Narration as Functions: from Events to Narratives

Junbo Huang
Department of Computer Science
University of Hamburg
junbo.huang@uni-hamburg.de

Ricardo Usbeck
AI and Explainability Group
Leuphana University Lüneburg
ricardo.usbeck@leuphana.de

Abstract

Identifying events from text has a long past in narrative analysis, but a short history in Natural Language Processing (NLP). In this position paper, a question is asked: given the telling of a sequence of real-world events by a news narrator, what do NLP event extraction models capture, and what do they miss? Insights from critical discourse analysis (CDA) and from a series of movements in literary criticism motivate us to model the narrated logic in news narratives. As a result, a computational framework is proposed to model the function of news narration, which shapes the narrated world, consumed by news narratees. As a simplification, we represent the causal logic between events depicted in the narrated world.

1 Introduction

News narratives use specific language to depict events, people, and issues, involving selective details, word choices, and story framing to convey particular messages describing how the world works. Reah (2002) examines the tension between objectivity and bias, highlighting how newspaper language reflects and reinforces social norms, values, and power structures, perpetuating stereotypes and influencing public discourse on politics, gender, race, and class.

Loosely speaking, Figure 1 illustrates how these messages are encoded through narration, and forwarded to news narratees. Often, real-world events are selectively reorganized into discourses. The reorganization concerns the question of *what should be told* (content) and *how it should be told* (expression). In terms of content, news narrators manufacture what is left in and what is left out, by taking a subset of real-world events, re-ordering them, and drawing connections between them. The notion of news narrators describes a unity of human and institutional factors that jointly shape the message.

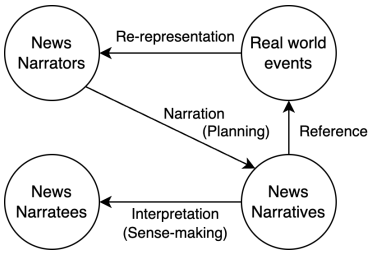

Figure 1: Diagram of how real-world events are re-represented into news narratives mediated by news narrators through the function of narration. While news narratives refer to real-world events, the function of narration shapes a narrated world, where news narratees make sense of the world.

In terms of expression, narrative elements are commonly used to shape the narrated world, such as the use of embedded stories[1] (Gervás and Calle, 2024), or temporal shifts, which leads to the complex nature of news narrative. Albeit language use in news narratives is far simpler than in fiction, challenges remain in extracting these messages computationally. Its difficulties include discriminating event instances, temporally ordering them or filtering out supplementary events that do not construct the core story.

We make a fundamental distinction between constituent events and supplementary events, as in Abbott (2020). Constituent events are essential in shaping the logic of the narrated world, whereas supplementary events are not required to understand how the narrated world works in terms of its causal logic. It is worth noting that a narrated world (Ryan, 1991) is the product of narration, which offers a space for narratees to make interpretation. A similar concept is a carrier bag (Le Guin and Haraway, 2019). Although different interpretations of the same message co-exist, it is of news narrators' interest to shape the narrated world, instead of dictating interpretations.

[1] Embedded stories refer to stories told within a story.

News narration is the process of creating this narrated world for interpretation. As a function of telling, it maps real-world events into textualized narrated discourse (the news article), mediated by news narrators as in Figure 1. These messages can be a particular ideology, e.g., promotion of consumerism in the USA after the great depression (Shiller, 2017).

To sum up, we adopt insights from Critical Discourse Analysis (CDA) (Van Dijk, 2015) and a series of literary criticism movements, such as (Wimsatt et al., 1946; Barthes and Duisit, 1975), and view news narration as a social practice that displays a narrated world with its own causal logic. We view events depicted in news narrative as being either constituent or supplementary (Abbott, 2020), where constituent events are important in constructing the narrated world, whose internal causal logic is represented as event-event causal relations.

2 Narration as Functions of Telling

2.1 Critical Discourse Analysis

CDA is a type of discourse analysis that primarily studies the way social power abuse, dominance and inequality are enacted, reproduced and resisted by text in the social and political context (Fairclugh, 1995; Van Dijk, 2015). In the context of media analysis, it views news narrators as a dominant group as they shape the narrated world encoded in language consumed by the public.

This motivates us to view narration as a function that shapes the narrated world and its displayed causal logic, represented as event-event causal relations.

2.2 Narratives

A narrative is a sequence of events and the telling of it. The fundamental distinction between fabula (the chronological order of events in a narrative) and discourse (how those events are presented—through narration) was first emphasized by the Russian Formalists in the 1920s, an influential group of structuralist critics such as Propp (1968) and Shklovskiĭ (2008), which is then interpreted differently by different narrative theorists. While the term fabula is associated with plot or historie, discourse is also known as syuzhet or discours.

We adopt Gervás and Calle (2024)'s definition and fine-tune it for news narratives, where *fabula is the actual sequence of events, that is chronologically and causally ordered, and discourse refers to the product of the telling, which reorganizes the chronological and causal order of this sequence.*

2.3 Revisiting Authorial Intent

Authorial intent is a controversial concept deeply rooted in classical literary criticism, reflecting a hermeneutical view that authors' intents are encoded in narratives, dictating a singular fixed interpretation. It was continuously challenged from the early 20th century by Russian Formalism, to New Criticism signified by Wimsatt et al. (1946)'s *The Intentional Fallacy* as well as later by structuralist critics such as Roland Barthes in the 1960s, signified in his essay *The Death of the Author* (Barthes, 2016). Contemporary criticism has long moved away from authorial intent. Instead they emphasize narratee's cognitive and experiential aspect navigating through the narrated story worlds, such as Ryan (1991)'s *Possible Worlds, Artificial Intelligence, and Narrative Theory* and Le Guin and Haraway (2019)'s *The Carrier Bag Theory of Fiction*.

Being similar to authorial intent, our notion of narrated world logic acknowledges the power of the author. We assume that news narrators (a set of factors that shape the narrative) display a narrated world to news consumers. Contemporary literary criticism's focus on experientiality juxtaposes CDA's acknowledgement that news narration is a tool to exercise social power. Therefore, revisiting authorial intent, in the context of interpreting news narratives, consolidates technological advancements in NLP for critical studies such as media analysis.

2.4 Deconstructing News Narration

In the context of news narratives, we view the narrated world refleced in language as a product of influences from various human or institutional factors, manifesting the causal logic underlying the sequence of events as conveyed by news narrators. As in Gervás and Calle (2024), discourse adopts an arbitrary representation, such as graphs, tables, or natural language. This intermediate representation of discourse decouples the complex function of narration into two sub-tasks: **narrative composition** (Gervás, 2013), a *planning* task for automatic story generation (Gervás et al., 2004; Riedl, 2009; Laclaustra et al., 2014; Gervás et al., 2019) and **natural language generation**, a sequence generation task that is well-suited to the capabilities of LLMs.

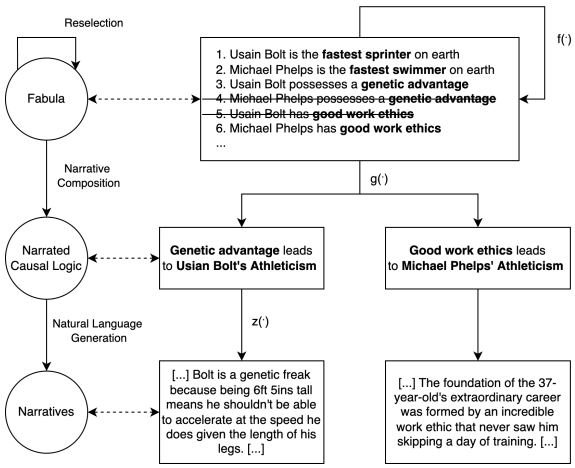

Figure 2: Diagram of how information flow from fabula to discourse, and textualized into news narratives. Source: Bolt and Phelps.

Figure 2 depicts how information flows (1) from real-world events to a subset of an organized event sequence with $f(\cdot)$ to form fabula; and (2) from fabula to an arbitrary intermediate representation of discourse, through the function of narrative composition, denoted by $g(\cdot)$, simplified to depict causal relations between events in fabula; and (3) from discourse to textualized narratives in natural language with $z(\cdot)$. These processes—subsetting events, narrative composition and natural language generation—correspond to the re-representation of real-world events and the narration performed by news narrators in Figure 1.

This leads to a critical concept in computational narratology: event as the smallest functional unit within a narrative (Abbott, 2020).

3 From Event Extraction to Narrative Extraction

Identifying events from text has a long past in narrative analysis, but a short history in Natural Language Processing (NLP). The long past refers to the important role of events emphasized by various narrative theorists (Propp, 1968; Jurij, 1977; Genette, 1980; Ryan, 1991). Its short history in NLP is associated with the task of event extraction[2].

3.1 Event Extraction in NLP

Event extraction is an information retrieval task, aiming at extracting event information such as event type, participants, temporal and geospatial information of events mentioned in text (Xiang and Wang, 2019). Such text can be fictional (Sims et al., 2019; Bamman et al., 2020) or non-fictional, such as news narratives (Wang et al., 2020; Norambuena et al., 2023) or microblogs (Ritter et al., 2012; Chowdhury et al., 2022). The fast development in NLP, signified by the Transformer architecture (Vaswani et al., 2017) and its descendants, including Large Language Models (LLMs), enables models' ability to accurately extract information from sequential data. Other event-centric information retrieval tasks primarily concern e.g., event co-reference resolution, temporal and causal ordering, and hierarchical event extraction.

It is crucial to recognize that these event-centric information retrieval tasks extract fabula-level information in the narrated world[3]. Recall that, while fabula describes an actual sequence of events, discourse shapes the narrated world through narration. Fabula-level understanding does not necessarily entail discourse-level understanding.

3.2 Events in Narrative Theories

The role of events in extracting narratives is emphasized in multiple work in computational narratology. Readers can refer to Vauth et al. (2021) and Santana et al. (2023) for a summary of various event definitions with aspectual differences. We more or less align with the structuralist perspective on events, which constructs narratives as physical artifacts. We consider an event as the smallest functional unit in the narrated world that causes a change of state. This state can be of a story world, or of a mental world for a character or a reader. This broader definition describes what Hühn (2009) refers to as the type I event, denoting any change of state explicitly or implicitly represented in a text. An implicit change of state can be purely descriptive, such as "Michael Phelps has speed genes". It implicitly changes a state for the reader since it is a new information.

However, we do not adhere to a rigid definition of events based on whose state is changed. Instead, we adopt a computationally pragmatic approach by categorizing events into two types: constituent events and supplementary events (Abbott, 2020).

Constituent events, also referred to as nuclei (Barthes and Duisit, 1975) or kernels (Chatman, 1978), are the essential events that form the back-

[2]Event extraction is often used interchangeably with event detection. To avoid confusion, we use the term event extraction.

[3]According to Ryan (1991)'s Possible Worlds theory, statements in news articles are true within the textual reference world, which is the news narrative itself.

bone of the narrative. These are the events without which the story would fundamentally change or would not make sense. They are crucial to the plot's development, driving the narrative forward.

Supplementary events, also known as catalyzers (Barthes and Duisit, 1975) or satellites (Chatman, 1978), are those that are not crucial to the plot but add depth, richness, and complexity to the narrative. These events are not necessary for the story to be complete but can enhance the understanding of characters, settings, or themes.

According to Abbott (2020), on the one hand, if a constituent event is removed, the story would be significantly altered or lose coherence. On the other hand, removing a supplementary event might make the story less detailed or interesting, but it would still be recognizable as the same story.

4 Representing Narrated World Logic

We denote the narrated discourse (in text) as S, fabula (a list of events) as F and pre-textualized discourse as D, and define,

$$F = \phi(S)$$
$$D = \pi(S|F)$$

, where $\phi(\cdot)$ maps text to fabula, and $\pi(\cdot)$ extracts the narrated world, conditioned on the extracted fabula. Fabula consists of (1) a list of temporally ordered events $E = [e_1, e_2, ..., e_n]$ mentioned in S, where n refers to the number of events, and (2) a relation matrix $H_{n\times n}$, representing the causal relation between them. To simplify the problem, we consider only one relation: event-event causal relation.

$$H_{n\times n} = \begin{bmatrix} 0 & r_{12} & ... & r_{1n} \\ r_{21} & 0 & ... & r_{2n} \\ ... & ... & ... & ... \\ r_{n1} & r_{n2} & ... & 0 \end{bmatrix} \quad (1)$$

represents the narrated causal logic, where $r_{ij} \in \{1, -1\}$ indicates the causal relation from the i^{th} event e_i to the j^{th} event e_j for any $i \neq j$. Furthermore, $r_{ij} = 1$ indicates e_i causes e_j in the narrated world, and vice versa, $r_{ij} = -1$ indicates e_j causes e_i. To compute r_{ij}, a pairwise classifier $b(\cdot)$ is well suited to estimate causality,

$$r_{ij} = b(e_i, e_j) \quad (2)$$

To achieve this, we formalize fabula as $F = \{E, H\}$. Extracting F from S requires extracting both E and H with an event extractor and event-event relation extractor respectively.

5 Finding Constituent Events

One major challenge for document-level event causal relation extraction is having a large fabula space in existing datasets, including BECauSE 2.0 (Dunietz et al., 2017), CaTeRS (Mostafazadeh et al., 2016), RED (O'Gorman et al., 2016), Causal-TB (Mirza, 2014), EventStoryLine (Caselli and Vossen, 2017) and MAVEN-ERE (Wang et al., 2022). Table 1 provides descriptive statistics of these datasets. $S(H)$ refers to sparsity of matrix H

$$S(H) = \frac{2 \times N_r}{N_e \times N_e} \quad (3)$$

. N_e and N_r denote the average number of event mention and relation per document. Thus, $2 \times N_r$ denotes the number of non-zero entry in H and $N_e \times N_e$ denotes the total number of entry in H. H is considered a sparse matrix if $S(H) > 0.5$. All popular document-level event causal extraction datasets have a highly sparse relation matrix.

Dataset	#Doc.	N_e	N_r	S(H)
BECauSE 2.0	121	14.90	0.91	0.992
CaTeRS	320	8.46	1.53	0.958
RED	95	91.91	12.07	0.997
Causal-TB	183	37.22	1.74	0.998
EventStoryLine	258	18.34	17.77	0.895
MAVEN-ERE	4,480	25.06	12.94	0.959

Table 1: Statistics on average number of event mention (N_e), average number of causal relation (N_r) per document and sparsity of the relation matrix $S(H)$ in existing document-level event causal extraction datasets. (retrieved and reorganized from Wang et al. (2022))

6 Extracting Core Story

When the number of events N_e is large and the number of relations N_r is small, the resulting relation matrix H often becomes sparse. This sparsity indicates a large number of supplementary events in the narrated discourse do not relate to other events. By filtering out these supplementary events, the matrix H can be made significantly denser, which improves learning efficiency, particularly in scenarios with limited training examples. A filtering function $q(E) = \{e_0, e_1, ..., e_m\}$, where $m <= n$, can be implemented to select only constituent events E_c from $E \in \{E_c, E_s\}$.

The result of this filtering process is a denser event causal relation matrix H_c, which includes

only constituent events. This matrix effectively captures the causal logic of the narrated world. Thus, $I_c = \{E_c, H_c\}$ symbolically represents the core story of causes told by news narrator.

The extraction of core story within a narrated world takes insights from literary criticism, enabling a critical application of information retrieval, for example, in measuring media biases and power abuse, and in understanding the broader sociopolitical implications of news narratives.

7 Related Work

This work positions itself at the intersection of NLP and literary studies. The application of NLP techniques to literary studies is well-established (Hatzel et al., 2023), with various tasks including narrative generation (Riedl, 2009), composition (Gervás, 2013) and evaluation (Vauth et al., 2021), However, the integration of narrative theories into NLP represents a more recent development, as evidenced by works such as Piper et al. (2021); Castricato et al. (2021).

8 Conclusion

We explored the construction of news narratives from an author-focused perspective, focusing on how real-world events are reorganized to to shape a narrated world through the function of narration. We proposed a framework to extract the causal logic within a narrated world, represented as event causal relations, by filtering out supplementary events. A precise and domain-specific definition of constituent events is required to distinguish them effectively. We acknowledge the assumption that public media discourse has a power structure where news narrators (a set of factors that shape the narrative) deliever an ideology to narratees (consumers of all medium such as newspapers, online articles and videos). Our work does not represent or model complex narratives, such as in e.g., artistic films or contemporary literature. We believe it is nevertheless beneficial for media analysis and for nourishing curious discussions between NLP and narrative criticism or other related disciplines.

9 Future Work

This work provided theoretical framework on extracting causal logic from the narrated world in news narratives. Evaluation of its effectiveness should be limited to news domain. Downstream evaluation on document-level event-event causal relation extraction is one option. However, existing news corpora involve various domains, or topics, making it hard to define the core story, constraining the identification of constituent events. A meaningful line of future research is creating such corpora which inherently allows the multiplicity of interpretation. This naturally leads to a low inter-raters agreement score, because of the difference in annotators' interpretation. More in-depth discussions on how to measure and represent interpretation should be encouraged.

Additionally, developing narrative-centric NLP benchmarks is crucial for advancing computational narratology. As exemplified in computational narrative understanding tasks, such as event instance discrimination and narrative level detection. Additionally, for computational story generation, a generalized representation of any change-of-state is required to plan shifts in story world. Other challenges include representing a change in focalized point, or temporal disruptions such as flashbacks and flash-forwards.

Moreover, representing event hierarchy in NLP should be more investigated to aid extraction in narrative understanding. An expert-designed representative ontology can be defined symbolically to assist reasoning or planning tasks, such as event temporal development or event causal discovery.

Last but not least, this work's assumption limits its domain to news narratives. Common narrative elements such as temporal shifts, rhetorical strategies, or emotional arcs, which also shape the overall narrative structure, are not considered in this work, because we view news narrative as being standardized to be informative and inclusive, and thus with simpler narrative structure. Integral frameworks and methods for representing and modelling complex narratives such as fiction or film should be the natural next step.

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Limitations

We view the shaping of the narrated world as an reorganization of events, and the sole consideration on causal relation. This simple assumption ignores common complex aspects in a narrative. The selection of constituent events solely considers relational aspect of the reorganization, limiting the scope to news narrative. Furthermore, non-event-related narrative nuances can not be captured.

Ethics Statement

To our knowledge, this work does not concern any substantial ethical issue. Example sentences shown in this paper do not harm any individuals or groups. Of course, the application of algorithms could always play a role in Dual-Use scenarios. However, we consider our work as not-risk-increasing.

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