Visualizing the spatiality in fictional narratives

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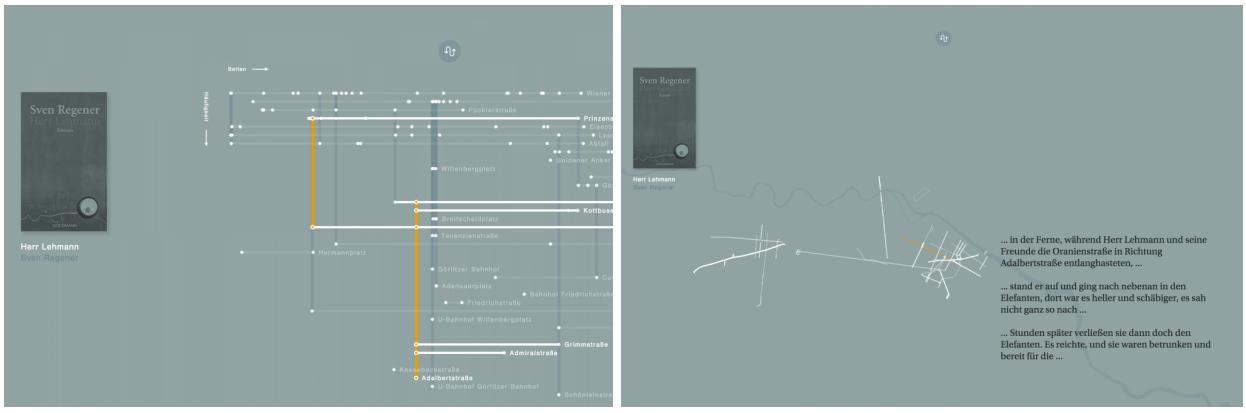

Fig. 1. *Novel City Maps* visualizes spatial structures in fictional narratives as transit maps (left) and weighted street layouts (right).

Abstract—This work is part of ongoing research on the visualization of spatial relationships in fictional works. Our aim is to arrive at aesthetic representations of fictional narratives set in actual places such as cities. *Novel City Maps* offers two map views, one inspired by transit maps and the other by conventional street maps. The former uses the aesthetic of abstract transit maps to reveal the co-occurrence structures between important places in a story. The street map view is designed as a spatial fingerprint of a novel by highlighting the places occurring often in the story.

Index Terms—Literature, geo visualization, digital humanities, information visualization.

1 Introduction

As the humanities are experimenting with algorithmic and data-driven methods, information visualization is receiving considerable attention as a key analysis technique. Many humanists express hope—and some even euphoria—about the different forms of enquiry that information visualization may support. Complementing the hermeneutic approaches of traditional humanities scholarship, visual analysis can offer alternative ways of interpreting the patterns and structures latent in literary works. The information visualization community is recognizing this potential for research in considering the unique tasks and datasets involved in the humanities. A recent survey of visualizations for textual data has already demonstrated a plethora of visualization techniques and tools for linguistic and literary scholarship [2]. On the one hand, visualization environments may provide a wide range of generic representations [4], on the other hand, bespoke visualization designs can reflect the particular structures of literary works, for example, to particular facets of literature anthologies [1] or the rhyme structures of poems [3].

While information visualization could be regarded as a quantitative, empirical method, visualizations of literature and poetry hint at the aesthetic potential of visualization. For example, TextArc, an early visualization of text documens arranged words within a circle according to their position in the text and adjusted the size based on their frequency [8]. While intended as an analytical tool, the resulting visualization evokes its own unique aesthetic, which was only later picked up by the proliferation of tag clouds [10]. Artistic visualizations of poetry and literature rather serve as aesthetic engagements with the represented works and often provide purely visual representations of textual narratives [11, 12]. We are interested in exploring these more qualitative opportunities by focussing our efforts on the development and investigation of possible spatial representations for works of literature. This focus on spatial aspects in fictional works relates to the macro perspectives on English literature that Moretti has used to promote the concept of distant reading [5]. Recent visualization projects on mapping fictional literature set in real places reveal the spatial distribution of books, allow for search and filtering [6] and highlight the challenge of exposing uncertainties [7]. In this project we are less interested in spatial analysis of fiction to arrive at absolute truths [9], but rather we aim to uncover the latent spatiality of fictional works to create alternative ways of reading and thus experiencing a story using city maps and, vice versa, creating ways of reading a city using fragments of a story. Spatiality serves as a starting point for alternative kinds of aesthetic representations. These alternative views give rise to new kinds of questions, such as: How do impressions of a city perceived in fiction change depending on author, time, and narration? How do spatial and narrative structures interweave?

Novel City Maps[1] is an attempt to visualize the spatiality and its relation to the story in Berlin novels in the form of geospatial maps that originate from the complex tissue of the underlying stories. For the current prototype, three popular Berlin novels have been selected that each present a distinct view of the city at different times of history: *Berlin Alexanderplatz* by Alfred Döblin (1929), *Alone in Berlin* (German: *Jeder stirbt für sich allein*) by Hans Fallada (1947) and *Berlin Blues* (German: *Herr Lehmann*) by Sven Regener (2001). The novels vary widely in terms of themes, style, and narrative

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[1] Web-based demo available: https://uclab.fh-potsdam.de/NCM/

features that the authors have employed. Considering the many radical social, economic, and political changes and developments the city has been subjected to in the last century, the city of Berlin lends itself particularly well to a spatial literary analysis. In the following we describe the design of the visualizations and elaborate on possible directions for future research.

2 Novel City Maps

The design of *Novel City Maps* takes inspiration from quotidian maps that are in daily use around the world: one for transit connections and the other for finding one's way in a regular street layout. At a closer look it becomes apparent how these maps are not just of cities, but rather of a city as represented in a novel. Our aim was to reinterpret the aesthetic of conventional city maps and subvert their purpose not to aid access to the city, but the story itself.

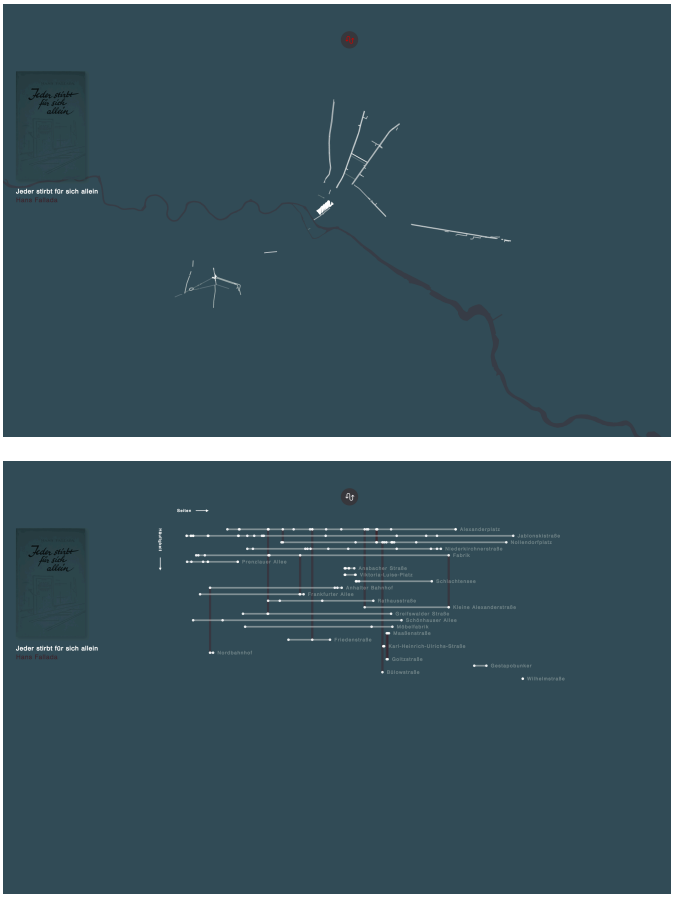

Fig. 2. The narrative view (bottom) visualizes the connections among places based on near mentions, and the map view (top) provides a spatial fingerprint based on the overall mentions of places in the novel.

2.1 Two views

The *narrative view* shows all the mentions of places in the respective novel and draws connections between the places that are mentioned in conjunction in paragraphs. The graphical system is a reminiscence of the typical transit map and brings to attention the movement of the story and often sudden change between places in the narrative. A given street, square, or any other site is drawn as a line. The horizontal axis corresponds to the narrative time of the novel. The earlier the line starts on the left, the earlier it is mentioned in the book. Each mention in the book is represented as a dot akin to a transit stop, where one can change lines. Whenever multiple places are mentioned in the same paragraph connections between these places can be uncovered by hovering over the respective dot, which also reveals the specific text fragment represented by this dot. Hovering over line segments highlights all other lines representing those places co-occurring with the respective place.

In the *map view* the reader is presented with a geographical display of the areas that are prominent in the story. Only streets and squares that are mentioned in the novel are displayed in the map. Those places that are more frequent appear brighter, resulting in a unique spatial fingerprint of the novel. For example, for *Berlin Blues* we can see two little islands in west Berlin neighborhoods Charlottenburg and Kreuzberg, where most of the plot is set (see Fig. 1, right). Since the story takes place during the 1980s, when the Berlin wall was still up, the eastern part is practically non-existent on this map. The river Spree is drawn for orientation, but otherwise the map is kept intentionally plain to allow the reader to focus on the spatial structure of the novel. Hovering over any street element brings up story fragments mentioning the respective place.

2.2 Fictional and real places

While we can identify certain "islands" in the map view that reflect areas, where parts of the plot are situated, in the narrative view we are presented with the connections between these "islands", the paragraphs where these locations co-occur. This co-occurrence often hints to a connection of locations based on the plot.

By transforming and in that way comparing the views, we get an impression of the relativity of the spatial representation. We are used to the geographical display of locations and spatial relations using maps as an essential part of our culture. When reading fiction, though, our mental model of a city often diverges quite fundamentally from the geographic basis, especially, if authors construct and invent new places and weave them into a plot that contains both: fictional and real places. *Novel City Maps* proposes an alternative view on the spatiality described in fiction.

As an example we can identify two outstanding areas in the map view for "Berlin Blues" by Sven Regener. While the West-Berlin neighborhoods Kreuzberg and Charlottenburg reflect the two main stages of the plot, we are not able to find out, how they are connected in the plot. Instead, we can turn to the narrative view to analyze the relationship between these locations. Here, we can observe that "transit lines" of several places in these two districts are connected. When hovering over these places and reading the paragraphs, we learn that the protagonist Herr Lehmann is on his way from Kreuzberg to Charlottenburg to welcome his parents, who stay in a hotel there. Since he usually does not leave Kreuzberg, this trip is quite an inconvenience to him and readers participate in the protagonist's misery in this unfamiliar territory.

2.3 Data corpus

After a few unsuccessful attempts with the tools Stanford NLP and OpenNLP to apply Named Entity Recognition to extract place names from the three novels, we decided to pursue a manual approach. Being no experts for NLP, we suspect two things responsible for the low recognition rate: 1. The German language models were not really suitable for our texts 2. Places mentioned in the novels don't exist anymore or with different names, respectively. Since we also wanted to consider places like bars, institutions, shops and the like, we figured a manual analysis is the only safe way of receiving a complete picture of the spatiality in the novels. We used the Stanford POSTagger to extract all nouns and proper nouns and went through this list manually to tag locations. Checking the recognition rate for one novel we were very familiar with, we had the impression the tagger is sufficiently reliable.

3 Discussion

With *Novel City Maps* we intend to explore new ways of visually representing the construction of fictional and geographical space in literature. We have exhibited the visualizations during a one-week

exhibition in Berlin, during which preliminary feedback has already suggested the benefit of the visualizations for identifying patterns of relations between locations mentioned in close proximity in a text. The transit map metaphor seems to be hard to interpret without further explanation. Several visitors immediately associated an actual movement in the plot with the transit lines and a change of places, where the intersections occur. An integrated introduction into the visualization could be a way of enhancing understanding. The map view helped people immediately recognize islands on the map, where parts of the plot are located. In some cases, when viewers were familiar with a novel, they could recite the actual passage that describes the place. We are further interested in exploring the effect of the visualizations on a reader's perception of the story and its places. In the following we reflect on possible directions for future research.

Each fictional text produces a distinct map that can be compared with other *Novel City Maps* of a particular city, the importance of places and locations and their connection becomes visible and the influence determined by story, author, time and other factors becomes accessible to visual analysis. It would be interesting to focus on these factors individually and in that way being able to isolate their influence, for example by analyzing and representing more Berlin novels from the same time. On a larger scale, a comparison of multiple novels set in different cities seems to be promising. Extending it to larger corpora would inevitably require making use of Named Entity Recognition though, carrying with it the trade-off of missing mentions of implicit places.

The visual depictions of the stories might help interested readers get a better sense of the spatiality in novels. Readers are put into the position to explore and read a novel "by the map", i.e., by the mentioned locations and their connections. The views may also help people already familiar with the novel to gain a new perspective and possibly a deeper engagement with a book on the one hand, while on the other hand it might also convince people unfamiliar with a book to read it because they have a connection to certain locations or are interested in the particular spatial patterns a novel generates. Scanning the different map views could also be seen as an alternative way of flipping through a book.

During the workshop we would like to explore the intersections between academic and aesthetic pursuits of visualizations for both research and reception of literary works. Following previous attempts to generate artistic interpretations of literary works, we are interested in expanding the space for aesthetic analysis.

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