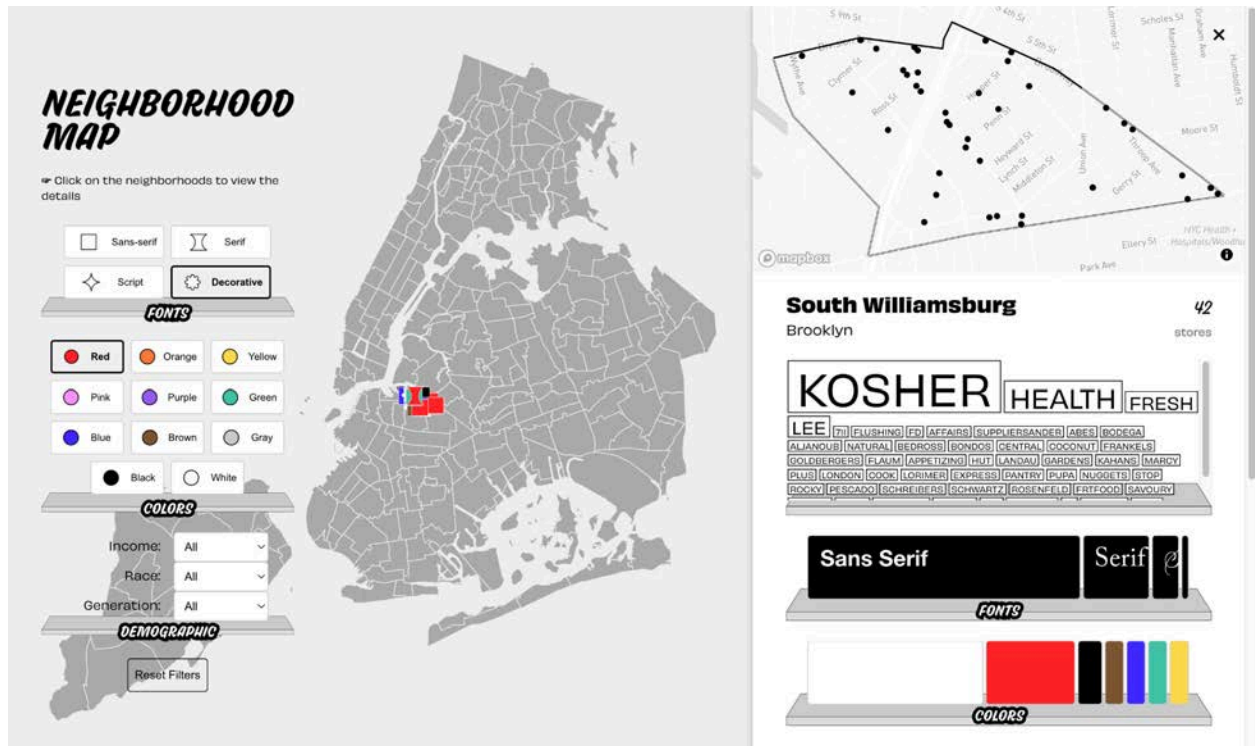


Figure A11. Neighborhood Map – Explore each neighborhood pattern in micro view

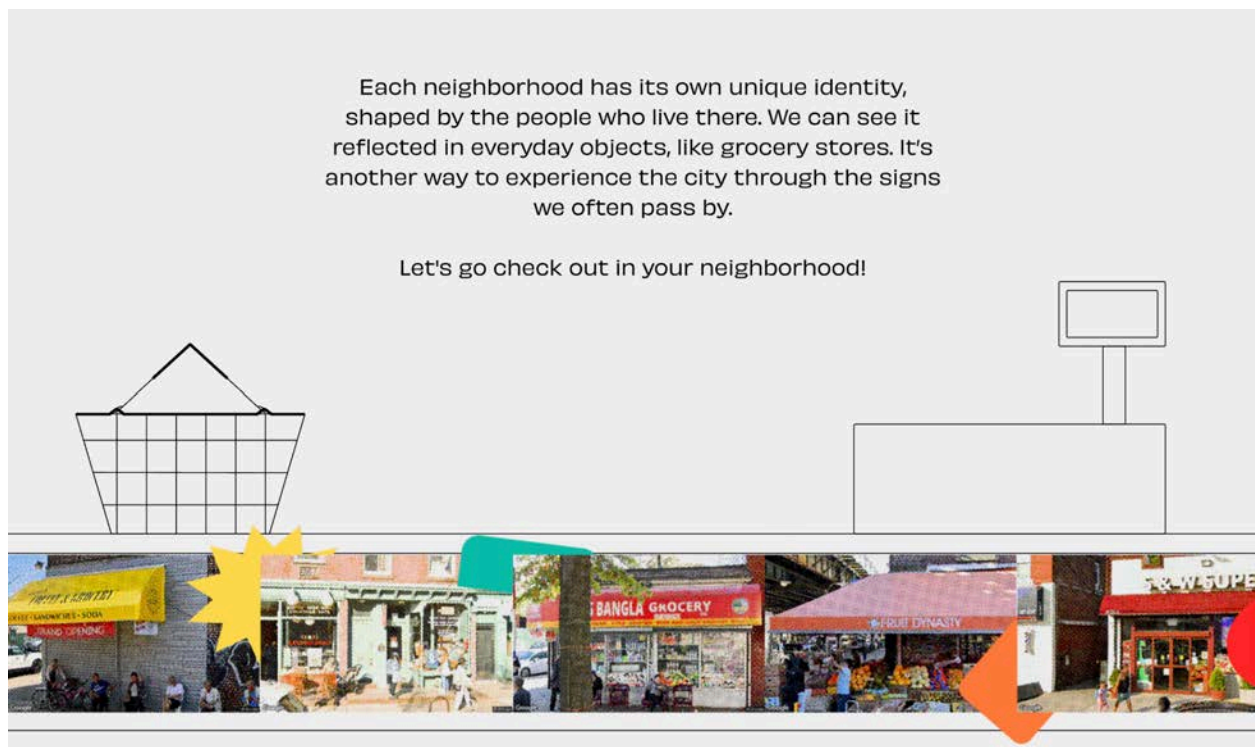


Figure A12. Outro

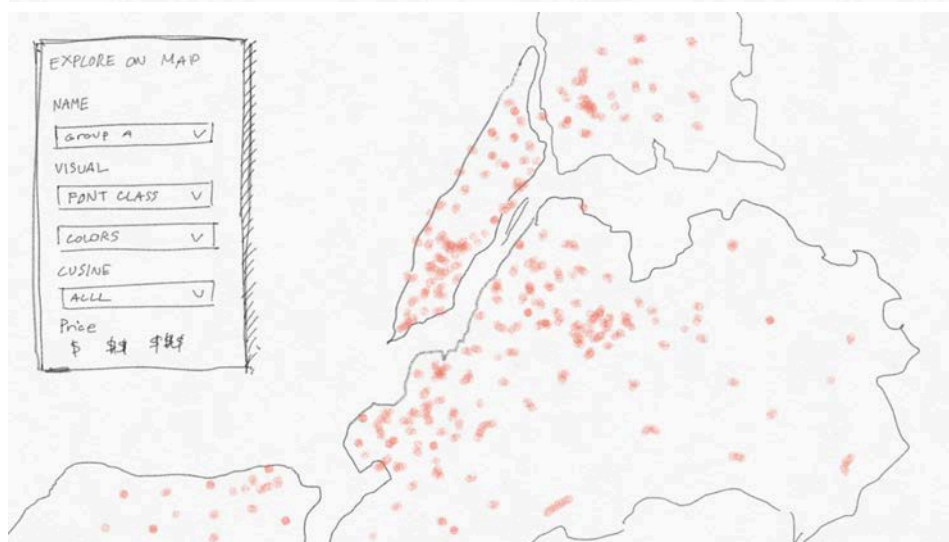
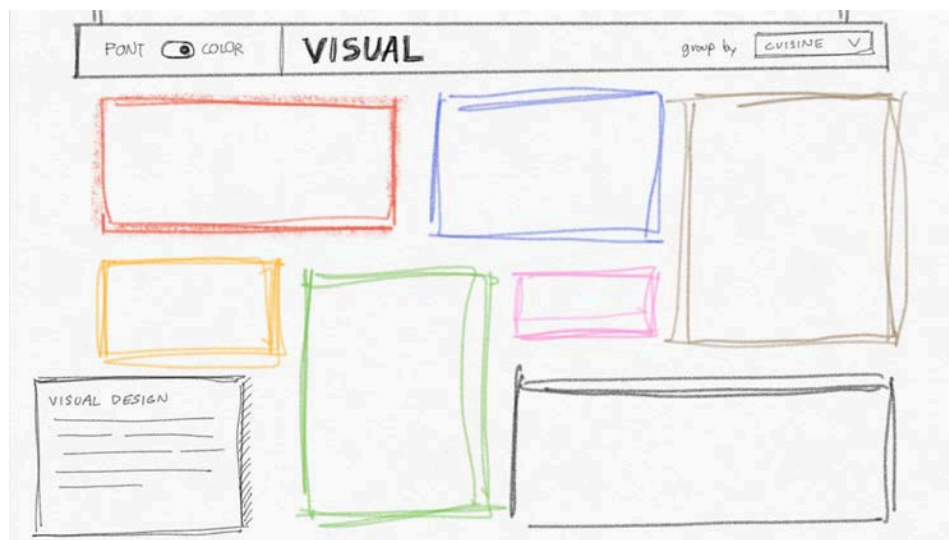
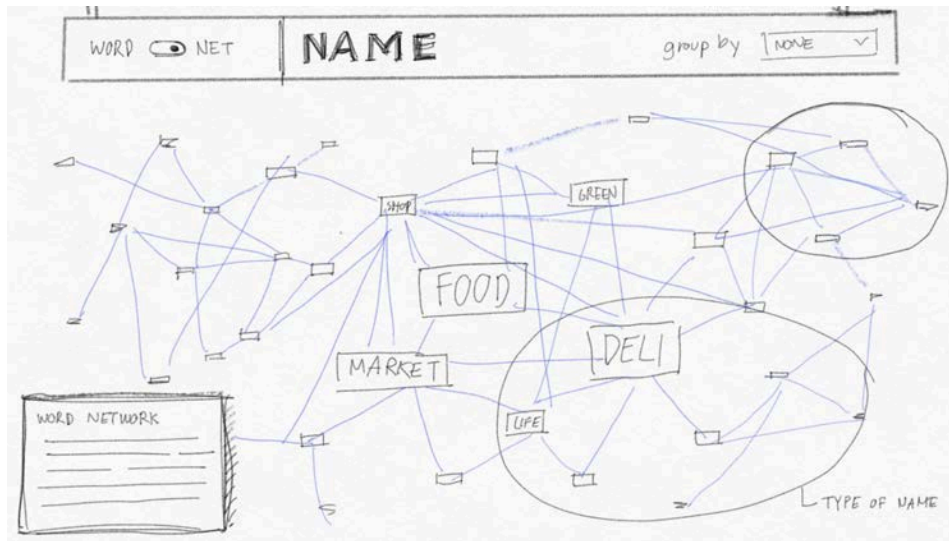


Figure A13-15. Sketches

The full interactive version of this project can be accessed at:
<https://monsichasris.github.io/thesis/>

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