Visualizing Nonlinear Narratives with Story Curves

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STORY
What is told

NARRATIVE
How it is told
Pulp Fiction (1994)
Narrative Order

Story Order

#2

#1

#5

#3

#4
NONLINEAR NARRATIVE

Telling events out of chronological order
GÉRARD GENETTE

French Literary Theorist (1930-)
Chronology
Retrograde
Flashback
Flash Forward
Zigzag

by Gérard Genette
How did Genette identify such basic nonlinear narrative patterns?
Sometimes passing in front of the hotel he remembered the rainy days when he used to bring his nursemaid that far, on a pilgrimage. But he remembered them without the melancholy that he then thought he would surely some day savor on feeling that he no longer loved her. For this melancholy, projected in anticipation prior to the indifference that lay ahead, came from his love. And this love existed no more.
Sometimes passing in front of the hotel he remembered the rainy days when he used to bring his nursemaid that far, on a pilgrimage. But he remembered them without the melancholy that he then thought he would surely some day savor on feeling that he no longer loved her. For this melancholy, projected in anticipation prior to the indifference that lay ahead, came from his love. And this love existed no more.
A2 [B1] C2 [D1 (E2) F1 (G2) H1] I2

Flashback

Flashforward
Close reading of a text passage does not scale beyond a few sequence.
Develop a **distant reading technique** to reveal global narrative structures
STORY CURVES
Events

Narrative Order
1
2
3
4
5

Story Order
1 C
2 D
3 A
4 B
5 E
“Silver Linings Playbook” follows the standard model for trailers, according to Bill Woolery, a trailer specialist in Los Angeles who once worked on trailers for movies like “The Usual Suspects” and “E.T. the Extra-Terrestrial.” While introducing the movie’s story and its characters, the trailer largely follows the order of the film itself.

- The trailer’s opening shot — an image of the family’s home — appears near the end of the film, but there are similar shots near the beginning of the movie.
- A handful of very short shots are never seen in the film, although most are shown from alternate camera angles.
- Shots that accompany the main actors’ names are also shown out of order.
Silver Linings Playbook

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PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino
PULP FICTION
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- **Beginning**
- **Middle**
- **End**

**Story Order**

(Narrative order →)
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Narrative Order
PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Column = Scene
PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino

Segment = Character
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Band = Location
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Backdrop = Time of the day
Begins in the middle of the story.
PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino
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Jules’ story (Red)
PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino
Vincent’s story (Orange)
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino
PULP FICTION
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Young Butch’s story (Yellow)
PULP FICTION
Thriller, Crime | October 1994 | Directed by Quentin Tarantino

Flashback
PULP FICTION
Thriller, Crime  |  October 1994  |  Directed by Quentin Tarantino

Jules’ story (cont’d)
FIGHT CLUB

Beginning in medias res
ETERNAL SUNSHINE

Diverging Zigzag
ETERNAL SUNSHINE
500 DAYS OF SUMMER

Short Zigzag
500 Days of Summer

Staged Flashbacks
500 DAYS OF SUMMER

Staged Flashforwards
500 DAYS OF SUMMER

Bidirectional Flashes
Annie Hall

Bidirectional Flashes
ANNIE HALL

Staged Flashbacks
READABILITY STUDY

Can people read narrative patterns from story curves?
READABILITY STUDY

13 Participants
• 8 female, 12 graduates
• no expertise in visualization or narrative theory
Readability Study

13 Participants
• 8 female, 12 graduates
• no expertise in visualization or narrative theory

Procedure
• Introduced to basic nonlinear narrative patterns
• shown how they are represented in story curves
READABILITY STUDY

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Procedure
- Introduced to basic nonlinear narrative patterns
- shown how they are represented in story curves

20 multiple-choice pattern reading questions
Q5. Among five basic patterns (Chronological, Retrograde, Flashback, Flashforward, Zigzag), how many of them do you see in this story curve?

Hint: Be careful and look at both overall patterns as well as sub-group patterns.

- One
- Two
- Three
- Four
- All Five
Q5. Among five basic patterns (Chronological, Retrograde, Flashback, Flashforward, Zigzag), how many of them do you see in this story curve?

Hint: Be careful and look at both overall patterns as well as sub-group patterns.

- One  - Two  - Three  - Four  - All Five

80% 

(16/20) 

Avg. Accuracy per participant
“Putting the origin at the upper left corner was initially disorienting” - P3
“I needed to remind myself that one thing is narrative and the other is chronological.” - P9
Q5. Among five basic patterns (Chronological, Retrograde, Flashback, Flashforward, Zigzag), how many of them do you seen in this story curve?

Hint: Be careful and look at both overall patterns as well as sub-group patterns.

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“I was able to recognize Memento’s curve. It is a totally fascinating idea.” - P11
How did we build story curves?
Eternal Sunshine of the Spotless Mind (2003)
by Charlie Kaufman.

INT. PUBLISHING HOUSE RECEPTION AREA - DAY

It's grand and modern. Random House-Knopf-Taschen is etched on the wall in large gold letters. An old woman enters carrying a tattered manuscript, maybe a thousand pages. She seems haunted, hollow-eyed, sickly. The young receptionist, dressed in a shiny, stretchy one-piece pantsuit, looks up.

RECEPTIONIST
Oh, hi.

OLD WOMAN
(apologetically)
Hi, I was in the neighborhood and thought I'd see --

RECEPTIONIST
I think he's in a conference. Unfortunately. I'm really sorry.

OLD WOMAN
Would you just try him? You never know. As long as I'm here. You never know.
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ORIGINALIST

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<table>
<thead>
<tr>
<th>Scene</th>
<th>Length</th>
<th>Time of Day</th>
<th>Location</th>
<th>Interior/Exterior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character</td>
<td>Verbosity</td>
<td>Sentiment</td>
<td>Gender</td>
<td></td>
</tr>
</tbody>
</table>

**Top Billed Cast**

<table>
<thead>
<tr>
<th>Name</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>John Travolta</td>
<td>Vincent Vega</td>
</tr>
<tr>
<td>Samuel L. Jackson</td>
<td>Mike Wallace</td>
</tr>
<tr>
<td>Uma Thurman</td>
<td>Mia Wallace</td>
</tr>
<tr>
<td>Bruce Willis</td>
<td>Seth Coolidge</td>
</tr>
<tr>
<td>Ving Rhames</td>
<td>Marselles Wallace</td>
</tr>
</tbody>
</table>
Movie Script

Still no information about the chronological order of scenes

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OLD WOMAN
Would you just try him? You never know. As long as I'm here. You never know.
Reconstruct the Chronological Order of Scenes
Support Visual Exploration of Movie Scripts
EXT. FRONT OF MARSELLUS WALLACE'S HOUSE - NIGHT

Vincent
Well I'm of the opinion that Marcellus can live his whole live and never ever hear of this incident.
The Malibu pulls up to the front. Mia gets out without saying a word (still in a daze) and begins walking down the walkway toward her front door.

Mia
Don't worry about it. If Marcellus ever heard of this, I'd be in as much trouble as you.
Mia smiles.
She turns around. Vincent's out of the car, standing on the walkway, a big distance between the two.

Mia
What's yours?

Vincent
What are your thoughts on how to handle this?

Vincent
Mia!
What are potential use cases of Story Explorer?
Participants
• 3 Professional writers (W)
• 1 Literary scholar (L)
Participants
• 3 Professional writers (W)
• 1 Literary scholar (L)

Procedure
• Introduced Story Explorer
• Presented narrative patterns discovered
• Discussed potential use cases
“The visuals look like musical notes. A literary work has also rhythm. It is fantastic to see the narrative structure in this way.”
“Students often have a hard time writing a good narrative even if they have a good story. They especially don’t know how to use time well and often overuse flashbacks. This tool can visually teach how time is manipulated in a narrative.”

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“In a TV series, people could use it to help visualize the amount and type of nonlinearity that is typical in early episodes. Similarly, it could help someone who rearrange the rendered scenes and compare different arrangements of events.”
FUTURE WORK

Extensions to Different Aspects of Nonlinear Temporality

- **Frequency**: repetitive descriptions of a single story event
- **Duration**: time taken to narrate a story event
- **Temporal paradoxes**: time loops & parallel timelines
FUTURE WORK

Extensions to Different Aspects of Nonlinear Temporality
• **Frequency**: repetitive descriptions of a single story event
• **Duration**: time taken to narrate a story event
• **Temporal paradoxes**: time loops & parallel timelines

Generalizations to Other Domains
• **Other genres**: theater plays, novels, video games, etc
Future Work

Extensions to Different Aspects of Nonlinear Temporality
- **Frequency**: repetitive descriptions of a single story event
- **Duration**: time taken to narrate a story event
- **Temporal paradoxes**: time loops & parallel timelines

Generalizations to Other Domains
- **Other genres**: theater plays, novels, video games, etc
- **Other data domains**: comparison of two orderings for the same set of elements
  1. Rankings in sports analytics
  2. Chromosome rearrangements in biology