Data-driven Brand Communication
exploring ways in which storytelling visualization can be used for brand communication

By Muling Jiang

Submitted in partial fulfillment of the requirements for the degree of Master of Fine Arts in Information Design and Visualization in the Graduate School of the College of Arts, Media and Design of Northeastern University

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Thesis presented by Muling Jiang

To the Department of Art + Design
In Partial Fulfillment of the Requirements for the Degree of
Master of Fine Arts in Information Design and Visualization

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Abstract

Storytelling is a classic technical approach in the advertising industry that has helped a large number of businesses achieve great success. However, besides the traditional fantasy-story advertising, a lot of data shows that the “scientific data” graphs can increase the persuasiveness of advertising media. With the popularity of information visualization in people’s daily life, there comes an opportunity for visualization designers to tell brand stories by data visualization. Therefore, the objective of this thesis is to explore how storytelling visualization can be used for brand communication. Specifically, this thesis (a) present a taxonomy of storytelling visualizations on different branding communication goals; (b) provide conceptual storytelling frameworks to guide through the design process, in order to make storytelling visualization more reliable and persuasive; (c) demonstrate and discuss the application of storytelling visualization in specific case of brand communication by using Hubway data; (d) discuss the limitations of this technology and the room for improvement.
Acknowledgments

This thesis would not have been possible without the help and support from fellow students and professors in our great program. I would thank all the people around me.

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To my classmates, whose critiques and advice have inspired me to make better designs. Special thanks to Liuhuaying Yang, for being there every time and the hundreds of deep conversations we had.

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First Experience with the Model

What is the brand value

How does Hubway promote its brand value?

Apply the Hubway dataset through the model

Be the hero!

Customized hero story

Be part of the local heroes!

Aggregate everyone into the story

Conclusions

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I think people have begun to forget how powerful human stories are, exchanging their sense of empathy for a fetishistic fascination with data, networks, patterns, and total information. … Really, the data is just part of the story. The human stuff is the main stuff, and the data should enrich it.

~Jonathan Harris
In human oral and drawing centered history, storytelling predated writing, with the earliest forms of storytelling usually combined with gestures and facial expressions. In addition to being part of religious rituals, some archaeologists believe that rock art may have served as a form of storytelling for many ancient cultures (“Why did Native Americans make rock art?”). In many ancient cultures, rock art may be the earliest storytelling in visual form. During the Middle Ages, religious paintings also developed many storytelling techniques to show people’s relationship and their historical stories.

In recent years, data visualization has been regularly promoted for its ability to reveal stories within data, yet these “data stories” differ in important ways from traditional forms of storytelling (Edward and Jeffrey, 2010). The Economist Cukier explores the proliferation of digital data and notes that visualization designers are “melding the skills of computer science, statistics, artistic design and storytelling.”(K. Cukier, 2010). Today’s popular storytellers and online journalists have increasingly been integrating visualizations into their storytelling, in some cases allowing the visualization to function in place of a written story. Another professional field that introduced data visualization is business: as Cole Nussbaumer mentioned: “don’t simply show your data—tell a story with it ” in her newly published book Storytelling With Data: A Data Visualization Guide for Business Professionals.

In fact, the combination of storytelling and business has a long history. Storytelling is a classic technical tool in the advertising industry that has helped a large number of businesses achieve great success. Traditional advertising stories are often designed to create a moving picture that appears in a variety of traditional media outlets. Traditional storytelling media such as words, speeches and images leave room for expression. This expressiveness is the
story’s foundation, using the manipulations of the data as narrative resources can thus generate a different story (P. Cruz and P. Machado, 2011). In the meantime, more and more people in modern society are now in an age of information and big data. Information visualization can help people get information faster and better. Therefore, how to use information visualization to turn data into a good story will give our designers a good opportunity to participate in the brand promotion arena.

Therefore, this thesis aims to explore how storytelling techniques can be used to enhance corporate brand identity. For instance, some cutting-edge information visualization companies, such as Fathom and Accurat, had built many of successful visual stories to explore, analyze, and describe complex systems of information. They re-imagine how organizations engage with their stakeholders through the use of storytelling data visualization. These projects are not to improve the efficiency of internal business, but for external display, thereby enhancing the public influence of these enterprises.

This thesis is divided into these parts:

1. to present a taxonomy of storytelling visualizations on different branding communication goals;
2. to provide conceptual storytelling frameworks to guide through the design process, in order to make storytelling visualization more reliable and persuasive;
3. to demonstrate and discuss the application of storytelling visualization with Hubway dataset;
4. to discuss the limitations of this technology in terms of branding and the room for improvement.

1. In this thesis, Hubway customer data is only be discussed under the assumption of “authorized use”.
Information visualization can not only improve the efficiency of internal business, but also the external display to the public, thereby enhancing the public influence of the businesses on society. Storytelling is the most popular one of the visualization techniques, it naturally meets the basic need of brand promotion: communication.

Data storytelling is the combination of two worlds: hard data and human communication. It is a compelling narrative which is crafted by compelling data. There are many types of communication, but Katy French argues in his article *Why Data Visualization + Storytelling Is Marketing Gold*: data storytelling uniquely functions and also scientifically supports to help marketers to achieve their communication goals in many ways (Katy French, 2017).
2.1 Storytelling visualization

As stated by French, all content is interpreted as data by human brains, but the highest-value content provides more than knowledge, it gives insight. In marketing, this insight can help decision-making and spur actions. Therefore it is the most meaningful approach. Data storytelling allows people to extract and communicate insight through compelling stories (Katy French, 2017). According to his opinion, although storytelling is not a technique that can “force you to buy the product” directly, it helps more in making the brand long-lasting in the market subconsciously.

To explore a taxonomy and system of storytelling techniques that are implemented in enhancing corporate brand identity, I will examine aspects of storytelling in different designs according to Edward Segel and Jeffrey Heer’s design space dimensions theory.

As Edward Segel and Jeffrey Heer have stated in Narrative Visualization: Telling Stories with Data, storytelling organization of the design space contains three divisions of features: (1) genre, (2) visual narrative tactics, and (3) narrative structure tactics.
In terms of genre, there are seven basic genres shown in Figure 2.3: magazine style, annotated chart, partitioned poster, flowchart, comic strip, slideshow, and film/video/animation.

In terms of visual narrative tactics, they refer to visual devices that assist and facilitate the narrative. According to Edward Segel and Jeffrey Heer, this division can be subdivided into three sections: (1) visual structuring, (2) highlighting, and (3) transition guidance. Visual structuring refers to mechanisms that communicate the overall structure of the narrative to the viewer and allow him to identify his position within the larger organization of the visualization. Highlighting refers to visual mechanisms that help to direct the viewer’s attention to particular elements in the display. Transition guidance concerns techniques for moving within or between visual scenes without disorienting the viewer (Edward and Jeffrey, 2010).

As stated by Segel and Heer, the narrative structure tactics are used by each visualization, or non-visual mechanisms in order to assist and facilitate the narrative. This division is further divided into three sections: (1) ordering, (2) interactivity, and (3) messaging. Ordering refers to the ways of arranging the path the viewer takes through the visualization. Sometimes this path is designed by the
author (linear), sometimes there is no path suggested at all (random access), and at other times the user must choose path among multiple alternatives (user-directed). And interactivity refers to the different ways by which a user can manipulate the visualization (filtering, selecting, searching, navigating), and it also means how the user learns such methods as explicit instruction, tacit tutorial, initial configuration. Finally, messaging refers to how visualization can communicate observations and commentaries to the viewer. This might be achieved through short text fields, such as labels, captions, headlines, annotations, or more substantial descriptions (Edward and Jeffrey, 2010).

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**Figure 2.4**

Framework form for analyzing important characteristics of the visualizations shown in the related works section.
2.2 Taxonomy of storytelling in brand communication

An information visualization can perform many different functions, depending on its intended purpose. In this chapter, I will examine several recent storytelling visualizations and identify different approaches to creating visualizations that convey certain brand promotion (inspire and activate customers’ sense of favorability, trust to a certain brand, get more customization information, etc.).

In order to clearly present the purpose of different designs in my thesis, I will group the branding-driven visualizations into four categories. The categorization of the four types shows how the application of storytelling visualization can help people achieve different communication goals and uses, depending on what they convey. The four categories are as follows:

1. Storytelling in data-driven identity
2. Customized story
3. Storytelling that engages and explains
4. Storytelling for exploration

Figure 2.4 shows a framework form that will be used to rate each of the visualizations in this chapter with several different storytelling design dimensions.
"Data Portraits at TED 2017", Accurat designed several unique visual Data Portraits of the attendees.
2.2.1 Storytelling in data-driven identity

In the Target Space at TED 2017 in Vancouver, Target intended to promote their company’s new ideas to customers: “We believe the future you isn’t a person, it’s a place.” For this promotion goal, Accurat designed an extraordinary visual Data Portraits\(^1\) of the attendees, and the designs were based on the answers to some simple but evocative questions that were turned into wearable buttons for the attendees.

In the Accurat design, the first step of imagining and defining the visual language of the Data Portraits of the attendees was to make sketches on paper, and the second step was to go through multiple repetitions, and then settled them on the final design that was used at TED. As is shown in the project, the tablet APP created by Accurat, it used the web technologies to recreate the style of the elements and then was deployed to the cloud. This made it accessible immediately on many devices, depending on the size of the crowd during the conference breaks.

Such a particular type of soft data and small data representation is proved very effective in promoting connections and conversations, and the success of such creativity shows that designers have great passion in discovering data even in some most unexpected places.

\(^1\) [https://www.accurat.it/works/ted/](https://www.accurat.it/works/ted/)
The idea of generative identity has been stated for a long time. In 2008, Faber Finds launched a service for generative book covers. As Faber said in his project that “only once we understood all the rules and nature of the design elements used on all levels, we could start building a generative solution which would introduce variations at certain points of its design process, manage and judge them automatically.” This initial part of the process included many things, such as identifying the five levels of symmetry, experimenting with minimum and maximum border widths and densities, exploring individual symmetry limits per shape element, finding the right amounts of shape elements that were used per border quadrant, etc. In total, they isolated over 35 of such rules and parameters (as shown in Figure 2.6).

Generative design systems usually work on the premise of concluding a given design idea/art direction. Because their purpose is to create such a system (rather than a single one-off design), it is essential to find the extreme cases and boundaries of some possible expressions, and then to shape them. Figure 2.7 shows how the book designer designed the layout systems while taking book metadata (number of pages, publication year, category) and turning them into beautiful covers. The initiator of this project was Marcin Ignac who gave foundation to data parsing, text layouts and first generative algorithms.

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Figure 2.6


Figure 2.7

Generative book covers (2017) indicated book content by showing different color shape and scale on the cover.
The new visual identity of the MIT Media Lab was inspired by its community. The highly creative people from all kinds of backgrounds, inspired each other and collaboratively developed a vision of the future.

The 45,000 possible variations of the algorithmic Corporate Design of the MIT Media Lab symbolize what the Media Lab constitutes: creativity, diversity, and reciprocal inspiration. The design was based on three geometric figures that are rearranged and colored for every application. Each figure symbolizes the contribution of an individual to the whole collaborative process, and the entire design stands for the result: redefining what media and technology can be in modern society.

What impressed me deeply is that this unique offering of the MIT Media Lab is reflected in its logo design (see Figure 2.8). Each of the three shapes in the logo represents one individual’s contribution. The resulting shape symbolizes the outcome of the whole process. Media and technology have been redefined. The logo of the Lab is based on a visual system, an algorithm that produces a unique logo for each person, for faculty, staff, and students. A custom web interface was developed, allowing each person at the MIT Media Lab to choose and claim an individual logo for his / her business card, as well as a custom animation which allows creating custom animations for any video content produced by the Lab.

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Custom algorithm makes a unique logo for each member of the faculty, staff and students.

Figure 2.8

"MIT Media Lab logo"
After Casa da Musica was completed in the city of Porto, Portugal, Sagmeister & Walsh Inc. was asked to create a visual identity for this institution – the classic corporate / cultural design job. How to handle it when the building is already “logo-like”? (Figure 2.9.1)

This is a fantastic identity of Casa da Musica. The Rem Koolhaas designed music center in the harbor town of Porto in Portugal. His initial desire of designing such an identity without featuring the building seemed to be impossible because the building itself is a logo. Kohlhaas calls this “the organization of issues of symbolism”. What he defines is true. But generally speaking, designers would avoid redesigning a building by developing a system where this recognizable, unique, modern form transforms itself like a chameleon from application to application, changes from media to media where the physical building itself is the ultimate rendering in a long line of logos. 5 Obviously, the goal of Kohlhaas was to show the different kinds of music performed in one house. Music filled in the house changes its character and works dice-like by displaying different views and facets of music.

“We failed to avoid using the building shape,” Sagmeister once said in a lecture at the design forum in Vienna, “so we looked for a different approach.” The result is the Casa da Musica logo generator. Based on the content’s color (e.g. a poster, see Figure 2.9.2), the generator “calculates” the logos colors. Consequently, object and logo merge.

Figure 2.9.1
“Logo-like” Casa da Musica

Figure 2.9.2
“Identity for Casa da Musica”, Sagmeister & Walsh developed a logo generator system for Casa da Musica.
2.2.2 Customized story

As described by IBM, “Our data is who we are. It’s an echo of our behavior. A record of our emotion.” In the Cognitive Photo Booth project, a key attraction at the AI-inspired Art with Watson portrait exhibition, IBM Watson turned data into the truest and best portrait and showed how technology could reveal the person within.

In this project, the user experience was expressed by way of conversations. Thousands of gallery guests queued up to converse with Watson, who then analyzed their answers to his questions by using his Speech to Text and Tone Analyzer APIs. Each guest’s personality profile was then presented as a custom, poster-sized portrait, in the form of a data visualization, printed in minutes (see Figure2.10). Then users took home their personalized portraits.

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7. https://www.behance.net/gallery/55504335/The-Cognitive-Photobooth
Figure 2.10

“The Cognitive Photobooth”, IBM Watson turned data into the “truest” portrait.
While consulting references related to my project, I was also impressed by the design of Fathom. When cooperating with Nike, Fathom built and designed a website enabling every Nike + Fuel Band user worldwide to see a portrait of their unique physical activity patterns. Members can download and share a poster that depicts their daily movement for every day of the year⁸. According to Fathom’s design as shown in Figure 2.11.1, each day of a person is drawn as a partly transparent area chart—where the horizontal axis marks the time of day, and the vertical axis represents intensity of activity⁹. This project helps Nike upgraded from a person’s wearing device into a social tool(Figure 2.11.2).

Areas of the poster with focus on colors illustrate more ingrained patterns and behaviors. As we can see, beneath each person’s fire-like activity profile, a series of charts breaking down daily and weekly movements and workouts. Therefore, it can be concluded that the top of the poster serves as a unique “fingerprint” of a person’s behavior, routines, and lifestyle, while the bottom portion offers a detailed summary of their year in hard numbers.

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⁸,⁹. https://fathom.info/yearinnikefuel/
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Figure 2.11.2

“Year in Nikefuel”,
Thousands of NikeFuel members shared their personal profiles.

Figure 2.11.1

“Year in Nikefuel”,
Fathom designed portraits of Nike+ users’ unique physical activity patterns.
Figure 2.13

“Microsite on E-Commerce”
Animated Infographic website for Swiss post to present various information and resources on e-commerce.
2.2.3 Storytelling that engages and explains

Storytelling visualization can help the audience to be guided through a narrative explanation and draw a specific conclusion about it.

It was reported that in 2015, the Swiss Post conducted YAAY studio with the idea of designing a website to offer various information and resources on the e-commerce. The microsite\(^\text{10}\) conveys the notion of e-commerce being more than just an online shop.

The medium of choice is a scrollable microsite (Figure 2.13) which can be realized in an innovative parallax or one-pager style. Short journalistic articles can be lengthened by employing infographics. The YAAY project face many challenges such as the interdisciplinary collaboration with journalists, the qualities of existing data, and the conception of powerful visualizations. Therefore, visual storytelling and content selection have become more critical due to the broad target audience including novices and experts. However, the ultimate goal is to make visitors get involved in the topic of e-commerce.

10. https://www.behance.net/gallery/33797548/Animated - Infographic-Microsite-on-E-Commerce
This project (Figure 2.14) is an interactive infographic designed by Column Five for Microsoft, which guides readers through a data heist anchored by data, and shows how prevalent breaches are. This HTML native site\(^\text{11}\) analyses the various stages of a company security breach from the hacker’s point of view. Highlighting the systemic weaknesses hackers look for most, the site symbolizes Microsoft’s solutions about how to avoid and overcome such gaps in security.

In addition to what visualization can provide, data storytelling also encourages the audience to get involved in the storytelling. Generally, there are two types of data storytelling: narrative and explorative. Both types need the audience’s engagement in it, but they also allow the viewers to take different approaches. Regarding the narrative one, it can guide the audience to a specific conclusion.

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11. https://cloud-platform-assets.azurewebsites.net/anatomy-of-a-breach/
Figure 2.14

"Anatomy of a Breach",
Column Five designed for Microsoft to show how prevalent breaches are
2.2.4 Storytelling for exploration

This project is conducted by Moritz Stefaner for FIFA. The FIFA Development Globe\textsuperscript{12} showcases FIFA’s performance activities. Due to the geometric abstraction of the world, the large number of events from all over the world and relevant background information about the FIFA development programs can also be accessed on the Globe.

The FIFA Development Division has conducted many programs and projects, but some of them have been condensed into four main areas: the Financial Assistance Programme, the performance programme, technical support and infrastructure projects. They have been put on a 3D globe (Figure 2.15) as colorful triangle based constructions, and they can also be filtered by their individual program types. The design of the Globe itself is based on an elegant geometric construction, and it reflects the country borders as abstracted geometry with an adaptive, recursive subdivision process.

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\textsuperscript{12} http://truth-and-beauty.net/projects/fifa-development-globe
Figure 2.15

“FIFA Development Globe”, Moritz Stefaner designed for FIFA showcases FIFA’s educational activities work
"Athenahealth",
Fathom created a visualization that shows how patients move through their healthcare network.
Fathom’s partnership with Athenahealth is another interesting case. In their cooperation, Fathom created a visualization demonstrating how patients move through their healthcare network. According to this visualization, more than ten million patient-to-healthcare interactions can be done in a single day. As explained by Fathom, Athenahealth’s services can be divided into four color coded parts: from the first office visit (purple) to a patient’s activity on the web portal (orange), to labs and order transactions (blue), and then to the processing of insurance claims (green). This graph depicts activity across their entire network.

As we can see from this graph in Figure 2.16, just above the panel, there is a progress bar to indicate the length of the visualization. On the right top, the structure control bar is designed to make the audience have a full view of the panel, thus presenting a mechanism for the user to navigate between the highlights.

Another project concerning branding is Your Better Life Index\textsuperscript{15} which was designed by Moritz Stefaner. Your Better Life Index was launched at the 50th anniversary of the OECD, aiming at comparing the world’s well-being affairs beyond traditional material measures like GDP. Moritz Stefaner\textsuperscript{16} was responsible for the interactive visualization of this new approach to ranking countries, which also provided the central theme for the branding of the initiative as a whole.

As the project indicates, users of Your Better Life Index can interact by putting different weights on the indicators, for instance, listing work-life balance as the most important indicator. And it can also be inferred from the graph (Figure 2.17) that the respective petal will become broader and more saturated, while the other petal is taken back a bit. If the influence of work-life balance on the total score will change, the ranking would also be changed. Thus, Your Better Life Index can help the OECD have closer contact with people to find out the topics the users are really interested in.

\textsuperscript{15} http://www.oecdbetterlifeindex.org/
\textsuperscript{16} https://truth-and-beauty.net/projects/oecd-better-life-index
Chapter 2. State of the Art

Figure 2.17

"Better Life Index", Moritz Stefaner designed an index for OECD to visualise and compare some of the key factors in world’s well-being.

How’s life?
Figure 2.18

“GE annual reports”, Fathom developed as a large-scale interactive touchscreen for the lobby of GE’s headquarters.

Tone

emotion

reason

Visual structuring

partial

overall

Highlighting

uncertain

direct attention

Narrative structure ordering

nonlinear

linear

Interactivity

no interactivity

free interactivity

Messaging

no message

heavy message
This large-scale interactive touchscreen is a cross-platform project created by Fathom\(^7\). For the lobby of GE’s headquarters in Fairfield. It aims to research 120 years’ worth of GE annual reports, covering the years from 1892 to 2011, in order to collect a great number of documents of the past as the reference for study.

\(^7\)https://fathom.info/reports/
Summary of category 1.  
**Storytelling in data-driven identity**

Use simple, aesthetic interest and curiosity to encourage engagement; use the generative pattern to create non-interactive icons. Less message added.

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<td>free interactivity</td>
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Summary of category 2.  
**Customized story**

Create tangible records of customized information; show the overall visualization, and allow user to contribute to it; provide narratives to guide the user.

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Summary of category 3.
**Storytelling that engage and explain**

Provide strong storyline to guide the user in scenarios without interaction; show relationships to preserve context, and indicate user progress; convey reason message.

Summary of category 4.
**Storytelling for exploration**

Support undirected exploration under an overall view by using modular components, make multiple references; provide opportunities to switch between narratives.
...rather than visualizing data directly, build the model first and try to visualize the data to the model, that is a general idea that has not (widely) been explored in visualization.... it can be extended to many other situations.

~ Moriz Stefaner
As it has been illustrated in the State of the Art, I have devised a taxonomy of storytelling visualizations to be applied in brand promotion in my thesis. By using a framework form for analyzing important storytelling dimensions, I found that in different branding contexts, the use of storytelling techniques is different, and it conveys different types of information in various ways.

In this chapter, my goal is to analyze and evaluate the storytelling taxonomy of these four different brand promotion categories, and to identify what kind of dataset are suitable for each category. Further to explore a common conceptual framework that can assist in the decision-making process of designing a visualization for branding, based on what types of data we have and what the focus the company want to advertise.
3.1 What is the branding goal, and what is the data

Different from other data-oriented visualization, branding visualization is a goal-oriented design. In order to design storytelling visualizations for brand promotion, the branding goal and the dataset, and the branding goal will be discussed first.

What is the goal. As I proposed in State of the Art, to explicitly present the purpose of different designs, I grouped and discussed those branding-driven visualizations into four categories. The categorization of these types manifests how the application of storytelling can have different communication goals and uses depending on what it conveys. The four categories are as follows:

1. Storytelling in data-driven identity
2. Customized story
3. Storytelling that engages and explains
4. Storytelling for exploration

In the following chapter, the four categories will be discussed as C1, C2, C3 and C4.

What is the data. After analyzing the related works, I found that most of the data used by Category 1 (storytelling in data-driven identity) and Category 2 (customized story) came from the customer’s data. These data often come from the company providing customer service, such as Uber, Airbnb, Hubway, etc. Therefore, I propose that designers can use the customer data to create a customization concept. Doing so gives the customer a sense of
reliance on the company by feeling their importance and being particularly cared for. Moreover, although the customized visualization various, they are all generated through a certain design system, so it can help to create a connection between people in the community.

Moreover, the data used by Category 3 (storytelling that engage and explain) and Category 4 (storytelling for exploration) came from the company's internal data, such as products’ data and working flow information. These data often come from the company that produces the product, such as Coca Cola, GE, etc. Therefore, I propose that designers can use the company’s internal data to create a concept of fact rather than a concept of fantasy in the traditional advertising industry. To achieve this, 1) visualizing story with credible data, audiences are more inclined to trust both the message and the brand; 2) the narrative should guide readers through, provide context, let them explore, and help them synthesize the data insight as effectively as possible.

But right now, many professional companies have both kinds of data, so it gives our visualization designers more room for experimentation, or even more explorations on the combination of these two kinds of data.

Figure 3.1
Storytelling framework based on what types of data we have and what the focus the company want to advertise.
3.2 A conceptual storytelling model

Concerning how to filter and visualize the data with storytelling, Dr. Pedro Cruz and Penousal Machado developed a conceptual framework for information visualization: generative storytelling. This framework aims to build various stories to convey the same fabula (“the raw material of a story”) from a given dataset. Their approach relies on an engine that transforms a fabula into a story. This engine consists primarily of two models (see Figure 3.2).

As Pedro Cruz and Penousal Machado defined, a fabula is as a set of time-ordered events caused or experienced by actors (P. Cruz and P. Machado, 2011). In the engine, the event model manipulates the time of the events, creating the story’s timeline. The event model processes the fabula events and triggers the respective actions. These manipulations not only can change the pace and rhythm but also can alter the chronology itself by introducing narrative devices. The action model deals with the representation of the fabula’s actions, implementing a set of actors’ behaviors (P. Cruz and P. Machado, 2011).

Figure 3.2

The generative-storytelling engine. The actors aren’t interpreted or manipulated by a model, so they’re unchanged by the fabula’s transformation. (Pedro Cruz and Penousal Machado, 2011)
Based on Pedro Cruz and Penousal Machado storytelling framework, I propose a new conceptual framework for brand promotion in this thesis. In terms of the fabula, I define it as “who produce the data”, so it becomes the dataset coming from customer or the internal company. In the engine, since not every data for branding is time-ordered, so I replace the event model with a structure model, which means it can manipulate the data by introducing storytelling structures. Correspondingly, the action model will deal with the data with different visualization techniques within the structure. Further, in order to increase its advertising performance, I add a part as the story tone, which symbolizes the visual expression direction. The outcome is the medium, I define it as the branding goal of the visualization.

As shown in Figure 3.3, a common conceptual framework is proposed. The framework can assist in the decision-making process of designing a visualization for branding, based on what types of data we have and what the focus the company want to advertise. Moreover, I propose this conceptual framework could be used to build various stories from a given dataset, then to support the brand promotion via various aspects or goals. To illustrate it, I build a series of visualization of two datasets by applying this conceptual model in the next chapter.
Data-driven Brand Communication

Dataset

Structure model

Condensed generative story

Time-ordered story

Slideshow story

Drill-Down story

customer data

company data
No interactivity, annotation, reduction and use spatial variables

metaphorically, aesthetically, emotional

None to less interactivity, annotation, visual highlighting, overall view

logically, timeline highlighted

None to less interactivity, annotation, tacit tutorial, animated transition, partial to overall view

fascinating, clearly organized

Free interactivity, annotation, overall to partial view, modular components, details-on-demand

logically, comprehensively
Chapter 4

First Experience with the Model

As discussed in the previous chapter, in order to utilize my storytelling conceptual model, I will build a series of visualizations that support the brand communication via various aspects or goals. Therefore, in this chapter, I will discuss what is the brand-communication goals, the data that will be used, how I will visualize it through the guidance of the framework I proposed, and discuss the outcome. To achieve the above, Hubway dataset will be guided through the storytelling conceptual model.
4.1 What is the brand value that Hubway wants to convey?

As introduced on its official website¹, Hubway is “metro-Boston’s public bike share program, with more than 1600 bikes at 160+ stations across Boston, Brookline, Cambridge and Somerville.” Hubway launched in 2011 and has become an essential part of our transportation network in Boston.

In order to find out what is the brand value that Hubway wants to convey, I searched “why join Hubway?” on its website. As shown in Figure 4.1, Hubway has five motivations for its customers: save time, save money, have fun, get exercise and go green. The first four motivations are more for individual benefits, the last one “go green” is beneficial both for individuals and the urban as a whole. In this chapter, I would like to emphasise on the brand value of “go green”, and communicate this value to the public.

The reason I choose to emphasise “go green” is mainly because of Hubway’s dataset and the company’s operation mode. In Chapter 3, I discussed two kinds of data that widely used in the brand-communication visualizations: one comes from the customers themselves and the

¹. https://www.thehubway.com/about
other one comes from company’s internal workflow. But right now, many professional companies that providing customer service have both kinds of data, such as Uber and Airbnb. And in most cases, this two kinds of datasets are combined together. Hubway also belongs to this kind of service providing company, its dataset has the potential to illustrate both the individuals and the whole system. In conclusion, “go green” is a good brand value to be tested with my model in its four aspects.

Figure 4.1

Screenshot from Hubway website. “Why join Hubway?”
4.2 How does Hubway promote its brand value?

Hubway is a technology company whose promotion method combines traditional forms of advertising such as posters, pictures, such as 5 million rides\(^2\) (Figure 4.2) and Hubway Map\(^3\) (Figure 4.3). At the same time, Hubway is also happy to share its data. Hubway is affiliated with Motivate\(^4\), and on the motivate’s website, it says “We’re data geeks. We rely on data to plan and assess every aspect of what we do. And we’re proud to share it with you too.” Here you can find public data for most motivate cities.

![Figure 4.2](image.png)

“5 million rides” shows Hubway’s achievement in the transportation network.

<table>
<thead>
<tr>
<th>Miles Ridden</th>
<th>Lbs of CO(_2) Reduced</th>
<th>Calories Burned</th>
<th>Gallons of Gasoline Saved</th>
</tr>
</thead>
<tbody>
<tr>
<td>9,206,649</td>
<td>6,626,551</td>
<td>395,054,024</td>
<td>1,721,460</td>
</tr>
</tbody>
</table>

\(^2\) [https://www.thehubway.com/5millionrides](https://www.thehubway.com/5millionrides)  
\(^3\) [http://maps-boston.com/hubway-map](http://maps-boston.com/hubway-map)  
\(^4\) [https://www.motivateco.com/use-our-data/](https://www.motivateco.com/use-our-data/)
Figure 4.3

“Map of Hubway” posted on the Maps Boston website.
Based on the concept of open data, Hubway also held several data visualization competitions. Most of these outstanding works are concentrated on the analysis of geographical variables, such as the analysis of trip duration\(^5\) (Figure 4.4); the location of the start/off stations\(^6\) (Figure 4.5). Both these two projects are winner in the 2017 Hubway Data Challenge. These visualizations are more like visualization tools and are more suitable for internal use by Hubway to make future strategic plans, such as where to add new bike stations, and how to reasonably allocate the number of bicycles stored at each station.

---

Hubway’s data is valuable and has huge potential. In addition to visualization tools within the company, can we use it to visualize brand values? In the next steps, I will use Hubway’s data (which is the same dataset generated the above visualizations) go through my model to produce a serial of visualizations to achieve brand communication.
4.3 Apply the Hubway dataset through the model

As written on its website: “It’s fun, efficient and affordable – not to mention healthy and good for the environment.” Undoubtedly, Hubway also regards “go green” as important brand value. To conduct Hubway’s “go green” value to the public, this project explores how storytelling visualization can be worked out with Hubway dataset. According to the conceptual model I proposed in Chapter 3, the outcome shows as Figure 4.6: four different visualization types to achieve four goals on various platforms.

By visualizing the customer data, it can not only give customers a sense of customization but also can help with building a eco-friendly sense in the city. To better display and use this set of data, I propose two groups according to the display platform. One is on the personal device to encourage customer “be the hero” by customized stories; another one is on the public advertisement to encourage customer “be a part of the local hero!” by engaging public into the city story as a whole. In the following article, I will explain in more detail how I create different visualizations under this guidance in these two groups.

It will use Hubway data\(^7\) from 03.2016 - 02.2017 in Greater Boston, it includes: trip duration/start time/stop time/start station/ user type/birth year/ gender/etc. from Hubway.

\(^7\) https://www.thehubway.com/system-data
Chapter 4. First Experience with the Model

Storytelling that engages and explains

Display on personal device

“Be the hero!”

Display on public advertisement

“Be a part of the local hero!”

Hubway data

condensed

generative story

time-ordered

story

slideshow

story

drill-down

story

customer data portrait

customized riding record

greenovation animation

urban riding timesheet

Storytelling in data-driven identity

Customized story

Storytelling for exploration

C1

C2

C3

C4
4.3 Be the hero!
- customized hero story

In this section, the aim is to create data-driven stories for customers and bring a sense of customization to them. My solution is to a customer-centric design for Hubway applications.

The application is the first platform for communication between brand and user. In order to present data-driven stories to users widely and enhance the user experience, my solution is to insert the story in the Hubway own mobile applications. According to the model, two structures could be applied:

1. Customer data portrait: convert customer’s riding process/data to a story through the application;

2. Data record: summarize the user’s riding experience as a customized story.

The storytelling experience not only allows customers to feel the process that they have become “a hero” with Hubway, but also encourages customers to share their experiences on social networks so as to reach a wider range of brand communication.

To tell a story, I explore the imagery of “go green” first. I propose that imagery is the key to translate data into a customer-understandable story. Imagery can better convey the brand value to the public.
The imagery of “go green.” Greenhouse gases mainly come from burning oil, gasoline from factories and cars and so on. Transportation generated more than 39.5% (2014) of the Greenhouse gas emissions in Boston. Government efforts to reduce greenhouse gas emissions are evident in Boston. Riding a bike a well-known way to reduce emissions, Hubway is a naturally fit for this theme.

In the Urban Tensions Hackathon 2017, I worked in a team with other two team members Liuhuaying Yang, Anqi Liu. Our team proposed that we could translate people riding durations into trees (this project will be discussed in the next section). The concept is to illustrate the carbon savings of biking in terms of how many trees it would take to generate the same savings (M Jiang, L Yang and A Liu, 2017).

Our team uses the total durations in Hubway dataset and average speed of a bike to calculate the customer’s total move distance (in miles) in 2016. Then, we used the total distance and vehicle average emission CO2 per mile to calculate total CO2 for that same distance in 2016.

After calculating, it shows:
4 hours ≈ 1 tree for one day
1 hour biking ≈ 5.98 trees in that hour

The formula behind is:

\[ \text{Duration} \times \text{Average speed of bike} = \text{total distance (miles)} \]

\[ \frac{\text{Total distance}}{\text{vehicle average emission CO2 per mile}} = \text{total CO2 emission} \]

Hubway reduced more than 135 tons of greenhouse emissions over the whole year. One tree can absorb 16kg greenhouse gas per day. To illustrate the “trees,” I created five types of trees by Adobe Illustrator (Figure 4.7). Although the size of these trees is different, we define them to stand for the same quantity of CO2 in the following visualizations.

Figure 4.7

Five types of trees stand for the same CO2 emission and carbon savings.
**Current Hubway mobile interface.** This section attempts to express the user’s riding data through visualization, so the first step is to discuss the existing Hubway data query interface. When users want to query their own riding records, Hubway offers two ways. First, it has its own mobile app. It can check the last ride and user’s all-time stats on the app, including the number of rides and total miles ridden. Another way is to log on the official website to query user’s riding records. This record is more detailed, in addition to riding time, Hubway emphasizes the brand’s value “go green” here. As can be seen from Figure 4.8, Hubway specifically describes the number of saving gasoline and reducing CO2 emissions each riding time.

---

**Figure 4.8**

User riding record on the responsive website.

<table>
<thead>
<tr>
<th>Last trip</th>
<th>My statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Start:</strong> Alewife Station at Russell Field June 8th, 2017 6:18 PM</td>
<td><strong>Number of trips:</strong> 1</td>
</tr>
<tr>
<td><strong>End:</strong> Alewife Station at Russell Field June 8th, 2017 6:38 PM</td>
<td><strong>Total usage time:</strong> 19 minutes 56 seconds</td>
</tr>
<tr>
<td><strong>Trip time:</strong> 19 minutes 56 seconds</td>
<td><strong>Distance traveled (estimated):</strong> 2.5 miles</td>
</tr>
<tr>
<td></td>
<td><strong>Gas saved (estimated):</strong> 0.1 gallons</td>
</tr>
<tr>
<td></td>
<td><strong>CO2 reduced (estimated):</strong> 2.0 lbs</td>
</tr>
</tbody>
</table>

[View all trips] [How are these numbers calculated?]
However, the customer’s riding data just simply listed on the current user interface, even on the responsive website which has more space for expression. Moreover, when the users using the product, that is, when they are riding a bicycle, the mobile application only displays a timer for real-time tracing (see Figure 4.9). However, this dynamic data could have a better expression, then to achieve the purpose of motivating users to use products more often.

**Experience with condensed generative story.** Based on the previously discussed imagery of “go green,” I tried to convert user riding data into a visualized tree and mapped it to the user interface. The first experiment is customer data portrait: convert customer’s riding process/data to the condensed generative story model to create a story through the application. The best way to achieve this is to let users see how their riding data “feed” his tree gradually. Based on this idea, I propose turning Hubway existing

![User interface introduced on Hubway’s official website.](image)
timer into “growth of a tree” will be more inspiring. The tree will grow up slowly due to the accumulation of each riding time, and the user can accumulate an integral tree after riding certain times. By this way, a riding target is set for the users. The benefit of doing so is motivating. For example, a user will be greatly encouraged to achieve this goal when the system prompts “only 15 mins left to plant a tree for Boston!” Secondly, users will get a sense of accomplishment in the use of Hubway.

According to the formula mentioned earlier, the amount of oxygen saved by riding for almost two hours is equal to the amount of oxygen emitted by a tree a day. Figure 5 is my prototype: A circle represents two hours of riding. Each small arc represents each ride. The longer the riding, the longer the corresponding arc length. For example, a half-hour ride is equal to a quarter of a circle. As the circle fills slowly, the tree in the middle circle will gradually grow up with the riding time. At last, two hours of riding will form a complete tree, representing the user to achieve the goal of “plant a tree for our city.”

First of all, I put the story of “feed a tree” on the Hubway mobile application interface instead of the location of the timer. Next, I discovered that this story could be better displayed on sports watches. Because the user will only take out the mobile phone to view the timer at the beginning and the end of the ride, so the user cannot view the process of “feeding trees” during riding. User test shows that users were involved in the story after I visualized this data on a sports watch. This UI shows on the next page (as Figure 4.10 and Figure 4.11).
Storytelling in data-driven identity
Although every tree is fed by two hours of riding, the user contributes different riding times and frequency to reach each tree, so the composition of the circle (i.e., the process of particular tree feeding) is not the same. The formation of each tree can be stored as a unique customer data portrait. Further, this generative data portrait can also be applied to create icons or logos, then to be printed on swags for brand promotion.
Experience with time-ordered story. The second experiment is data record: summarize the user’s riding experience as a customized story by conducting the time-ordered story model. From the data display on the mobile and the responsive website of the Hubway, it shows that all-time stats is a topic of concern to the user. Can we find more impressive ways to show user experience? I was inspired by Nike’s full-year data (Figure 4.12), instead of merely displaying a cumulative figure, why not show each accumulated experience of the user and sum up a story that can be explored?
In order to demonstrate the customized user riding story, I prototype the record shown in Figure 4.13. In this annual user data summary report, each line shows a ride. The dataset provided by Hubway records the start time of each user’s ride, according to this, each line has an endpoint connected to a specific starting time on the bottom 24-hour scale bar. The other end of the line is connected to a tree, and several lines connected to a tree stand as roots of a tree, meaning that several rides can “feed” a tree. The customer can view how many CO2 they saved and equal how many trees planted. To add more fun, I divided the trees into four groups according to the seasons, so that users can observe which season they ride the most, gain longest ride time, and in which periods of the day the user chooses to ride most in different seasons.

This artistic annual user summary will make users feel that every ride in Hubway contributes to the city eco-system, and every action is worthy of praise. In this case, each user can be a hero. This data visualization can not only intuitively convey the brand value “go green,” but also better motivate users to use Hubway more as a city hero. More importantly, such customized storytelling visualizations will be shared by users on their social networks, encouraging more people to join Hubway and become urban heroes. The user has actively become the platform for brand communication.
In this annual user data summary report, each line shows a ride. Lines are colored by four seasons.
4.4 Be part of the local heroes!
- aggregate everyone into the story

The previous section discussed the use of storytelling visualization in the user application. This section will discuss another structure “encourage everyone to be part of the local heroes!” For this purpose, I will treat the Boston data as a whole for visual processing, rather than just using the user’s data. According to my model, two forms of storytelling visualization will be tested: slideshow story and the drill-down story will be explored to achieve two brand communication goals: 1, storytelling that engages and explains; 2, storytelling for exploration.

**Experience with slideshow story.** The third model applied with Hubway data is slideshow structure. This storytelling framework provides a way allowing people to browse and gain insight quickly, mainly without interaction. Animations and videos are popular slideshow method in the advertising industry. But when we tell the story with the true data, the outcome could be more reliable and attractive - since it is produced by the real local citizens around us. It is the data-driven story.

The third experiment is a team project. I worked in teams of three, co-designed with Liuhuaying Yang and Anqi Liu. We designed, developed and implemented all in 3 hours during the Urban Tensions Hackathon. Then we were encouraged and decided to move towards to Hubway Data Challenge within 24 hours. I was responsible for visual design and participated in ideation through the whole design process.
Take the previous work further, this project puts the metaphor between biking and tree more directly. Our team coded a visualization that expresses the carbon savings of biking in terms of how many trees it would take to generate the same savings. To apply the slideshow structure into our design, riding time is calculated by hours. To inspire the city as a whole, we not only show how many trees saved by biking, but also show how many people ride a bike during that hour in Boston. We want to encourage people to ride bikes more than driving. For our green city, each person can join the Hubway program and do something. By joining Hubway, people don’t have to buy a bike and don’t have to maintain it.

In the first draft of the design, we hope that we can use the data to show how many people use Hubway bicycles in Boston, and the corresponding environmental effects of their cycling (the effect of “feeding trees”). In this design, for the public to understand our design more quickly, we decided to use the image of a cyclist and a tree and emphasized the experience of cycling. However, when we actually visualized the data, we found that the number of cyclists was huge, and the number of cycling varied greatly at different times. Unlike other data visualization, we did not convert numbers into geometric shapes. For example, we did not use small dots or circles to represent cyclists or trees. So this kind of realistic visual form made the screen cluttered (see Figure 4.15).

To solve this problem, in the second draft of the design, we decided to use the imagery of the cyclist as an icon, and use the bar chart and the specific number next to the icon to display the data represented by the icon. The first round of tests allowed us to discover that the tree’s image round of tests allowed us to discover that the tree’s image is suitable for random layout. Moreover, they create a visual effect of the forest when they come together.
This scene perfectly met the Hubway value of “go green” for the city. So we decided not to use numbers to simplify the tree’s data, but to show off their impressive “urban forest” effects directly (Figure 4.16). At the same time, a whole piece of urban forest can arouse the pride of the viewers. Besides, the image of a cyclist is a symbol of individual’s power, which means everyone can contribute to our city. This watching experience can encourage the viewer to “be part of the city heroes!”

We interviewed some people to get feedback from this untraditional data visualization. We expected them to understand the expression of data and the relationship between biking and trees. We found that it helped a lot when we highlighted the numbers and the accumulation of time instead of showing a group of cyclists images. It shows that this combination of artistic imagery and number attracts interviewees and provides reliable numbers to them at the same time.

In order to achieve the best aesthetic results and working
efficiency for visualization, our team decided to make all the dynamic components into SVG, and then use coding to paste that SVG on the screen. To do this, I made all the visual parts in Adobe Illustrator: five different forms of trees, the image of a cyclist, a summary bar chart showing twelve months of cycling data, and all the static background as a whole piece of artboard. My amazing teammate Liuhuaying is responsible for data aggregation. She efficiently set up a visual framework simultaneously when I was creating the visual elements. The framework allowed SVG been pasted on the screen according to our prototype quickly. This sharing-tasks working method allowed us to maintain delivery at a standard time so that we can produce resources for trial and debugging throughout the entire process. I learned a lot in this efficient collaboration, and I think that this type of cooperation can be applied to the process of making other slideshow visualization. Because by this we can achieve effective communication and delivery in such a limited time. Moreover, modification on SVG and debugging can be completed most quickly during the process.

Figure 4.15
Urban forest with highlighted number accumulation.
Because this is a non-interactive data visualization, it can be considered as a traditional animation advertisement that can appear on various public platforms, such as outdoor screen, or advertisements on web pages. However, unlike traditional animations that consume a lot of time to produce and hard to make changes, data-driven animations are made faster - we complete the animation in three days, and more importantly, when the data changes, the corresponding animation changes automatically. This is one of the greatest advantage of data-driven brand communications.

In terms of display platform, in the mockup picture of Figure 4.17 shows the screen is recommended to be built in public space. The no-interactivity screen works as a normal advertising, but provides dynamic attraction and strong storyline to guide the user in scenarios without spending time on interaction.
Figure 4.18

The slideshow structure, an educational animated display.

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**GREENOVATE**

Hubway is Boston’s public bike share program with 1,300 bikes and 190 stations across Greater Boston area. People used Hubway more than 66,000 times in 2015. This reduced more than 125 tons of greenhouse emissions over the whole year. One tree can absorb 11kg greenhouse gas per year. One day Hubway = plant 11 trees.

One day Hubway = plant 11 trees.

Loading... please wait

**GREENOVATE BY CYCLING**

Hubway is Boston’s public bike share program with 1,300 bikes and 190 stations across Greater Boston area. People used Hubway more than 66,000 times in 2015. This reduced more than 125 tons of greenhouse emissions over the whole year. One tree can absorb 11kg greenhouse gas per year. One day Hubway = plant 11 trees.

Mar 3, 2019

Rides 70 = Trees 136 in 16:00 Thursday
Experience with drill-down story. Thanks to the transformation of the modern journalism industry, data visualization has received a lot of exposure within among public in recent years. The ordinary people become more and more curious about data visualization, and their interaction capabilities are getting higher. This trend gives our designers the opportunity of using data visualization to allow the public to explore information and achieve the goal of brand communication.

In order to stimulate the public desire for exploration, the fourth model applied with Hubway data is drill-down structure. This storytelling framework provides a way allowing people to explore their interests with interaction to gain insights. Although we are in a data-based society today, visualizing the data by simply spread out numbers does not inspire public curiosity. So we need to relate the data with shared memory that all people know about the city. Boston has various extreme seasons and the temperature difference between day and night is also very high. Based on this common memory of Bostonians, time is introduced as an important latitude to show the Hubway data in this project. As a result, all citizens are connected with Hubway in this visualization project.

In state of the art, I analyzed this drill-down storytelling structure: other than using a slogan to promote the brand in the beginning; it revealed the value of the brand in the process of encouraging users to explore. For example, in the “Anatomy of a Breach” Column Five designed for Microsoft. It first guides readers through a data heist

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Anatomy of a Breach
https://cloud-platform-assets.azurewebsites.net/anatomy-of-a-breach/
and shows how prevalent breaches are. Then tell readers what is Microsoft’s solutions for security. Such storytelling structure will not let users to feel be exposed to the advertising environment at first, but to investigate according to their preferences, to generate ideas during the process of exploration. So I decided not to emphasize Hubway brand, but tell the user that this visualization produced by Hubway dataset in Boston from 2016 to 2017. Since exploration allows users to spend more time initially, I decided to add another brand value: “get exercise” (Figure 4.19) with the previous one “go green.”

Figure 4.19

Get exercise with Hubway.

Why join Hubway - Get Exercise
https://www.thehubway.com/how-it-works
This is a project I co-designed with one of the designers from previous project Liuhuaying Yang. It has been awarded Longlist by Kantar Information is Beautiful Awards 2017. In order to find an interesting way to map the data by time as an abstract form, we tested two kinds of time ordering.

The first test is the distribution of biking duration by day: we nested the data by duration in months after removed the duplicated durations in each month. Each dot represents one duration and colored by season. The x-axis is a linear scale of the time, from left to right is 00:00:00 to 23:59:59. Y-axis is a linear scale of duration, from bottom to top is smaller to largest (Figure 4.20).

The second test is the distribution of rides by day: we nested the data by the hour in the day after removed the duplicated trips in each hour. Each dot represents one group of rides, and the size of the dot represents the count of rides (Figure 4.21). The x-axis is the date, from left to right is Jan 1st to Dec 31st. The y-axis is the hour of the day, from bottom to top is 12 AM to 23 PM. Then we applied a linear scale of color (red is small, blue is large) to the dot by the average duration of that group. It can tell that blue dots mainly locate in the center of the screen (Figure 4.22). In order to avoid approximate color, a dark background will be applied later in the final view.

This project is on Kantar Information is Beautiful Awards 2017 Longlist
https://www.informationisbeautifulawards.com/showcase/2293-mapping-the-timesheet-of-urban-cycling
Figure 4.20

Test 1: Distribution of biking duration by day

Figure 4.21

Test 2: Distribution of rides by day

Figure 4.22

Test 2: Distribution of rides by day, after applied a linear scale of color
After the two tests, we found that data pattern various by the hour, weekday and weekend. By the hour, we could see the peak time over a day. By weekday, we could see that fewer rides with longer average duration on weekends while weekday is on the contrary. Then, we decided to combine the case one and case two (Figure 4.23). The dot represents the rides, and the size of it represents the total of rides, and the color represents the season. The x-axis is the day, and the y-axis is the hour. After color trials, we replaced the color by season with by average duration. We tried different color scale for filled color and stroke style. Finally the dots fits well with the dark background (Figure 4.25). Each dots stands for individual participation, the mapping of cycling timesheet shows all the heroes in the city.

In terms of display platform, the mockup Figure 4.24 shows that the touchscreen is recommended to be built in public space where there is a large waiting crowd. It is a touchable screen is free for people to play with. This promotion is not to tell people what to do directly, but to draw their own conclusions through the exploration.
Figure 4.25

The drill-down structure, an explorable timesheet of urban cycling.
Chapter 4. First Experience with the Model
Data-driven Brand Communication
Chapter 5

Conclusions

The goal of this thesis is to explore the role of data visualization in brand communication. In particular, how to use data in a variety of storytelling ways to achieve different brand promotion purposes. Although the advantages of cooperations between data visualization and brand communication have gradually emerged in recent years, this is still a relatively new field. I hope that this paper can provide designers with more thoughts and discussions in this direction of data visualization and that they can extend the data visualization to more fields in the future. The news industry has made a good example. I think data visualization also has the potential to be a huge success in the business area.

In state of the art, many excellent cutting-edge works demonstrate the feasibility of data visualization in brand promotion. In this regard, I extracted a matrix for evaluating storytelling characteristics, used this matrix to evaluate the design of various visualizations, and summarized how these visualizations helped the brand promotion. In this section, I was more tend to discuss the visibility and opportunity of data visualization in this area, and summarize a taxonomy of storytelling in brand communication with
four categories. Although this is only a rough classification, I hope it can inspire designers to explore more space and feasibility of the cooperations between data visualization and brand communication.

Through the analysis of state of the art, I came up with a storytelling model. The model works like a decision tree, in which the framework guides the dataset through different storytelling structures to achieve different brand communication goals. According to this framework, designers can get a rough visual structure. This rough visual structure can guide the direction of this set of data visualization. For example, in this thesis, I discovered that Hubway data could be used to classify two significant categories of visual work, one for the application user and the other for the broader public group. At the same time, I think this storytelling model can better link designers and developers so that everyone can reach a consensus faster. And in the early stages of idea generation, this model can provide designers and client with an excellent communication platform to discuss the potential of data.

In the chapter of the first experiment with the model, I found that if we want to generate different brand communication, we need first to distinguish the objects of communication. When the object is concrete, we can then classify the data in more accurately. For example, in this article, I use data generated from Hubway users. And there are only three variables that I used in the dataset: user ID, riding duration and start time. When the communication object is one specific user, I need to extract the riding duration and start time of a particular ID to customize the design; When the communication object is public, the entire dataset will be used.

Moreover, I found different scenarios suitable for different storytelling methods. Based on this, these storytelling
data visualizations are ideal for different platforms. For example, when the brand’s communication target is an individual user, in order to stimulate the user to use the product more, the visualization can be displayed on the App and combined with the user’s experience with the brand. And this visualization is aesthetically pleasing and can provide users with a sense of accomplishment. This encourages users to share their riding records on social media, thereby turning the users themselves into ambassadors of brand communications. When the brand communicates with the public where most people have not used the product, the visualization can be displayed on outdoor monitors. And in the fast-passing space, it can play as an animation, and in the waiting space, it can be an interactive display.

At the same time, in the experiment, I also discussed the benefits of data-driven brand communication. Some of the benefits are: (a) it can provide a more customized design so that users can get more satisfaction. (b) readers can be encouraged to explore the data so that readers can gain their brand insights, and such insights are more deeply rooted and impressive. (c) data-driven brand communication and traditional advertising are not the same. When the data changes, data-driven animation or visualization can be automatically updated. Instead of spending a lot of labor and time cost to organize all raw materials again as the traditional way.

Since the outcome of slideshow-story visualization may have similarities with the results of the traditional advertising animation, I would like to discuss the superiority of the data-driven visualization design process. When the ideation stage is done, designers and developers can work simultaneously. For example, a designer can make all the elements into SVG, and developer programs a framework for pasting SVG. This sharing-tasks working method
allowed designer and developers to maintain delivery at a standard time so that they can produce trials and debugging throughout the entire process. This working method can also carry forward the communication between brand merchants and the designers.

However, it is worth noting that the decision-making model presented in this thesis does not apply to all companies: the difference in data content will lead to limitations and impact on the results of the visualization outcome. For example, some companies only have data on the internal production or data on operations, so there is no user or customer data that cannot be disclosed. In this way, the first two storytelling structures on customization cannot be applied. Companies such as Hubway, UBER, and Airbnb are fortunate that company operations data includes, or itself is customer data, so these four storytelling structures can all be applied to the brand communication purpose.

Another issue worth exploring is the public’s understanding of the data. As Alberto Cairo said, the public need to be more educated about how to read the information visualization, therefore, how to make the visualization for brand communication more easy-read and easy-understood for the public is indeed an issue worthy of our attention. In my first experiment, it is evident that the visual system for the first three visualizations is different from the last one. The first three used the imagery of the tree to generate public interest and aesthetics, and it also made it easier for the general public to read and understand. The last visual visualization (storytelling for exploration) is more in line with “data visualization” in the traditional sense. Its advantage is that it contains a lot more information and it looks more scientific and reliable. The disadvantage is that for the general public, it takes time to understand, although it seems cool at first sight. At the
same time, based on my exploration and practice, I found that it is not easy to unify the four storytelling forms with the same branding visual system. It is worth exploring in the future works.

Finally, although “data-driven” is now a trendy word nowadays, the privacy of data is also worth concerning. Are personal data collected when they are aware of it? Is data used with permission? For example, in this thesis, Hubway customer data can only be discussed under the assumption of “authorized use.” However, in real life, many personal data are used without knowing. When people are immersing in the enjoyment and convenience of “personalized” and “customized” brought by modern technology, personal data privacy is also less and less protected. Moreover, many “data-driven” technologies are gradually blurring the boundaries between personal data and public data. Perhaps this is the future trend, but it is also worth discussing who will regulate data privacy, and how to ensure the transparency of data collection and processing process.


