

# Homo Narrans

## From Information to Narratives

**Jochen L. Leidner, Invited Talk, Text2Story '24 Workshop, Glasgow, 2024-03-24**

# A Story

For sale: Baby shoes, never worn.

# A Short Story That is Very Short But Still Deep

- Thesis: *We can learn a lot about “stories” and “narratives” from the literary genre of **short stories**, the most densely packed form of prose.*
  - surface plot is not (usually) the story
  - symbolism (hard for NLP!)
  - it’s a lot about what isn’t said or described explicitly (hard for NLP!)
- Here:
  - Author unknown (ca. 1920) - misattributed to Hemingway, but predates him
  - 6 words, one whole story of pain & suffering: “For sale: Baby shoes, never worn.”
  - unused piece of clothing symbolizes one’s unfulfilled dream (of being a parent)
  - with the baby’s passing, a piece of self of the parents also died
  - would be too hurtful to keep the shoes, constant reminder



# Another Story

"What's the matter? What's happened?"

"There's been a horrible accident," said Cook. "A man killed."

"A man killed! Where? How? When?"

But Godber's man wasn't going to have his story snatched from under his very nose.

"Know those little cottages just below here, miss?" Know them? Of course, she knew them. "Well, there's a young chap living there, name of Scott, a carter. His horse shied at a traction-engine, corner of Hawke Street this morning, and he was thrown out on the back of his head. Killed."

# Another Story

What matters in the news

Headline (mostly WHAT)

WHO

WHAT

WHEN

WHERE

HOW

What matters here

Someone has a story they want to tell  
It is horrible, but people are still fascinated

The story has a symbolic meaning  
(which will become evident later)

Headline

"What's the matter? What's happened?"

"There's been a horrible accident," said Cook. "A man killed."

"A man killed! Where? How? When?"

But Godber's man wasn't going to have his story snatched from under his very nose.

Narrative

"Know those little cottages just below here, miss?" Know them? Of course, she knew them. "Well, there's a young chap living there, name of Scott, a carter. His horse shied at a traction-engine, corner of Hawke Street this morning, and he was thrown out on the back of his head. Killed."

Source: Katherine Mansfield (1922) "Garden Party"

# Another Story

And after all the weather was ideal. They could not have had a more perfect day for a garden-party if they had ordered it.

[...]

What did garden-parties and baskets and lace frocks matter to him? He was far from all those things.

Source: Katherine Mansfield (1922) "Garden Party"

# Another Story

State of *naive bliss*

And after all the weather was ideal. They could not have had a more perfect day for a garden-party if they had ordered it.

[...]

↓  
Protagonist's Epiphany

What did garden-parties and baskets and lace frocks matter to him? He was far from all those things.

# Outline

- Motivation: Two Examples
- ‘Text to Story’ – What does that all *mean*?
- Research Questions
- Elements of a Model of Narration
- The *Time* Dimension
- The Space Dimension
- The *Topical* Dimension - Topics & thematic shifts
- Other Dimensions
- Three Suggested Rules
- “Why?” Reconsidered
- Epiphany
- The End

# “Text to Story” – What does that all mean?

- **Text:** a document is a document, but a news “story” is not intended to narrate, but to inform respecting one’s time (inverted pyramid structure of reporting)
- **Story:** (1) s.th. told to entertain, or (2) telling the development or history of s.th.
- **Narrative:** synonym to story, a way a sequence of connected events are told
- *Telling a story is a cultural ritual (we will get back to that!)*



Source: Oxford Dictionaries

# Typical Text to Story NLP/IR Tasks

- Temporal Relation Identification
- **Temporal Reasoning and Ordering of Events**
- Causal Relation Extraction and Arrangement
- Big Data Applied to Narrative Extraction
- **Narrative Representation**
- Annotation protocols
- **Narrative Representation Models**
- Lexical, Syntactic, and Semantic Ambiguity in Narrative Representation
- Narrative Analysis and Generation
- Argumentation Analysis
- Language Models and Transfer Learning in Narrative Analysis
- Narrative Analysis in Low-resource Languages
- Multilinguality: Multilingual and Cross-lingual Narrative Analysis
- Comprehension of Generated Narratives
- **Story Evolution and Shift Detection**
- **Automatic Timeline Generation**
- Datasets and Evaluation Protocol
- Evaluation Methodologies for Narrative Extraction
- Annotated datasets
- Narrative Resources
- Ethics and **Bias** in Narratives
- Bias Detection and Removal in Generated Stories
- Ethical and Fair Narrative Generation
- Misinformation and Fact Checking
- Narrative Applications
- Narrative-focused Search in Text Collections
- **Narrative Summarization**
- Narrative Q&A
- Multi-modal Narrative Summarization
- Sentiment and Opinion Detection in Narratives
- Social Media Narratives
- Narrative Simplification
- Personalization and Recommendation of Narratives
- **Storyline Visualization**

See our **news bias** model  
(Menzner and Leidner 2024)  
at this ECIR (IR for Social Good)!

# Sample Bias News Classifier Output

## (Menzner and Leidner, 2024; at this conference)

sentence_text	In October, Breitbart London reported that French police are allegedly actively assisting migrants to avoid detection by UK Border Force, telling them when and when not to attempt to cross the channel, according to a people smuggler
gold_label	Biased
assessment_by_model	GPT-3.5 FT
bias_type	Reporting-level context bias
bias_score	0.5
bias_description	The sentence cites Breitbart London as the source of the information, which is known for its conservative bias. This could be seen as a bias in the choice of source, potentially influencing the reader's perception of the reported event.
sentence_text	Football supports Trump in its promotion of racial division, the crushing of dissent, and the spread of misinformation, inequality, and brutality
dataset_label	Biased
assessment_by_model	Llama2
bias_type	Political bias
bias_score	0.9
bias_description	This sentence directly implies that football, by extension the NFL, supports Trump and his policies, which is a highly controversial and debated topic. The use of the phrase 'promotion of racial division' and 'spread of misinformation' implies a strong negative bias against Trump and the NFL, and could be seen as taking a political stance.

# Research Questions

What is a “story”, and why should we care?

What is a narrative made up of?

What signals from textual prose tell us what the narrative is?

What about signals from structured data that imply a particular narrative?

What is the larger narrative behind a “scatterplot” set of individual event datapoints?

What is the essence of a story?

And how to model all that?

**Could we draw some *inspiration* from the non-scientific literature?**

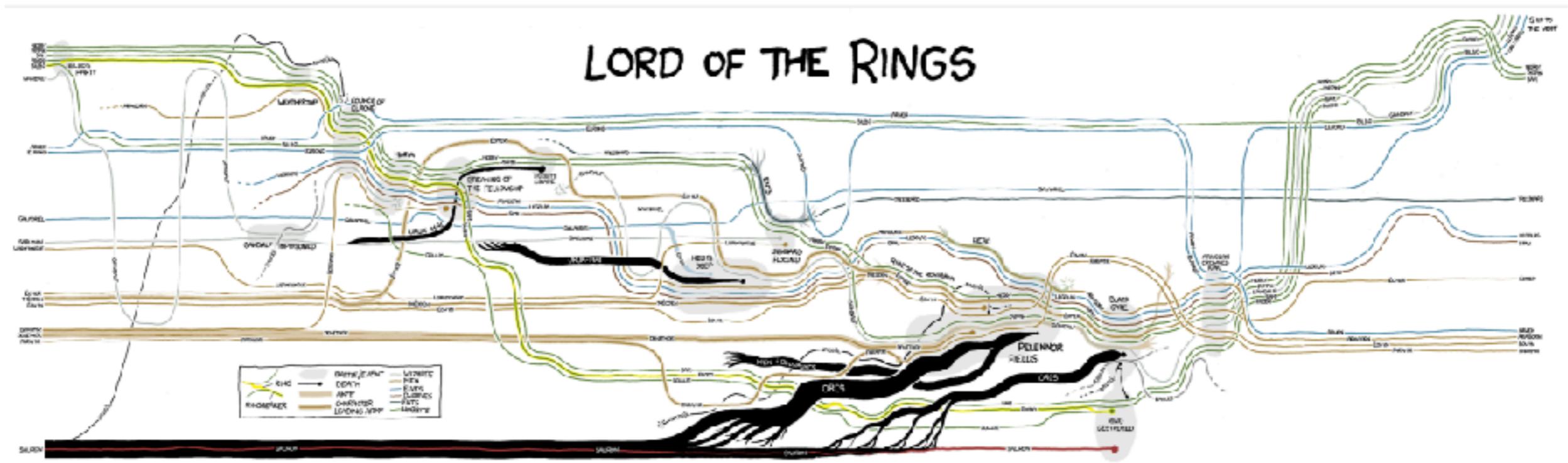
# Elements of a Model of Narration



- Story  
(news or otherwise)
  - Model of Narration  
(explains the story)
  - Space
  - Time
  - People (actors: people doing stuff)
  - Topics + Thematic Shifts
- 
- Developments  
(e.g. personal growth, a person changing a view)
  - Outcomes  
(results, moral of the story, insights)

# The *Time* Dimension

- Time is the essential dimension to order the elements of any story along
  - Using a single relation ( $\text{before}$ ,  $<$ ), we can bring a certain order into things, and also visualise



Source: XKCD comic

# The *Time* Dimension

- Allen *et al.* (2001) want "to help a person monitor changes in news coverage over time"
- Temporal summaries: "extracting a single sentence from each event within a news topic" subject to the constraints:
  - the stories are presented one at a time and
  - sentences from a story must be ranked before the next story can be considered
- Althoff *et al.* (2015) **TimeMachine**: zoomable time lines for entities



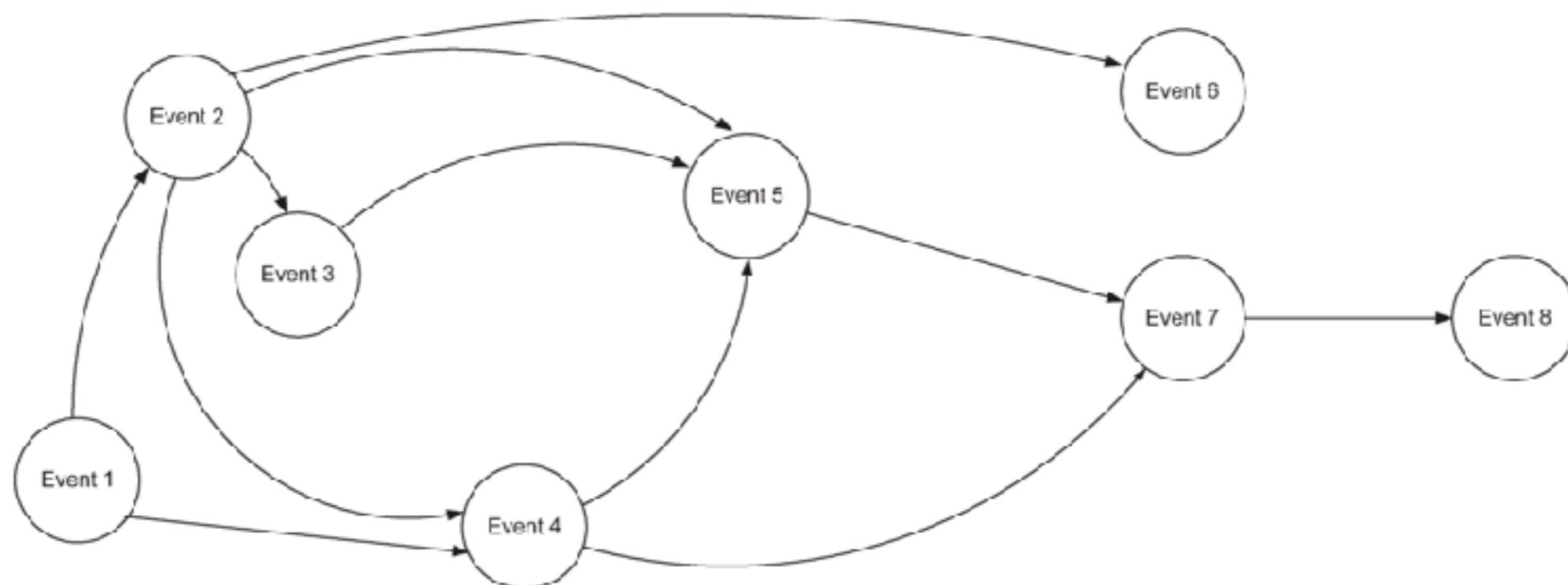
Example time line for U.S.-American actor Robert Downey (left: macro, right: zoomed-in)

# Time Lines From Event Evolution Graphs

## (Yang, Shi and Wei, 2009)

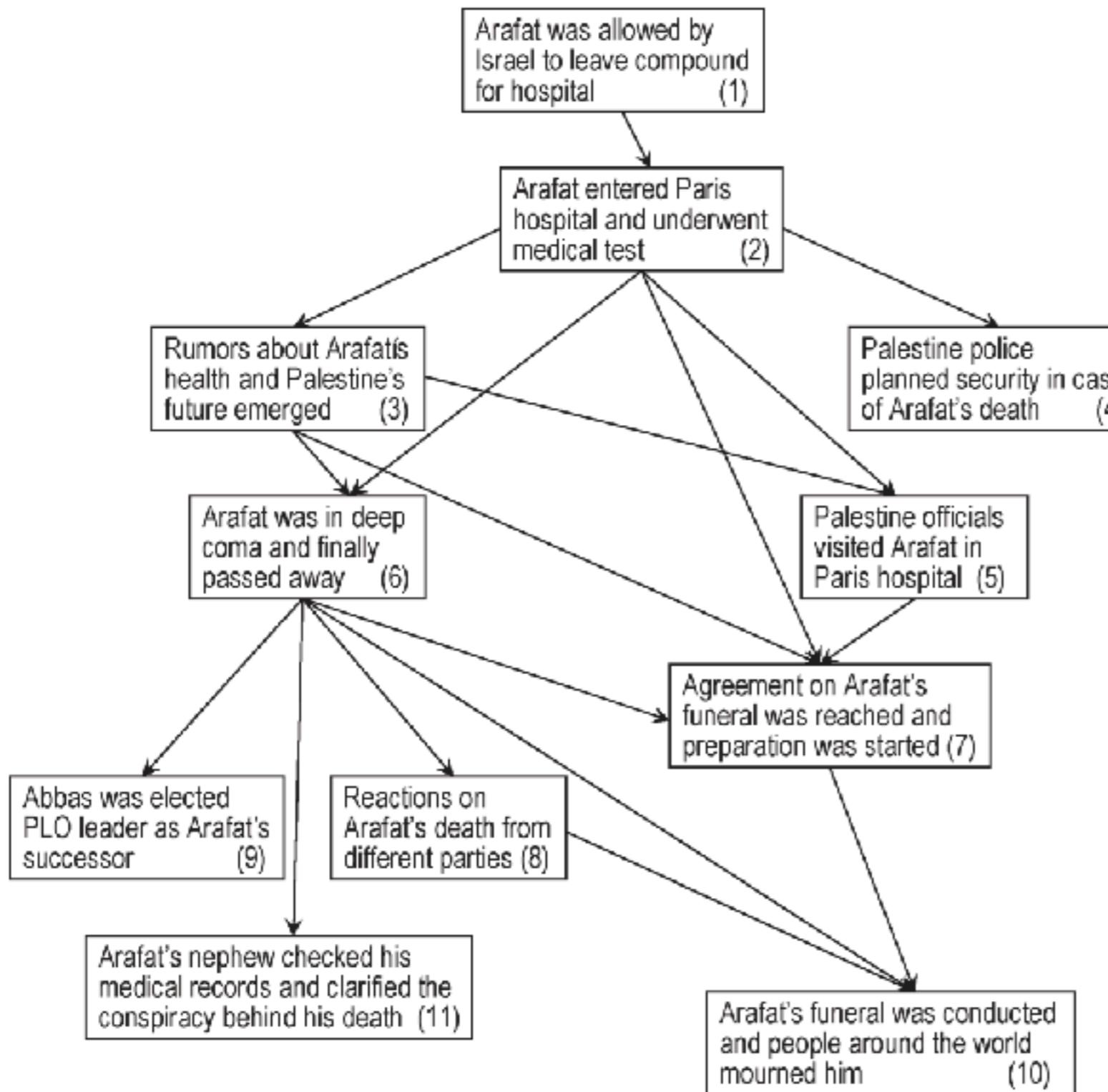
TABLE I  
EVENTS IN "CHECHEN TERRORISTS SEIZING BESLAN SCHOOL" TERRORIST ATTACH CASE

Event	Event Summary	Num. of doc.	Start time	End time
1	Chechen terrorists seized the Beslan school with hostages, negotiated, freed some hostages	5	2004-09-02 01:46	2004-09-03 07:08
2	Special task force assaulted terrorists and hundreds of hostages were dead	3	2004-09-03 14:46	2004-09-05 05:14
3	Responses of different parties on the Beslan school hostage tragic	5	2004-09-04 15:45	2004-09-07 13:04
4	Russia approached to identify the suspects of Beslan tragedy	6	2004-09-06 01:07	2004-09-08 17:54
5	Russia conducted investigation and determined to put terrorists on trial	4	2004-09-08 15:44	2004-09-24 11:36
6	Beslan school resumed classes after the hostage tragic	3	2004-09-14 08:12	2004-09-15 12:33
7	Russia claimed to strike Chechen terrorism	3	2004-09-14 08:52	2004-09-17 12:38
8	Russia's successive efforts against terrorism	3	2004-09-29 12:01	2004-12-17 13:53



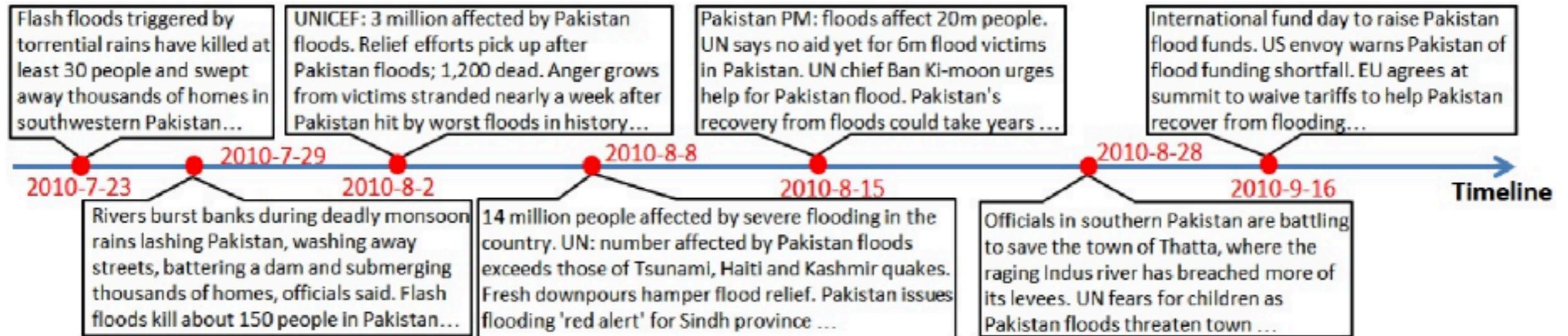
# Event Evolution Graph “Arafat’s Death”

## (Yang, Shi and Wei, 2009)



# Breakpoint Modeling for Timelines

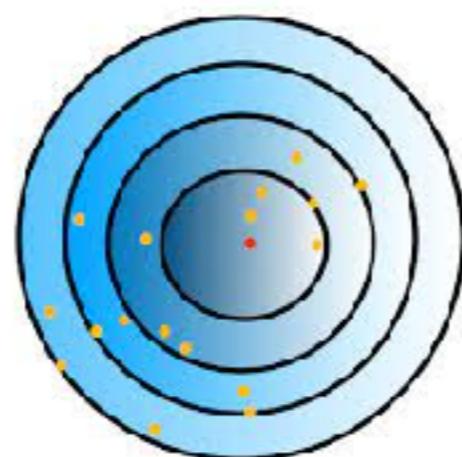
## (Hu et al., 2011)



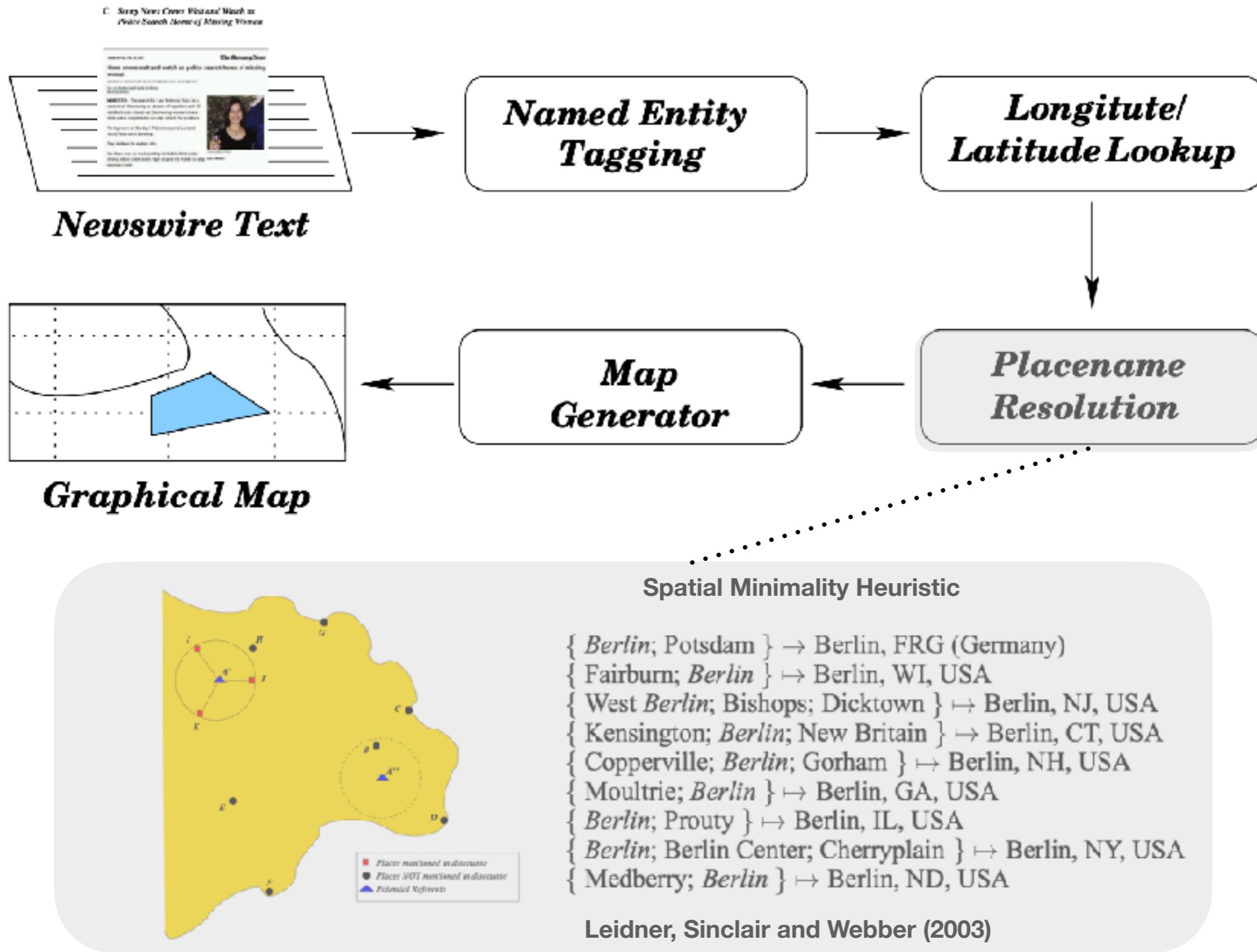
- Use sentences to represent events at a certain stage
- breakpoint: date when decisive changes occur in the development of a topic.
- HMM with Poisson emission probabilities

# The Space Dimension

- Geographic space complements time
- Physics already views space-time as a single 4-dimensional space, but in ordinary life we decide between 3 spatial dimensions, which permit us to move freely inside of, and time, which is a single dimension where we can only traverse forward.
- Every story happens **somewhere**
- "Everything is related to everything else, but near things are more related than distant things."
  - First Law of Geography: Tobler (1970)



# The Space Dimension - LSW03



# The Space Dimension

## C Story News Crews Wait and Watch as Police Search Home of Missing Woman

Posted on Thu, Feb. 20, 2003

**The Mercury News**

### News crews wait and watch as police search home of missing woman

SCORSES OF REPORTERS HOPE FOR MORSELS OF INFORMATION

By Lori Ribasai and Linda Goldstein  
Mercury News

**MODESTO** — The search for Laci Peterson took on a carnival air Wednesday as dozens of reporters and 18 satellite trucks staked out the missing woman's home while police completed a two-day search for evidence.

The big news of the day? Police measured Laci and Scott Peterson's driveway.

They declined to explain why.

But there was so much jostling for tidbits that police strung yellow crime-scene tape around the home to keep reporters back.



Associated Press  
Laci Peterson

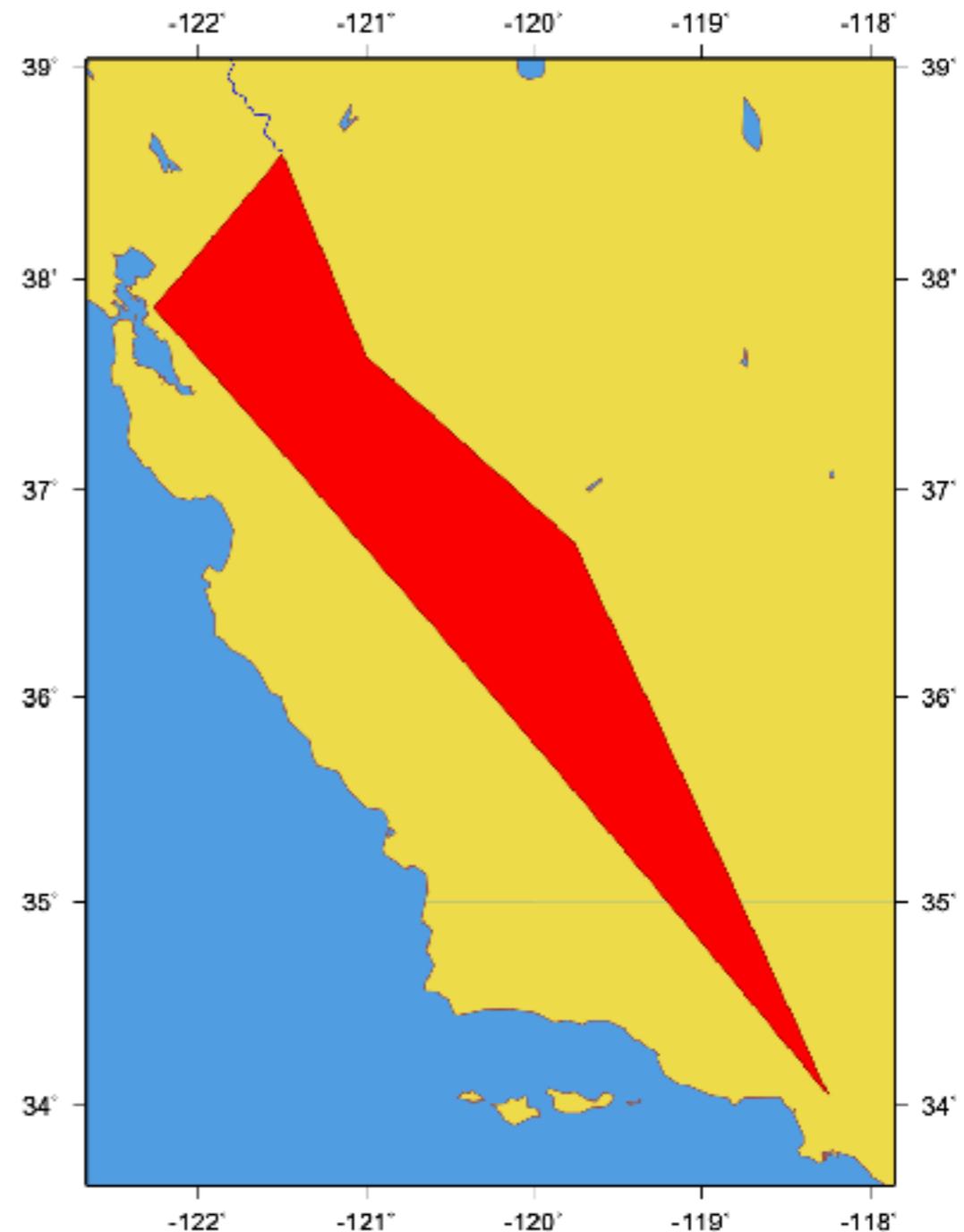


Figure 8: Automatic Visualization of Story C: A Pregnant Woman is Missing in Modesto, CA (Local View; Final Paragraph Excluded).

# Where The Buck Stops... Or Not

≡ Sections

Los Angeles Times

CALIFORNIA

## Scott Peterson Arrested in Wife's Slaying

BY MONTE MORIN AND DAN MORAIN

APRIL 19, 2003 12 AM PT



TIMES STAFF WRITERS

Four months after his pregnant wife disappeared from their Modesto home and days after her skeletal remains washed ashore in San Francisco Bay, federal and local authorities Friday arrested husband Scott Peterson near a La Jolla golf course.

Peterson, 30, has yet to be formally charged with the deaths of his 27-year-old wife, Laci, and their unborn son, Conner, whose remains also turned up beside the bay this week.

The fertilizer salesman is expected to be arraigned early next week in the double homicide, on charges that could lead to the death penalty, Stanislaus County Dist. Atty. Jim Brazelton said at a news conference Friday evening in Modesto.

Authorities issued an arrest warrant for Peterson late Thursday, a day before investigators had positively identified the badly decomposed remains. Modesto police, the California Highway Patrol and federal agents had been watching the husband for months, using wiretaps, vehicle tracking devices and direct surveillance. They said Friday that they feared Peterson might flee, perhaps to Mexico.

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### LATEST CALIFORNIA >

# Laci D. Peterson - Timeline

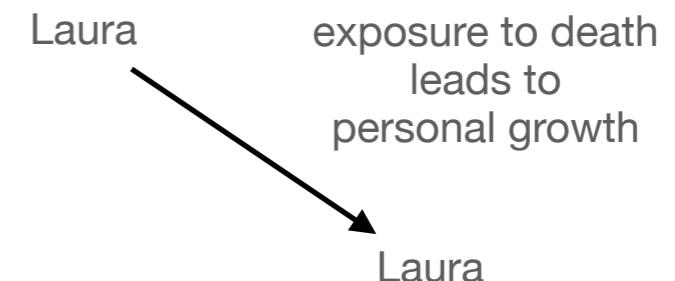
Dec. 24, 2002	Laci Peterson, 27, a substitute teacher who is eight months pregnant, disappears while walking her dog. Her husband, Scott, says he last saw her at 9:30 a.m. when he left to go fishing alone in Berkeley.
Jan. 4, 2003	Divers search area where husband says he was fishing, but police do not name him as a suspect.
Jan. 17, 2003	Missing woman's family confirms reports that Scott Peterson was having an affair.
Feb. 10, 2003	Due date for the Petersons' child.
Feb. 18-19, 2003	Two-day search of Peterson home produces nothing to clear or implicate Scott Peterson, police say.
March 5, 2003	Modesto police announce case is being investigated as a homicide.
Sunday, April 14, 2003 (Wikipedia: 13th)	Remains of a fetus are found in Richmond, on the shores of San Francisco Bay, about 100 miles from Modesto.
Monday, April 15, 2003 (Wikipedia: 14th)	A woman's remains are found about one mile farther south, and about two miles from the marina where Scott Peterson said he was fishing Dec. 24.
Friday, April 19, 2003	Police announce the arrest of Scott Peterson in San Diego County.
November 2004	Scott Peterson was found guilty of the first-degree murder of his wife Laci and the second-degree murder of his unborn son Connor. He was sentenced to death.
2020	Scott's sentence was overturned.
2021	Scott was re-sentenced to life in prison without the possibility of parole.

<https://www.latimes.com/archives/la-xpm-2003-apr-19-me-laci19-story.html>

<https://www.scottpetersonappeal.org/>   [https://en.wikipedia.org/wiki/Murder\\_of\\_Laci\\_Peterson](https://en.wikipedia.org/wiki/Murder_of_Laci_Peterson)

# The Topic Dimension(s)

...as applied to “Garden Party”:

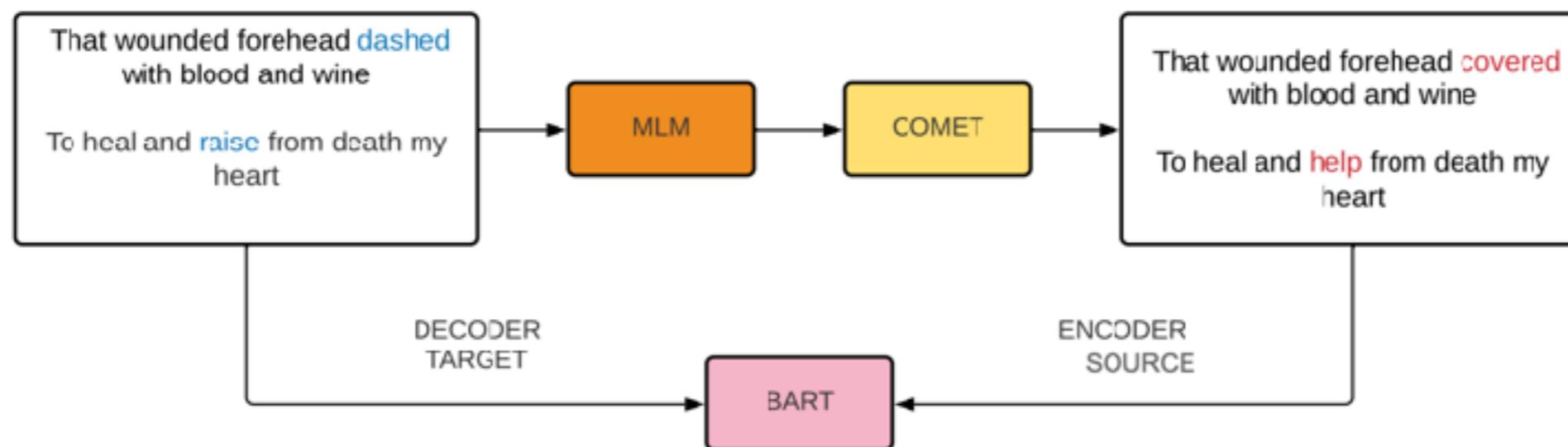


- **Life & Death.** The writer addresses the theme of life & death in the short story. The protagonist learns life is simply marvellous, death and life co-exist, and death is more of a permanent peacefulness state rather than anything scary.
- **Class Consciousness & Class Agnosticism.** Protagonist Laura and the other kids are told to stay away from where their lower-class neighbors live. Yet feels closeness to the workers their family employs; she also takes to the Scott family.
- **Illusion & Reality.** Laura is stuck in a world of high-class housing, food, family, and garden parties. When she learns a neighbor died, she clicks back to reality upon discovering death.
- **Sensitivity & Insensitivity.** The Sheridans hold their garden party, as planned, complete with a band playing music. Laura questions whether this will be appropriate, discovering the death of their neighbour only a few hours earlier.

# Other Dimensions



- The *actant* dimension
  - People (real people, fictional people, sometimes non-human named characters) act in stories - hence we extract PERSON named entities
  - Can be captured by NER + QLF extraction (I predict logics will be back after or even during the transformer hype!):  
DID\_WHAT(WHO, WHOM)
- The *discourse / text related* dimensions, e.g.: "seven standards of textuality: cohesion; coherence; intentionality; acceptability; informativity; situationality; intertextuality" (De Beaugrande and Dressler, 1966)
- The **symbolism** dimension: important for non-news (as we saw), but not many working on non-literal NLP (but see: Markers and Nissim, 2009 on metonymy).
- Chakrabarty *et al.* (2021) generate metaphors/symbols:



# Why?

- Sharing a story is an entertaining, information sharing, community-forging activity
- Humans are wired to listen to narratives - a *homo narrans*
- The bonfire goes together well with the ritual of storytelling, propagating ancient narratives
- Young and Saver (2001), Newman (2005), Hsu (2008), Le Hunte and Golembiewski (2014), and esp. Armstrong (2020)

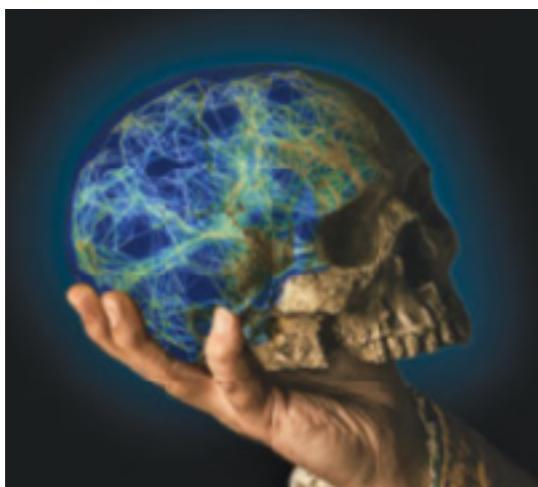


Image credit: Armstrong (2020) cover art



Image credit: coolofthewild.com

# What You See is Not What I See



# What You Read Is Not What I Read

- Our own background stories trigger different conceptualizations and interpretations from the same word sequence

“The fresh smell of the forest after a recent shower.”

*versus*

“Another cut down tree, our planets in execution mode, one ‘arboricide’ at a time.”

- Hence, one piece of text can resonate more with you than with me.

# Who Writes History Controls the Narrative

- Writing history books means choosing one narrative over another.
  - What to include and exclude (*selection bias*)
  - What to highlight and what to downtime (*framing bias*)
- For example,
  - Germany history books now go to great lengths explaining to German school children how Adolf Hitler used the dire economic situation after WW I. combined with *scapegoating* (= blaming the Jewish population) and appealing to populist ideas about identity/heritage, which had the effect that over 6 million people were murdered in gas chambers or made into soap or lampshades.
  - In contrast, Japanese history books do not properly acknowledge WW II. atrocities, nearly 80 years later (Japan and Italy were Germany's allies).

See our **news bias** model  
(Menzner and Leidner 2024)  
at this ECIR (IR for Social Good)!



Berlin Holocaust Memorial. Source: AP

consideration by the local districts.

In 1965 Ienaga Saburo, a prominent historian, filed the first of his three lawsuits against the Ministry of Education, charging that the process of textbook approval was unconstitutional and illegal. The Ministry had rejected Ienaga's history textbook because it contained "too many illustrations of the 'dark side' of the war, such as an air raid, a city left in ruins by the atomic bomb, and disabled veterans."(5) His second suit two years later also involved the issue

# “Why?” reconsidered

- Maybe now we can consider why it is worth doing “Text-to-Story” work?
  - It’s valuable to decode the narrative
  - There is more to text (in subtle ways) than what has been implemented to work well by NLP researchers.
  - Two types of work:
    - “connecting the dots” (information filtering) and
    - “what’s the essence of this story” (summarization)
  - ...beyond, can we also model meaning, moral of the story, symbolism?

# Three Suggested Rules

- **Find a stakeholder** (that's what users are called by people who think "users" is a bad word) who you think will need your method/system and **talk** to them.
- **Decide** if you are in the business of (1) reducing an embellished story to its essence by leaving out the non-essential, i.e. you are a **summarization** person, or whether you are into (2) putting together the most likely story given some sparse data points ("*connecting the dots*"), i.e. you are an **information filtering** person.
- **Think** what evaluation metric to pick, from a **pain minimisation** perspective: what hurts the stakeholder more, **FP** or **FN** (usually FN)?



*"Never summarize until you know what the summary is used for."*  
*(Donna Harman, personal comm., 2016-03-22)*

# Garden Party Redux

At the corner of the lane she met Laurie.

He stepped out of the shadow. "Is that you, Laura?"

"Yes."

"Mother was getting anxious. Was it all right?"

"Yes, quite. Oh, Laurie!" She took his arm, she pressed up against him.

"I say, you're not crying, are you?" asked her brother.

Laura shook her head. She was.

Laurie put his arm round her shoulder. "Don't cry," he said in his warm, loving voice. "Was it awful?"

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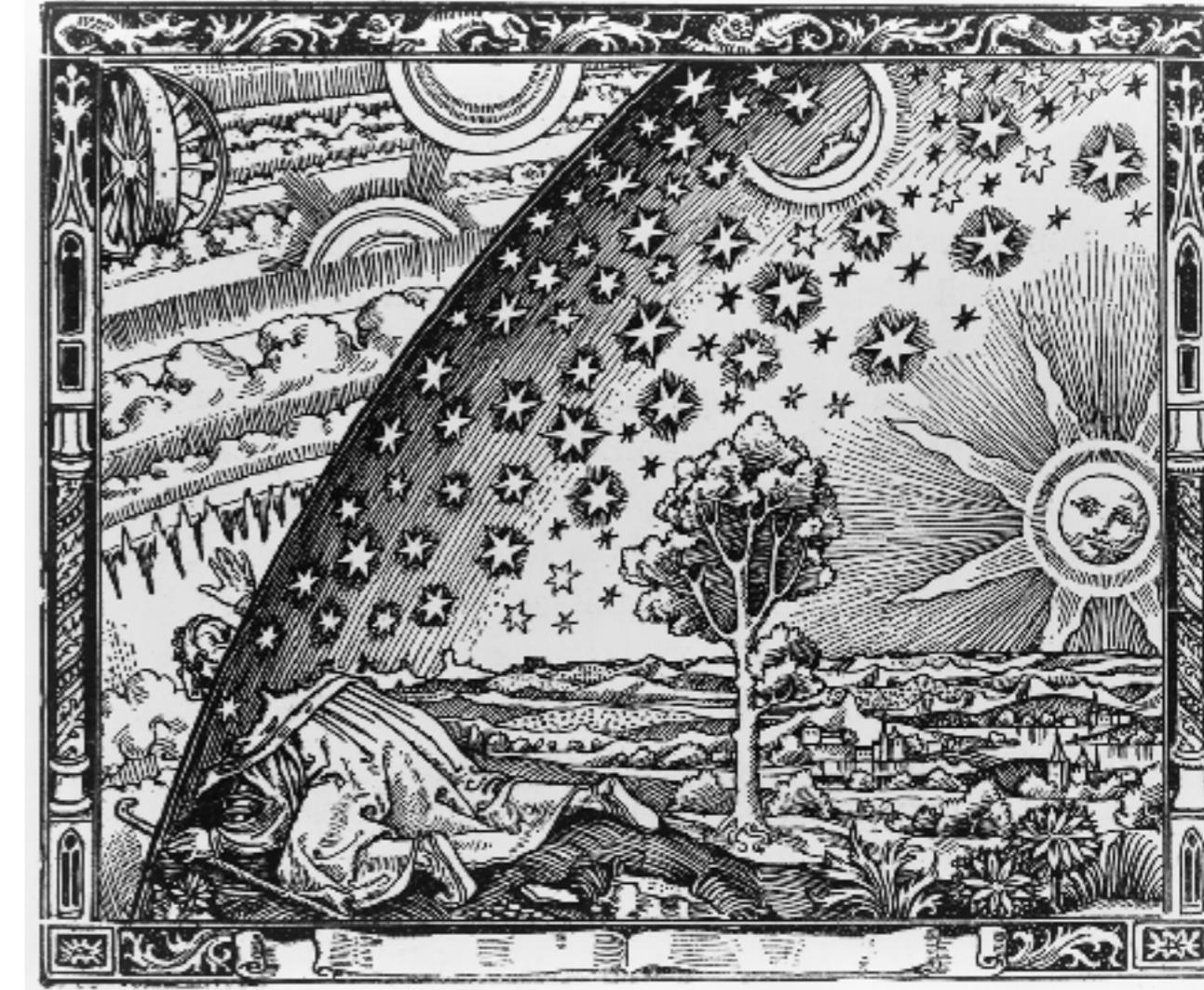
"No," sobbed Laura. "**It was simply marvellous.** But Laurie--" She stopped, she looked at her brother. "**Isn't life,**" she stammered, "**isn't life--**" But what life was she couldn't explain. No matter. He quite understood.

"Isn't it, darling?" said Laurie.

*Protagonist transformed  
epiphany*

# Epiphany

- In general, and in short stories, a deeply revelational “aha” moment when a protagonist catches a glimpse of what is really going on when they otherwise have been staying on a lower level of awareness.
- “*An epiphany (from the ancient Greek ἐπιφάνεια, epiphaneia, “manifestation striking appearance”) is an experience of a sudden and striking realization. Generally the term is used to describe a scientific breakthrough or a religious or philosophical discovery, but it can apply in any situation in which an enlightening realization allows a problem or situation to be understood from a new and deeper perspective. Epiphanies are studied by psychologists and other scholars, particularly those attempting to study the process of innovation.*” (Wikipedia)



# ...But Wait, Where Is Your GPT Slide for this Talk?

(3.) Laura's Journey  
is the gold dust  
To make this an  
“A” answer!  
(A+ would require  
mentioning “epiphany”)



You

ChatGPT, what is holding the different parts of the short story "garden party" together?



ChatGPT

"The Garden Party" by Katherine Mansfield is held together by several key elements:

1. **Setting:** The story is set in a specific location, the Sheridans' family home and garden. The vivid description of the garden and its surroundings serves as a unifying backdrop for the events of the story.
2. **Theme of Class Division:** The story revolves around the Sheridans, an upper-class family, preparing for a garden party while contrasting their lives with those of the working-class Scott family, who live nearby. The theme of class division and privilege permeates the narrative, tying together the interactions and conflicts between characters.
3. **Laura's Journey:** Laura Sheridan, the protagonist, undergoes a subtle transformation throughout the story. Initially excited about the party, she becomes increasingly troubled by the news of Mr. Scott's death and the subsequent decision to cancel the party. Her personal growth and realization about life's fragility serve as a central thread in the narrative.
4. **Symbolism of the Garden Party:** The garden party itself serves as a symbol of the Sheridans' social status and privilege. It represents a world of beauty and luxury that is sharply contrasted with the harsh realities outside their gates. The cancellation of the party due to Mr. Scott's death forces the characters to confront the disparity between their privileged lives and the suffering of others.
5. **Conflict and Resolution:** The story builds tension through conflicts such as Laura's internal struggle over attending the party after learning of Mr. Scott's death and the family's debate over whether to cancel the event. The resolution comes when Laura decides to visit the Scotts, bridging the gap between the two families and bringing a sense of closure to the narrative.

These elements work together to create a cohesive narrative that explores themes of privilege, empathy, and the complexities of human interaction.

# The End

- This narrative stops here (and the narrator need to go back to bed to recover) ... but you are just getting started!
- Enjoy ECIR 2024 and thank you for your attention!

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## Stories and the Brain

*The Neuroscience of Narrative*



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# Abstract

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KEYNOTE:

## Homo Narrans: From Information to Narratives

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# Abstract

Humans are curious creatures, equipped with a sense of (and desire for) finding meaning in their environment. They are predisposed to identify patterns, real and spurious, in the world they live in, and above anything else, they understand the world in terms of *narratives*.

In this talk, we will explore a set of questions about narratives: what is a narrative made up of? What signals from textual prose tell us what the narrative is? What about signals from structured data that imply a particular narrative? What is the essence of a story? How can narrative information be extracted and presented? Open source intelligence analysts and investigative reporters alike are hunting for the story, the narrative, behind the petabyte intercepts or terabyte leaks. The more data we gather or have available, the stronger will be our thirst to distill meaningful stories from it.