Explaining Events to Computers: Critical Quantification, Multiplicity and Narratives in Cultural Heritage

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Abstract

Digital Humanities provide the means and methods to research topics in a transdisciplinary and multilayered way. In this paper we combine perspectives from historical research and literary criticism to problematize the categorization, computation and representation of events in cultural heritage. Combining methodologies of narratology, historic research and Digital Humanities we aim to extract, classify and quantify events in a way that preserves their inherent multiplicity and multivocality. In two case studies we exemplify that narrative may be seen as a means to mediate events rather than a classical media-centred tradition to preserve an authorized version of cultural heritage.

1. Introduction

"History is not what you thought. It is what you can remember. All other history defeats itself." (Sellar and Yeatman, 1930)

Sellar and Yeatman's 1066 and All That is a tongue-in-cheek parody which sends up a (perceived) preoccupation in the British education system of the pre-Second World War period with iconic historical events, including the Battle of Hastings of 14th October 1066, when the Norman army under William I ("The Conqueror") landed close to the modern town of Battle, and defeated the Anglo Saxon army under Harold II.

This view places the event at the heart of discourse. Many humanities disciplines remain fundamentally concerned with events, their interpretation, and their description. It follows therefore that narrative, as the primary means of making events meaningful, is key to the way in which information becomes knowledge in the humanities; and therefore has a fundamental role to play in the definition of how an "event" should be defined in those domains. Until the emergence of the ubiquitous World Wide Web, most narrative in humanities communication was mounted almost exclusively in text. In this paper, we review recent discussions of how web technologies have changed the way narrative events are formulated, described, connected, received and transmitted in humanities discourse; and explore how an "event" that is "meaningful" from a narrative point of view might be described as structured data, rather than in text. We also consider how this approach might be used to support multivocal narratives. The study itself is explorative and sometimes even experimental. It thus follows more than one research question. We focus on nevertheless how multiplicity and multivocality in the narration of events is represented in traditional and non-traditional narrative media. Is there a difference in value between the narration of events in textual representations and in other forms of cultural objects, such as monuments and landscapes? We therefore have to ask how events can be made machine readable and how they can be evaluated in terms of narrativity.

There is a growing recognition that narratives do not have to be "told" in the textual medium, or at least by text alone. A museum exhibition, for example, might present the narrative of how a particular class of object, such as a pottery typology, develops over time and across space, either through emphasising the artefacts as linked entities rather than their physical attributes (upon which conventional approaches to museum display rests) [Cuno 2008], or through the cultural elaboration of museum spaces themselves. The role of maps as instances of geographic and cartographic narrative has been extensively explored in recent years [Taylor and Caquard 2005] [Caquard 2011], as has the curation and presentation of heritage spaces [Azaryahu and Foote 2008]. Archaeological sequences have been explored as narrative memes [Hodder 1993], as has their interpretation as ways of telling the stories of

the past [Pluciennik 1999]. All of these approaches take as their starting point the definition (and distinction) of events, and how they are rendered meaningful through contextualisation with one another. It follows that events can be told through various media in various ways.

However, one key aspect that they do not address is that of multiplicity or multivocality. Each approach, to one degree or another, applies the textual paradigm of the single author, the single narrator, the single point of view -- whether this be the author of an historical treatise; the framer of an archaeological sequence (as reported through the authorship of an archaeological report); the curator of a museum collection; the designer of a museum space, or the designer of the visitor infrastructure of a heritage site. In each case the analogy of multiple authorship can be applied; however, in such cases any joint responsibility for the narrative is funnelled through a single point and platform of authorship: the narrative is "authoritative", produced in a top-down (or rather centre-out) manner, and its coherence relies on these attributes.

In the 1990s to early 2000s, the "operationalisation" of narrative as a process by which events are made readable by machines tended to concentrate on hypertext, and the possibilities for readers to use its affordances to reorganize text according to their own expectations and requirements.The inception of Web 2.0, which can be dated to approximately 2007-2009, promised a multivocal platform for narrative expression; and it can be said that the mooted possibilities of hypertext as a vehicle for multiplicity have not been realised (much the same can be said in the present day of blogging and other social media). This is for two reasons: firstly, the use of hypertext to link one part of one document to another still relies on the single-authorship model: one user makes one decision to select one part of one document, and link it to one other. This is closely related to the second reason, namely that since 2007-2009, focus of linking material online has shifted away from the hypertext web to the semantic web. The latter implicitly rejects the notion of multiplicity, and concentrates instead on linkages between monovocal information, structured into data according to predefined schemata. For the study presented here, two approaches to the phenomenon of eventnarration are of particular interest. First, we hypothesize that there can be multiplicity and multivocality even in single-author narration. Second we state that one single event can be narrated in multiple ways.

By comparing narrative models arising from a) factual and fictional text about crime in twentieth century Hamburg and b) the curated monumental and archaeological space of Hadrian's Wall, we argue that web-readable data structures gives humanists the means to look beyond text, and the analogies of textual paradigm that are applied to non-textual narrative of the kind described above, to provide multiple insights into events, as well as the process of research itself. Instead of following a single research hypothesis, or a "single authored" narrative, digital narratology can explore multiple research data, told in multiple voices from multiple sources. This reflects the truth that through innovative research settings in collaborative work, re-usability of research data or citizen science projects often come up with more than one possible interpretation.

2. Narrative and historic events

The possibility of viewing events in cultural heritage as data equating to narrative elements rather than as text opens up the possibility to analyse them from multiple perspectives. However, in past decades, they have often been delivered or distributed in textual form, or as narratives following the traditions and parameters of textual delivery, which means that even though alternative modes of narrative communication, such as oral storytelling, might be an important means of delivery, there are still "authoritative" ways of producing historic narratives, for example, by museum curators. In order to build up databases of narrative events, one possibility is to gather as many texts on them as possible and to extract the most significant events from them in a quantifiable way. As historic events are often represented in different kinds of sources - fictional and factual texts as well as representations in different media, installations in museums or performances - it is helpful to use the term "event" in a transdisciplinary way in order to find an apparatus of tools to extract individual events from those

sources, put them into a database, and give them attributes according to narratological traits such as tellability and meaning. This allows us to accommodate multiplicity and multivocality. The term "event" has very specific meanings in narratology and history, and it is to those that we now turn.

The importance of events in narrative studies is undoubted, although there are slightly different definitions of the term in different traditions of analysis. In a broad sense, the term, or similar terms, is used (for example) to explain why people tend to tell stories in general, such as in disciplines like sociological narratology or cognitive narratology; rhetoric and literary criticism events play a central role in theories about storytelling and interpretation techniques as a fundamental part of human meaning making [Ryan 2007]. However, in linguistic approaches to narrative, the term "event" is more quantitative, referring to the smallest element of stories. Our approach here requires that we encompass both these traditions.

In rhetoric narratology, the core definition of narrative is "somebody telling somebody else on some occasion and for some purpose(s) that something happened" [Phelan 2007]. In this definition, the happening or event is the central necessary condition for the rhetorical act. A similar notion of event as the motivation of storytelling can be found in literary studies [Martinez and Scheffel 2009] and also in anthropological approaches to narrative [Ochs and Capps 2001]. The ambiguity of the term is stressed not only by the initiation of a story but also the smallest element of action, and thus also of the plot [Martinez and Scheffel 2009] [Meister 2013]. On one side we thus find a notion of event as being something which is closely linked to the act of storytelling, or more precisely the tellability, or "that which is worth telling" in an event. The more structure-orientated perspective on events starts with the definition of a single event as a change of state. A number of single events is organized according to the parameters of time (such as frequency, duration and order) to build an action. A number of actions is organized to build the plot. In this article we focus on events which are linked to motivation, and thus to the tellability aspect of storytelling. Nevertheless it is important to keep the ambiguity of the term in mind, which has also been the object of important narratological research.

In narratology the double meaning of the term event forms the basis of a distinction between two types of events, referred to as Event I and Event II [Hühn 2014]. The first of these refer to the "smallest element" of story in literary terms, and are defined as change of state. The second is the motivation of the story, and is broadly outlined by describing several conditions that it has to fulfill (although not all of the conditions must be fulfilled). Both types of event are found to have certain properties, such as having an inherent motivation [Martinez and Scheffel 2009], being presented in a certain mode of narration [Bonheim 1982], being at least indirectly attached to space through the characters involved, and having an ontological status in reference to the story world [Ryan 1991]. But only Event II has been characterised with six conditional properties being:

1.   relevance for the storyworld,

2.   unpredictability (what cannot be foreseen by the characters of a storyworld),

3.   irreversibility (again the term refers to the storyworld - death usually is irreversable, unless it occurs in a fantasy storyworld where the dead may return),

4.   non-iterativity (something which results logically from an event is not eventful in itself - If somebody rings a bell, pushing the button will be an event but the ringing resulting from it will have no eventfulness. If somebody pushes the button in order to ring a bell but then hears someone shooting rather than hearing a bell, this would have some eventfulness as it is non-iterative and interrupts the order of the storyworld)

5.   effect (if we stick to the shooting example, the effect on the storyworld will be high if a main character gets shot, so this would be considered a highly eventful event) [Schmid 2008]

6.   script violation, an additional term introduced by Hühn as a condition of tellability, which classifies events which do not follow usual cultural procedures (there is, for example, a cultural script for visiting a restaurant which tells us to follow certain steps such as entering, greeting, being led to a table, checking the menu, ordering, testing wine, and so on, so again if the waiter suddenly turns around and shoots one of the characters, this would be a script-violation and therefore eventful) as highly tellable [Hühn 2008]. These conditions have been termed eventfulness. The conditions are scalable, e.g. a more or less relevant event is stated as more or less eventful. In addition to that, an event can be more or less eventful in relation to its context [Hühn 2008], a fact that will be clearly proven by the following case studies.

Following the ideas of relativity and multiplicity developed above, we propose to use the term "eventfulness" in relation to two questions; and thus to explore whether these types of event can be categorised in such a way as to support a multivocal discourse in humanities contexts, while maintaining the attributes of tellability, contestability and reproducibility that are essential to scholarship. First, we ask whether or not a condition of eventfulness is fulfilled, and second, whether it is found to have a lower or higher value of that condition, according to its contextualization. By doing so we open up an interpretive field in which each single event may be analysed according to each of the conditions of eventfulness and tellability, and therefore displaying multiple perspectives on it. An event will thus no longer be a homogeneous unit, but rather a unifying frame of different aspects. Each aspect is given a value from zero (0) to high (3) so that in the end the multiple conditions of eventfulness may be evaluated in numbers which opens up the possibility to compare different events in their factor of eventfulness and tellability. We take it as fact that the terms event, eventfulness and tellability can be used in a non-literary context. The storyworld referred to above thus becomes either fictional or factual. Further on, we highlight the interpretive character of events and open up the process of deciding whether to evaluate an event in relation to a condition with a lower or higher number. By so doing, we admit that other interpreters or readers might (or might not) end up with other values for a particular event, but nevertheless would probably come to similar conclusions. This approach in itself is shaped by the idea of multiplicity.

2.1. Eventfulness and Tellability

In theorizing the role of events in collective memory, the question of remembrance and forgetting arises. Despite the fact that forgetting is a cultural technique of equal importance for cultural heritage as remembrance [Luhmann 1997], our approach here also addresses the question of why certain events are more likely to be constantly retold and others are not. One answer lies in authoritative deliverance by a single narrator or narrating institution; however, a more complex and under-researched approach lies in multiplicity and multivocality. This leads us back to the discussion of eventfulness and tellability, because both terms may help to define why an incident turns into an event (in this case incident means an occurrence in the real, historic world whereas event might be an event I or II in a story world) [Baroni 2014] and also why and how people tell stories about certain cultural heritage artifacts, scenarios or other objects.

The concept of tellability was first developed in research on conversational storytelling [Baroni 2014]. It emphasises the personal [Fludernik 1996] and interpersonal [Ochs and Capps 2001] relevance of "what can be told" to eventfulness, which is useful for the analysis of narrative in cultural storytelling. While in structuralist and post-structuralist narratology the focus mostly lies on literary narratives, this perspective widens it to include oral storytelling. More than in literary criticism (although in literary criticism there are also attempts to give the reader a co-authoring role [Fludernik 2003] [Fludernik 1996]), it becomes clear in the theory of conversational narratives that a narrative act is produced by the agents of both sender and receiver in a certain context. Furthermore roles and relations of sender and receiver may vary [Ochs and Capps 2001]. Narrative storytelling might be distributed among numerous authors, or oral storytellers, or bodies, or objects, or texts, meaning that the narrative is

detachable from one author or even an authoritative instance. This forces us to assume that agency itself is not an irreducible constant: one may also include other ways of agentive storytelling or receiving, for example, through visual or object bound narratives, spatial narratives or even narratives of bodily experience.

Whereas the term eventfulness may be directly connected to tellability [Hühn 2008], the term tellability may not lead back directly to eventfulness (a disjuncture that is highlighted in both our case studies). This is emphasised in Literary Criticism research on oral storytelling traditions and performances, where the fact that stories may be told for entertainment, or because of a collective experience [Norrick 2000] or as an art has been described. In fact there are some examples of literary texts which show how the paradigm of eventfulness could be eluded by telling stories without events, thus showing that they are still tellable [Ryan 2005]. Whether or not their aim really fully excludes eventfulness from their kind of storytelling cannot be revealed in this paper.

Similar approaches from more sociologically oriented narratological research disciplines show that something becomes tellable for different reasons. One of those reasons can be eventfulness, but there are others, i.e. the creation of a narrative identity by the means of small stories, which can but must not include events [Bamberg and Georgakopoulou 2008] or communicative interaction in everyday life in general [Ochs and Capps 2001]. All of these attempts show that narratives cannot be regarded solely in terms of eventfulness but that there are more conditions of story, especially personal and interpersonal dimensions of significance.

Reflecting the distinction between the "non-eventful" and "highly eventful" described earlier, tellability can also be seen as a scalable value ranging from untellable to highly tellable. Logically, stories which are not tellable are/can not be told. In the context of cultural heritage, these untold stories may be of some importance because what is not told indicates certain cultural conditions [Baroni 2014], which restrict the ability of telling, and thus conserving them. In addition to which, it has been stated that certain components of everyday-life seem to have no tellability, such as daily routines [Ochs and Capps 2001].

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In this paper we use the term tellability to augment eventfulness with aspects of significance, and unite all possible properties that may be attached to cultural heritage issues (events, objects, artifacts and so forth), in order to describe their likeliness of being put into narrative. We thus add to the six properties of eventfulness named above the properties of tellability those of (7) personal significance and (8) interpersonal significance. In the same way that we hold eventfulness to be scalable, we propose to use tellability in a similar way. The generic properties of tellability may be equated with values describing the factor of significance. For reasons of quantification, we propose to establish four stages on an ordinal scale of eventfulness/tellability. We acknowledge that this is a very basic and simple way to numerate the scale, as it is beyond the scale of this paper to develop a theory on whether or not values of significance, effect or iterativity increase in a linear way. Broadly adopting the definition of historical events given by Mostern and Johnson as "an instantiation of information about the past in the form of a named, spatially located, temporally circumscribed entity" [Mostern and Johnson 2008] – which, by implication can be operationalized in such a way as to be analyzable by a machine - we analyse the utility of this approach in constructing narratives in a socio-historical setting, and in a spatial one and, in particular, evaluate whether this approach effectively allows the representation of multiple viewpoints of those events.

2.2. Historic events

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Just as the disciplines of history and narratology share narration of events as central concerns, the two genres of historiography and literary narration share common roots, with the two being largely undifferentiated until the 18th century [Lützeler 1992]. However, we acknowledge that there have been several recent attempts to distinguish the two. Besides stating that historic texts have a different ontological status than literary texts, being factual rather than fictional, it has been stated that, in narratological terms, historical narratives must have a different focalization, because no historically credible "narrator" would have access to the minds of historical characters [Pavel 1992]. This reflects the criticisms of phenomenological approaches in archaeology (e.g. [Tilley 1994] [Brück 2005], which holds that monuments and other landscape features can only be understood by direct personal experience in the contemporary world (and thus, by extension, of "events" in which contemporary observers participate) [Barrett and Ko 2009]. Furthermore, there seems to be no direct need to differentiate between author and narrator in historical texts, and the (general) reader tends to assume that the author-narrator of historical text is reliable [Cohn 1989]. Despite those distinctions, we take it as fact that there are some similarities in the representation techniques of historic and literary narratives, if only from a purely functional point of view: i.e. both the author of fiction and the historiographer put a number of events into a sequence by building up connections [Lützeler 1992], and extrapolate from them a "meaningful" point of view. It is on these aspects of literary and historiographic narratives we want to concentrate on in this article.

Above all, we emphasize the role of narrative as a means of human meaning making. From this perspective, the difference between factual, fictional and fictionalized events becomes limited. Therefore we would like to enrich the narratological view on eventfulness and tellability outlined above with the historic perspective (and vice versa).

An especially suitable attempt to define the historical event with regard to the possibility of operationalizing it and using it for computational research has been made by [Mostern and Johnson 2008]. Instead of describing events by their properties, as done in narratological research, they see events as named entities with a spatial and a temporal anchorage. These three variables – name, space, time – might be seen as parts of a grammatical structure which frames an action on the content level (following [Heise 2014] they involve agents, objects and instruments on this level). Contrary to the narratological perspective, the levels of content and representation are very clearly distinguished, which might be explained by the fact that narratology is never really interested in the event itself, but rather tends to focus on the representation or more specifically the telling of it. We are taking two additional factors to our list of eventfulness/tellability properties from this attempt which are (9) spatial outreach and (10) temporal relations. However, the idea of event as named entity suggests that by focusing on the event as such one can single them out more easily. Afterwards one may turn to more interpretive decisions as to whether an event relates to others, and how or whether its ontological status remains possible or is realized in the actual world (be it a "real" world or a fictional (story-)world). In both narratology and historiography, this interpretive dimension of events is stressed [Ryan 1991] [Lützeler 1992], so we propose to follow two lines of investigation. First, we try to concentrate on events as units or entities of cultural heritage. As this approach tends to turn events into black boxes excluding their properties and the characteristics of their narration, we will interpret the findings in terms of eventfulness and tellability.

This consideration of theories of narratives in Digital Humanities suggests the need for two approaches to cultural events in order to use computational methods and tools. First, is that we need to find a way to extract events from the different modes of narrative media identified above. Here the approach to events as named entities seems to be very suitable. Second, is that we will have to find a way to represent this data in a way that includes interpretive multiple and multivocal perspectives.

Facing the first challenge one must state that computational methods provide us with the possibility to look at a critical mass of text and therefore unify multiple single authored texts (see, for example, the

University of Leipzig's Canonical Text Services project: http://www.cts3.sourceforge.net). Instead of looking at one single text by one author on one topic, we can use computational methods to do research on many texts by many authors on a topic, event or series of events. Following the idea of multiplicity and multivocality it does not make any sense to limit this approach to textual representations or ontologically homogenous narratives only. The scope is thus widened to include different media, as well as fictional and factual narratives.

In an attempt to operationalize events and make them traceable with computational means, we developed the following model. This model is based on a tag-set developed in the context of the CATMA (Computer Aided Textual Markup and Analysis) project in order to visualize different attempts to specify the significance of events for (and within) narrative. It shows a perspective on events as singled out units, the multiple properties they may have, the connection to tellability and the ability to operationalize them in order to use them with digital tools.
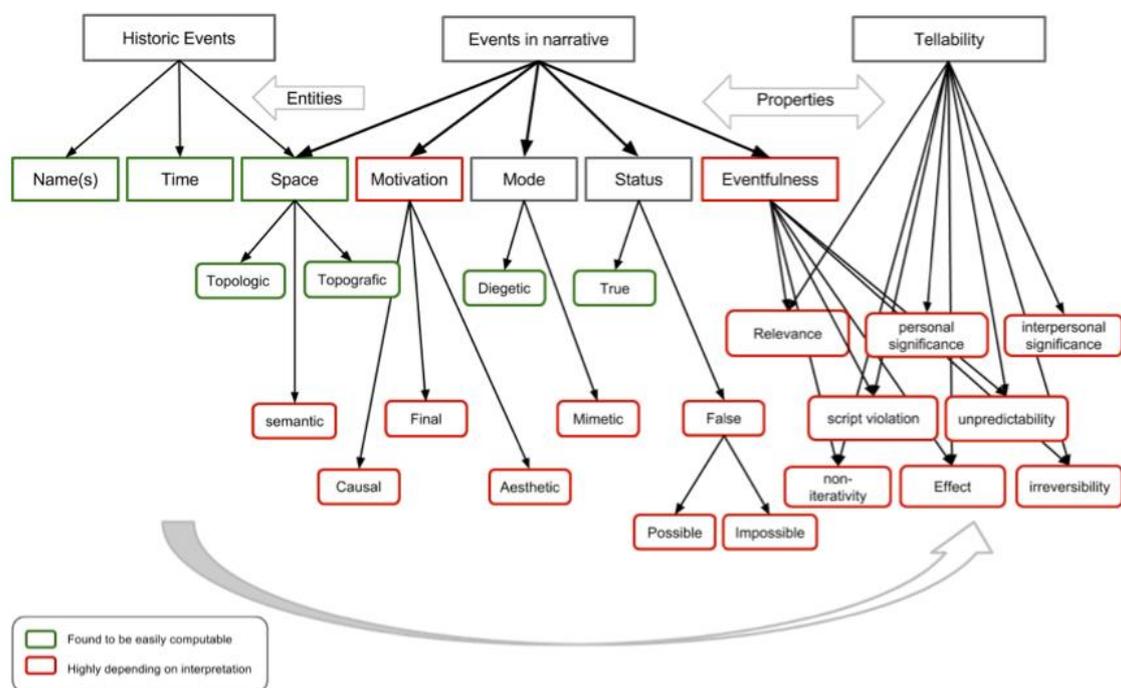

Figure 1.

Model of Events and tellability employed in the following case studies

This approach reappraises structural and poststructural approaches to narratives in a radical way, in order to define categories of significance which are both operationalizable and interpretive, such as the properties of eventfulness and tellability. The importance of operationalizing categories of literary criticism both for doing Digital Humanities and finding new ways to analyse literary texts has been pointed out very clearly by [Moretti 2013].

These categories may be used in a computer-based analysis according to their categorization. Those properties of events that highlight their status as named entities are extracted from narratives to be quantified and analyzed. Afterwards the interpretative categories are used to evaluate eventfulness and tellability of the events. In this sense, narratology itself becomes a toolbox which helps to find out what kind of evidence in a text leads us to assume that a certain category is used as a part of the structure of a certain narrative. And it provides us with the necessary theoretical framework to contextualize the raw data.

3. Der Fall Pinzer (The case of Werner Pinzner)

For this case study the main question is what kind of multi-textual evidence is needed to approach the essential narrative category of events; and how this evidence can be operationalised and visualized by computational means. The corpus includes fictional as well as factual texts and is put together in a transmedial approach, following the cultural studies paradigm that the term "text" is extended to other media and cut loose from a written representation (an idea that is developed further in our second case study below). The corpus is therefore set together by one novel [Göhre 2011], one journalistically written book [Lindlau 1992], one TV movie [Hofman 1995] and one TV documentary [Harrich-Zandberg 2002]. Each of these texts represents a special form of narrative and therefore has to be seen as an exemplary choice.

The case is a true crime story from the 1980s that took place in Hamburg. We have selected this case because the factual act of crime is found to have a high eventfulness and follows the additional paradigm of tellability, by virtue of its significance to the community of Hamburg. The texts all deal with the case of Werner Pinzner, who murdered at least five men living and working in the surroundings of the red light district in St. Pauli, Hamburg, an area well known for crime. The case became famous because of two central events: Firstly, this was one of the first acts known or acknowledged to exist in Hamburg, or even in Germany, of organized murder, which is at least partly due to the fact that Pinzer started to talk to the police very openly once he was caught. Secondly, is the fact that he committed an extended suicide killing not only himself, but also his wife and the prosecutor inside the police office during an interrogation. This extended suicide led to several developments in the works and procedures of the police in Hamburg (such as regular screenings of visitors of criminals and other increased security measures). In terms of eventfulness and tellability we argue that the case matches all ten conditions (relevance, unpredictability, irreversibility, non-iterativity, effect, script-violation, personal and interpersonal significance, spatial outreach and temporal relations) to a very high degree. It is therefore not surprising that it was used in factual and fictional narrative representations in different media.

As we have noted, there have been a few attempts to model events using computational means. On an abstract level, trying to prove that the notion of event regardless of its eventfulness always is interpretive, which is underpinned by the use of a computational tool revealing how in the surrounding text of manually identified events other interpretive decisions could have been made [Meister 2013]. Another approach was developed by computational linguists, who attempted to extract events on a spatio-temporal basis [Strötgen et al. 2014] [Shrestha et al. 2014] [Wang and Steward 2013]. The last is very similar to the approach presented in this paper, but supplemented by an interdisciplinary perspective, adding the properties of historic events.

If we take for example the definition of historic events proposed by [Mostern and Johnson 2008] instead of a very complex structure of properties and possibilities as found in narratological models, we get a set of surface markers which will lead us to the historic event as named entity when put into the right grammatical structure. Following their argumentation the historic event combines three properties: name, place and time. All three of them will be tied together very closely, each one of them evoking the other when being named.

In our example the historic event could be named "Der Fall Pinzner" (literally translated to "the Pinzner Case"). In this case the name functions as a unique identifier for the event whereas place and time are less likely to evoke thinking of this specific event immediately. But of course this event is really a series of events. The more concrete an event becomes, the more identifiable will it become by its location and time. So if we take the suicide of Pinzner and the murder of his wife and the prosecutor as one central event of the top-event Pinzner-case, the place will be as concrete as an address with a room number (police office Berliner Tor, Room 418), the exact date will be 29th July 1986. The fact that this specific event has no name as unique identifier brings us back to the more unspecific narrative event. What we can take from the definition of historic events is the possibility of identifying events by a set of surface

markers. Furthermore, the characters involved are also good objects to identify an event. The ensemble of characters, place and time altogether will be as unique as a name. The problem in automatic extraction, however, will be that in opposition to our example one will most often not know all of the entities involved. But one can at least be sure that there will be one or more characters, a place and a time attached to an event. So the unique event identifier would be

- specific character(s) involved + specific place + specific point in time

Especially when dealing with fictional texts, we face the problem that there will not always be all of the variables in this formula explicitly named in the text. Nevertheless we can take them as hints to events. The more of these hints can be collocated in a text passage the more likely they will lead us to events.

All of these ideas still do not provide a solution to compute all kinds of events in a narrative. But it does provide us with a categorized set of clues, which are likely to lead us to most of the narrative events in a text, and thus providing the possibility to interpret and categorize them according to narratological models. The next step therefore is to identify and collocate the variables of the above named formula in stories, and to interpret them according to their narrative function. In order to do this we developed a semi-automated workflow or pipeline including Digital Humanities tools as well as manual steps. As one possibility for finding named entities is Named Entity Recognition (NER), we applied the Stanford NER tool to the corpus. This tool provides a script for the German language which was trained on a corpus of journalistic texts. As the corpus focused in this case study contains a journalistic text as well as a fictional text, the tool will not work equivalently well on both texts but, as we do not attempt to extract all the events from one text but rather a critical mass of events altogether, this fact does not seriously detract from the interpretation and conclusion found here. In the end what we get in this step is a text document enriched by HTML tags highlighting names, places and organizations (this last entity being one excluded from this study).

As NER does not include time, we used a second tool called Heideltime to extract temporal data in a similar way. Again, the result is a text document enriched with HTML tags. We stress this point here as it is desirable in Digital Humanities to have cross-tool compatibility in different domains. In this application we normalized our outcome data to create a "real" HTML file. However the next tool we used is CATMA, which satisfies the requirement for cross-domain compatibility by accepting HTML files with intrinsic markup. With CATMA we could do several collocation analyses. Thus, we first looked at all three entities being name, place and time found in a textual surrounding of 20 words. In this analysis CATMA is detecting automatically passages of text in which all three entities are found in proximity to each other and lists all possible variations into a spreadsheet of keywords in context. We repeatedly run queries changing the parameters from all three entities to just two of them and changing pairs. In the end we exported all keyword-in-context-lists to search them manually for the events told in the text and to exclude duplicates.

However, as the tools named above do not work on audio-visual medial representations the whole process was manually performed when it came to the analysis of the two movies included in the corpus. This means nothing else than noting down each entity named in the movies into a table. "Naming" in this case can be differentiated into being told acoustically or visually which could be either textually or through showing characters or places (we followed Kuhn's attempt [Kuhn 2011] to movie narratology here by assuming an audio-visual narrative instance replacing the narrator). Afterwards the lists were again searched manually for events in the surrounding of the named entities characters, place and time.

As stated above the collocation of all three identified surface markers of events (characters, place, time) leads to the most precise outcome, but unfortunately this approach proved very unsatisfactory regarding recall. On the other side a collocation of two of the variables was not very precise but a lot more events could be found in the outcome data. The automatically produced outcomes were manually analysed and events in the surrounding text passages were identified. Despite the fact that this method is not

sufficiently productive to use it on larger corpora it led us to a number of events of different eventfulness and tellability, and thus provided us with a starting point for interpretation.

In the corpus, a totality of about 350 events were identified as explained above. They were evaluated according to the ten properties of eventfulness and tellability following the key 0=none, 1=low, 2=medium and 3=high. The findings were set according to the output data and put into tables, one for each of the texts (the following table exemplifies the first five thus processed events of Lindlau's "Lohnkiller":

Event	Trial against Brothel keeper gets shot	Giovanny Falcone Death of prosecutor	Body is found	Witness talked about	organised crime scene
Relevance	3	1	1	1	3
script-violation	1	2	2	1	3
Irreversibility	3	3	3	3	3
Effect	3	1	2	2	3
unpredicatbility	0	2	2	2	3
non-iterativity	0	0	0	0	1
personal significance	3	3	3	3	3
interpersonal significance	3	1	3	3	3
spatial outreach	2	1	1	1	1
temporal relation	2	1	1	1	3
Value	20	15	18	17	26

Table 1.

Narrative events in Der Fall Pinzer.

The outcome of the analysis shows the different values of eventfulness of the events in the narratives and it gives some hints on narration techniques. This kind of output data cannot lead to any absolute statements about narrated events, as it is not extracted from a sufficiently large corpus, nor is the method stable enough to let us assume that a significant percentage of all events in the text could be extracted. However, the data represents events of diverse degrees of eventfulness/tellability and thus shows a stable variety of the construction of narratives with events.
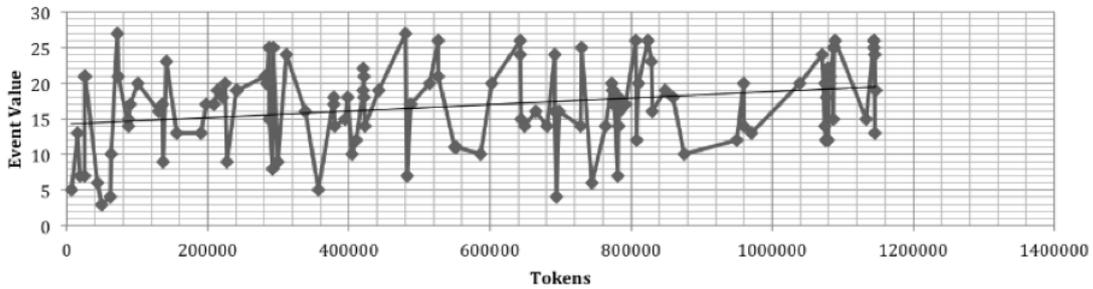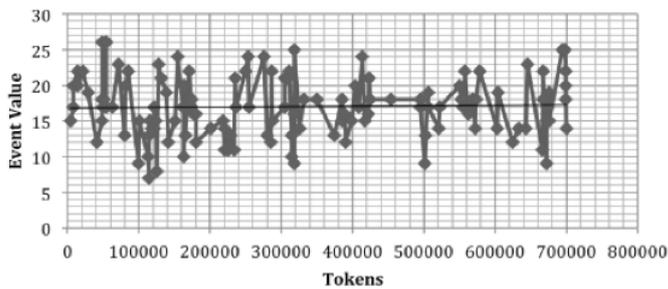
Figure 2.

Events in textual representations of the Pinzner-Case and their values

The most important findings for this paper are, firstly, that the six major events (the 5 paid murders and the extended suicide) of the case were narrated through a much larger number of events and, secondly, that these events differ in value of eventfulness. These findings underline the theoretical hypothesis that narrative can be a means to exploit multiplicity and multivocality in events. It is also interesting that in this case study there was neither found an event with no eventfulness at all, nor any kind of "super-event" reaching the highest possible score of eventfulness. The visualization above shows this multiplicity of eventfulness values quite clearly.

It also shows that there are more events with low eventfulness and that the means of eventfulness is altogether a bit lower in the fictional representation. In addition to that the fictional representation tends to use more eventful events towards the end. On the other side the factual representations shows quite a lot more events on less tokens which means that there is a higher density of events in that text. (However, this finding could also be due to the fact that the tool works better on journalistic texts, so it should not be evaluated too highly.) In both representations one can see that there are passages in the text which show more events than others; one significant finding of such a local event density in both examples being the end, although only the factual representation narrates the historic situation with the extended suicide and murder of the prosecutor (whereas in the novel text, the "St. Pauli Killer" kills himself and his wife in his cell). It is also interesting that both textual representations end with an event of medium eventfulness.
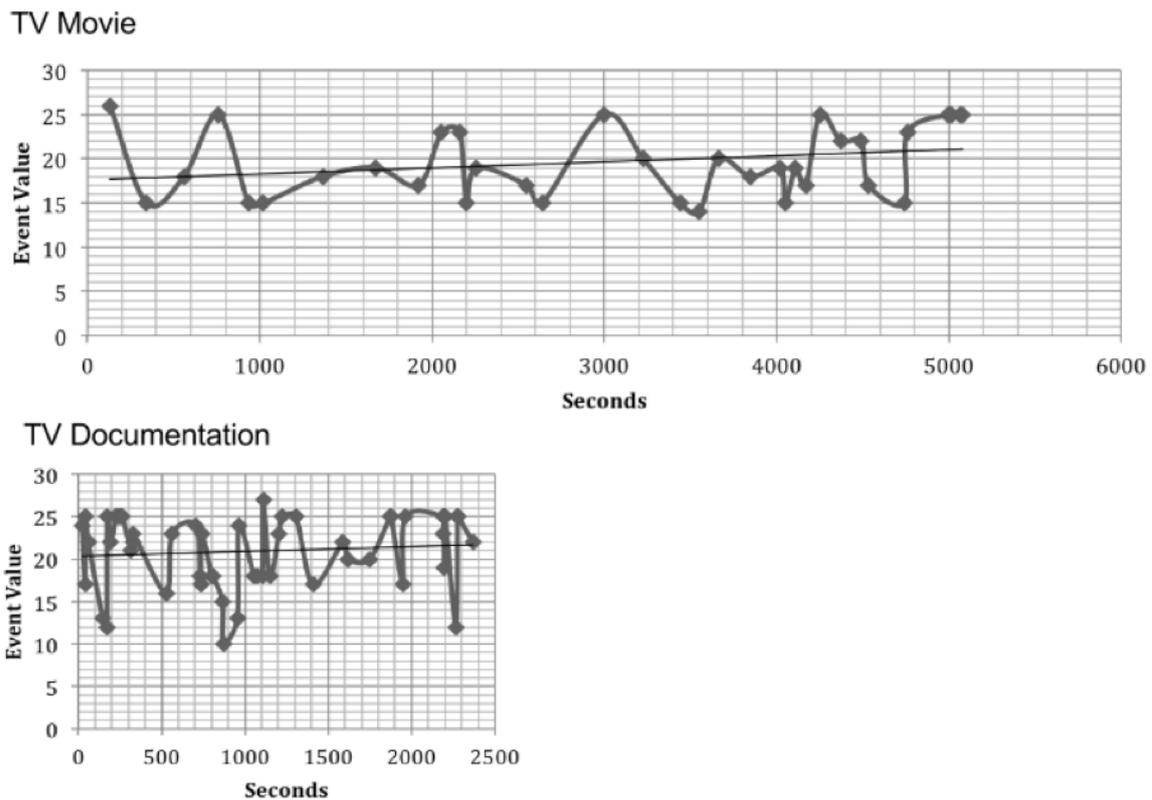
TV Movie

TV Documentation

Figure 3.

Events in audio-visual representations of the Pinzner-Case and their values

The data found in the filmic representations shows similar trends. Again, the main event is told by a number of smaller events of differing eventfulness. Again, the means of the eventfulness values is higher in the factual representation and again the event density is higher in the factual representation showing more events per second than the fictional movie (as in this case the extraction was not done automatically, there is no measuring error to be kept in mind here). The TV movie, though, is the only representation showing a structure which tends to the Aristotelic order of beginning, middle and ending using highly eventful events in these parts of narration. Both films start with a very eventful event "in medias res" which could be interpreted as a typical narrative opening for this medium whereas the texts in this corpus tend to start with rather low-level events. In contrast to the textual representations the filmic narratives both also end with highly eventful events, which might also be medium specific. It is also interesting that the filmic factual representation does not keep one level of eventfulness throughout the whole narration but shows a slight trend to more eventful events towards the end as in the textual representations only the fictional text did.

In order to get hold of the multivocality of these four texts one has to step back from the data presented above and look into the representations itself. One example which shows this aspect quite well is the spatial narration concerning the street "Reeperbahn", which is where the red light district of Hamburg is situated. Especially in the journalistically written text "Der Lohnkiller" (literally translated "the paid killer"), the "Reeperbahn", is presented as if it was a character of its own having its own will, making its own decisions, and its own narrative. But the spatial narrative of this street is presented in all the texts of the corpus as a collective narrative which many people living in Hamburg and especially in the area around the "Reeperbahn" share and some relate to in a special way, because they take part in it. By doing this they create a collective identity so closely linked to a space that it may seem as if the place

was the agent of the narrative, whereas in reality the spatial narrative is a multiplicity of individually experienced events and collectively chosen decisions. What is special about places like this and also about the one presented later on in the second case study of this paper, is that there are different layers of connections to the individually experienced events. The Pinzner case takes the perspective of somebody desperately wanting to take part in the spatial narrative, but never fully getting there, because Pinzner, despite his "job", never really achieved the respect for which he aimed. Further on, the narratives in the corpus also show other characters that take part in the criminal surrounding of the Reeperbahn. The narratives show police, prosecutor and lawyer being inside the spatial narrative and outside of the collective identity of it at the same time. And finally, and no less importantly, the mention of the spatial entities (in addition to Reeperbahn, the area St. Pauli takes a similar role as well as the nickname of it "Kiez") evoke an experience-centred connection to events in the individual memory of the recipient, be it that s/he has heard rumours about it before, visited it before or even takes part in the life-world connected to it.

Despite the fact that the narratives in the corpus represent the event of the Pinzner case in a traditional way using traditional media such as books and movies, they do add multi-perspective and multivocal narratives to the cultural heritage of this specific area of Hamburg. They also add historic events to the experience-based spatial narrative an individual might connect to places like the "Reeperbahn". They even preserve some narratives of places which have vanished from the city today, as the old police headquarters which was situated in the city centre and not as it is now in a highly secured area in the periphery. In the end the events not only structure the narrative, the narrative is also connecting events to other entities (as characters, spaces and dates) and thus adding significance to them. The events vary in eventfulness and tellability as well as in functionality, and thus a narrative multiplicity is not only acknowledged but supported actively.

The Pinzner case is an especially good example for showing multiplicity and multivocality of narrative events, but it is arguably too recent to be especially significant for illustrating historic events. Therefore, in the following we now introduce a second case study, which examines Hadrian's Wall. The Wall is a spatial entity which is less constrained than the Reeperbahn in terms of size as well as in terms of history. From here on we will focus less on traditional representations in modern media and complement the above shown point of view by other storytelling traditions such as oral storytelling, cultural heritage delivery and personal and interpersonal experience and interaction.

4. Hadrian's Wall

As noted above, text is only one medium through which narrative can be conveyed. Another is in the curation and presentation of monuments [Azaryahu and Foote 2008] [Nesbitt and Tolia-Kelly 2009]. This is a particularly interesting environment in which to test the theory of narrative categorisation and non-binary operationalisation, as monuments have multiple "narrators" of their spaces and significance – the designers, the builders, those who occupied the landscape at the time, and those who occupy it now. Hadrian's Wall is one of the UK's most iconic ancient monuments. It is a place in its own right, but it is also a place made up of multiple locations (much as the events in Der Fall Pinzner combine to form a larger event), some of which are specific and "tellable", and others more abstract. Its tellable significance derives not only from its size and scale, stretching some 84 miles between the coasts of Northern England, with good preservation of the monument in the middle sections; but also from its context as a key section of the frontier of the Roman Empire from AD 122 until late antiquity. Many writers and observers throughout history have seen it, as a whole, as embodying narratives of separation and division; despite more recent archaeological researches which have stressed its role as a mediator between the (occupying) Roman population in the south and the unoccupied populations to the north [Dobson and Breeze 2000]. However, as [Hingley 2010] has demonstrated, the separation narratives persist; in fact one might say they were imposed on the monument after the Roman period by later authors, appearing and reappearing in the writings of multiple witnesses throughout subsequent

generations. Following Hingley, one might quote the German historian of the Roman Frontiers, Theodor Mommsen:

[The German limes] had not, like the Britannic Wall, the object of checking the invasion of the enemy … the Romans in Upper Germany did not confront their neighbours as they confronted the Highlanders of Britain, in whose presence the province was always in a state of siege. [Breeze 2009]

Or the English historian and travel writer, John Collingwood Bruce, who describes the Wall as:

a great fortification intended to act not only as a fence against a northern enemy, but to be used as the basis of military operations against a foe on either side of it [Hingley 2010]

Both these readings of Wall narrative stress its narrative "wholeness", read in the context of the nineteenth century nation state, with firm notions of "inside" and "outside", and a concept of "civilisation" and "barbarism", drawn largely from a reading of Classical authors. It reflects the employment of two individuals' spatial literacy in the understanding of the Wall.

The concept of spatial literacy is a useful one here, as it implicitly invokes the metaphor of "reading" when it comes to geography, and allows us to develop the concept of the "spatial narrative", in parallel to that of textual narrative. As will be seen, it also supports a similar non-binary operationalisation of events as that demonstrated in Der Fall Pinzer. It also allows us to consider particular embodied interactions with the Wall in terms of their "eventfulness" and "tellability", in much the same ways as the Hamburg sequence above is composed of "eventful" and "tellable" happenings at different scales. The idea of the spatial narrative has been theorised in recent years by scholars such as Bodenhamer, Corrigan and Harris [Bodenhamer et al. 2010], and in relation to the curation of heritage sites by [Azaryahu and Foote 2008]. For the present purposes, it may be most usefully defined as "a meaningful statement, or set of linked statements, whose fundamental structure is geographical", where each statement tells an event. Or, to put it in the context of the poststructuralist theory of narrative developed above, a narrative is a "spatial" one when its "eventfulness" and "tellability" stem from the description of events which happen in, and relate to, a location, which is specifiable to a greater or lesser degree. The statement may stem from experience, proximity, association, or some extrinsic geographical (or archaeological) feature. "Reading" such a narrative is the making of personal meaning as "told" by the place, as opposed from a narrative that is told by another human agent. In this case, "the other" is not a human narrator or agent, but the Wall itself. It follows logically that a spatial narrative cannot be read in any light other than that of multiplicity. The more points that are added in terms of time, character and (smaller) places, the definition of the event becomes clearer.

The "embodied" narrative of Hadrian's Wall has been described by [Nesbitt and Tolia-Kelly 2009], who operationalise the monument in terms of its narrative, and how its narrative significance is shaped by the authority structures of English Heritage and the National Trust, who regulate physical access to the Wall, and thus the embodied experience of it. They state:

English Heritage and the National Trust delimit and control access to the Wall. These authoritative interpretations and recommended route ways delimit the bodily encounter with the Wall and this affects the physical intelligibility of the experience of the landscape. [Nesbitt and Tolia-Kelly 2009]

We have here an example of events which can happen in relation to the monument being regulated by an external actor. This exemplifies the "authoritative", or "single-author" model of narrative construction described above, and how such a model can relate to corporate as well as individual human authorship.

However, this narrative is only part of the broader spatial narrative of the monument, as may be illustrated by considering the case of the fort at Birdoswald, in Cumbria. This, fort number 11 in the official English Heritage listing, was not described in Camden's Britannia, although Camden himself

was clearly aware of it, as John Warburton, in his 1778 treatise on Hadrian's Wall, noted that Camden had mistakenly believed the fort to have been situated at the nearby town of Willoword [Warburton 1753]. Our narrative begins with the establishment of the fort, which is connected by the Wall to milecastle 49 and, further on, to the extant Wall structure to the east of the river at Willoword. Approximately 800 meters to the east of the present-day course of the river is a bridgehead of Roman date, indicating that the course of the river has moved to the west in the intervening centuries. The present-day National Trail, curated by English Heritage, which follows the approximate line of the Wall, diverts to the south, crosses the modern river, and then climbs a steep hairpin bend to the fort itself.

This specific section of the Wall relates to the narrative of Momsen, Collingwood Bruce and Camden in a way which is tellable, but not eventful. There are no specific events or happenings in the history of this section which can be invoked to support the narrative of separation. On the other hand, as Nesbitt and Tolia-Kelly note, the embodied experience of the Wall, and of its constituent forts, is conditioned by English Heritage curation, and this is expressible through the individual embodied experiences of those who visit or interact with the section, at any point in its history [Nesbitt and Tolia-Kelly 2009]. In the context of the present day, its impact on visitors, as recorded by how they move along and through the monument, can be rendered visually in GPS traces uploaded to OpenStreetMap, the Open Source online mapping platform. Here, people have the opportunity to capture the pathways they take using their mobile devices, and share them on the map platform. They are thus adding specific and individual narrative events to abstract spatial narrative of the Wall as a whole. The traces shown in Figure 3 indicate little or no engagement with the Wall or the trail, rather they all lead from the nearby car park. Once at the site, the highly conditioned nature of the experience, and thus of the narrative, become apparent: most of the visitors' movements are confined to the north of the fort, with much less movement in the south. Most of the embodied engagement is therefore with the visitors' centre and shop, and prior to that the car park. One can also detect that some visitors moved a few meters to the north, perhaps for the purposes of getting a longer view of the site.
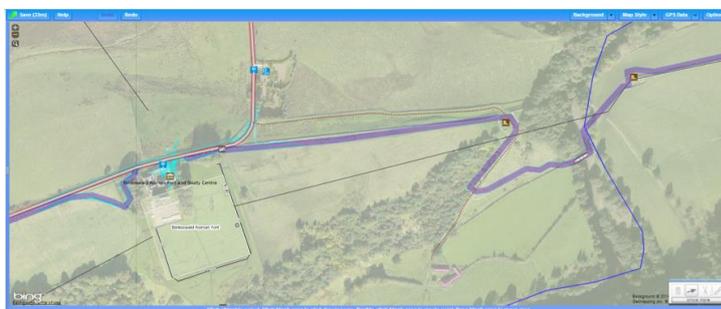

Figure 4.

Figure 5.

Individual encounters with Hadrian's Wall shared on OpenStreetMap (figure 4) and detail of the interactions with Birdoswald Fort.

This section of the Wall may therefore be related as a set of events linked by geography.

Individual parts of the topography may be easily mapped and entered in a gazetteer-like database: the spatial footprint of the fort, the visitors' centre, the car park, the line of the Wall, the Turf Wall, the bridgehead, the modern bridge, the extant Willowford section etc. All of these relate to the abstract whole of the Wall, and its associated narratives of separation through time and are "tellable" in that larger context, but they can only become "eventful" when they come into contact with the experience of the individual. The operationalisation of the Birdoswald section of the Wall in table 2 reflects this

Event	Wall constructed	Birdoswald constructed	Camden describes the Wall	Life of St Oswald (gives fort its modern name)	Warburton visits Birdoswald fort	Warburton describes Camden's mistaken description of the topography	English Heritage assumes responsibility for the Fort	Individual visitor visits Birdoswald
Narrative Representation	Officially documented by historians	Officially documented by historians	Personal narration	Officially documented by historians	Personal narration delivered by historians	Personal narration delivered by historians	Officially documented by historians	Personal narration
Relevance	3	3	2	1	3	1	3	1
Script-Violation	0	0	0	1	0	0	3	3
Irreversibility	2	1	3	3	3	3	3	3
Effect	3	3	3	1	1	2	3	3
Unpredictability	2	1	3	3	3	2	1	0
Non-iterativity	3	3	0	3	2	0	2	0
Personal Significance	3	2	3	0	3	3	0	3
Interpersonal Significance	3	2	1	2	0	2	0	3
Spatial outreach	3	1	3	2	1	1	3	1
Temporal Relation	2	3	0	3	3	3	1	3
Value	24	19	18	19	19	17	19	20

Table 2.

Narrative events around Hadrian's Wall.

Whereas "Der Fall Pinzner" showed us that in one single authored narrative there may be a multiple and multivocal set of events which tell the story altogether, in this case study we went the other way around and chose some events connected to the Birdoswald Fort in order to compare them by eventfulness and tellability. First of all we have to clarify that these events are historic events rather than narrative events because they are not necessarily narrated. In opposition to the events of the first case study, they may be seen as raw events and yet it has been proven possible to evaluate them with narratological categories.

Contrary to the events that constructed the narratives about Pinzner, these events are relatively in the value of eventfulness/tellability despite the fact that they are very heterogeneous when it comes to their historic time, or their status as events that are "told" by official or unofficial sources. What is striking

about the events when represented in this way is that individual visits of the wall have a slightly higher eventfulness/tellability than most of the officially delivered events:
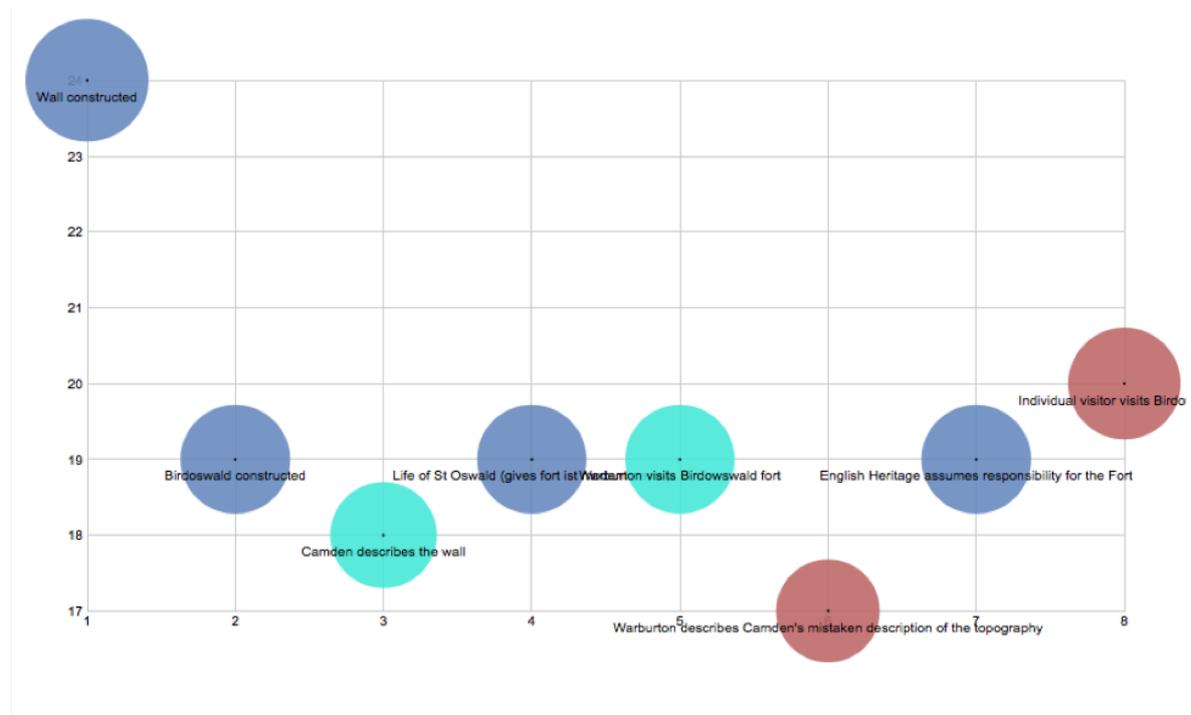

Figure 6.

Events connected to Birdoswald in value (x-axis = size) and way of deliverance (colour)

Overall, this suggests that where spatial entity, such as Hadrian's Wall, is the dominant feature in its landscape, it normalises the narrative complexity of events which are connected with it. The eventfulness and tellability might vary with the kind of event, and the "official" or "unofficial" nature of the narrator, but essentially they share the fact that they are all differing interpretations of a common dominant feature. This is in contrast to an area such as the Reeperbahn, which contains and informs, but does not dominate, the narrative of the Pinzer events.

5. Conclusions

This analysis has shown that representations of events in traditional media are not as unilinear and univocal as they first appear, and that representing subjective instances of them in a machine-readable way is potentially possible. Secondly we can state that individually experienced, or "instanced" events, to use the terminology of [Mostern and Johnson 2008], events are of equal value as culturally delivered events. This comparative analysis across a specific narrative in Hamburg, and an abstract one in Northern England, shows events can be conceived in a gazetteer-like way, without the reductionist limitations that a gazetteer based purely on Cartesian space contains.

In terms of methods we have demonstrated that an approach to events which included multiple factors of eventfulness and tellability is fruitful for the analysis of single events in the context of all the others, and may bring us closer to the materiality of humanities discourse as evidence-based storytelling. It has also been shown that narrated or mediated events and historic events may be analysed with the same parameters (if these include the ideas of multiplicity and multivocality). The structured data we processed in our case studies showed that the storage of events in a database gives us the possibility to evaluate those, along different parameters derived from narratological theory.

The DH workflow including several tools was fruitful but nevertheless found to be inconvenient for studies focusing on larger corpora. In terms of finding effective ways of automated event extraction this attempt therefore must be seen more or less as failed. Nevertheless the basic ideas of quantification and (semi-) automated extraction of data taken from Digital Humanities research led to first insights into general narrative techniques related to the representation of events. Aspects of storyline and event density could be discussed and related to different narrative genres. These very first hints on technical aspects of storytelling could lead to further (DH) research on plot structures combining the computational with the narratological perspective.

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