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The Discussion Between Puzzle Film and Non-Linear Narrative Film

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Abstract

Classical narrative cinema started production in Hollywood in 1920. Non-linear narrative films have recently not only become more and more popular among audiences and filmmakers but have inspired a great deal of research. Fundamentally, in classical movies, narrative time and space develop the story plot and logic. However, Puzzle films refer to a narrower subset: complex cinema generally has a specific structure, and it will offer unique viewing experience within 'pervasive paradoxes. They present impossible universe, even though are not performing physical impossibilities but principally including logical impracticalities, such as mutually special versions of events, looping temporal lines and alternative paradoxes. Data visualisation and the 'story curve' tool explore innovative methods to study puzzle films. Meanwhile, it also displays each character and their scene length, which is a part of frequency in non-linearity. Pulp Fiction's non-linearity number is 0.63. Compared to Memento, which has a non-linearity of 0.81, Pulp Fiction seems to have a lower frequency of non-linearity, showing that in Memento, emotions and curves significantly fluctuate within non-linearity and relevant storytelling circumstances. In other words, data visualisation offers ways to observe the structures of puzzle films via computer science.

Keywords: Art Cinema, cognitive confusion, puzzle films, non-linear narrative films, data visualization

Introduction

Classical narrative cinema started production in Hollywood in 1920. Non-linear narrative films have recently become not only more popular among audiences and filmmakers but have also inspired a great deal of research.

David Bordwell indicates in The Art Cinema as Mode of Film Practice (Bordwell, 1979) that narrative structures are a traditional way of telling stories. He also discusses "caused-effect" logic and narrative parallelism, which produce a story that projects its action via psychologically defined, goal-oriented characters. The interaction between characters and goals has become the primary motive for creating the plot framework in narrative films, which influences editing and the music in post-production. Essentially, in classical films, narrative time and space build the storyline and logic of the story. Art cinema provides an alternate method of narrative that is frequently devoid of a goal, since the art-film character moves passively from one event to the next. Montage sequences, crosscutting, and jump cuts, for example, are important ways to break through chronological storytelling in film.

Furthermore, art cinema is more concerned with character reactions than with action. In the classical Hollywood movie, plot manipulations of story order are usually affected by the characters' subjectivity, such as in *8 1/2* and *Hiroshima, mon amour*. Characters' motivations push forward the storyline, which stimulates the filmmaker to finish the entire story. An open-ended tale offers the audience psychological ambiguity.

Story Curve and non-linear narrative analysis

A team of scholars developed a tool to analyses story patterns and their editing logic (camera movement and sound design) statistically and precisely in the creation of non-linear narrative films. For instance, *Pulp Fiction* is a good "puzzle film" for data visualisation analysis of the relationship between characters and their temporal and spatial aspects. Within the story curves tool, scholars choose characters and scenes as the design goal, with the intention of identifying non-linear narrative patterns, such as 32 seconds of *Memento*, in a word. According to the published lists of visualisations utilizing "story curves," Hollywood currently uses non-linear narrative to produce many fascinating movies. Another movie that has been the subject of experimental research is Christopher Nolan's *Memento*. This film's complicated temporal interruptions can be reorganized for originally chronological storytelling.

Although David Bordwell claims that non-linear narrative films fall within the umbrella of art cinema (Bordwell, 1979), we contend that this is a limit to what is meant by art cinema. For instance, "jump cuts" in French New Wave films differ greatly from those used in non-narrative

movies. Hollywood also creates a lot of non-linear narrative movies for commercial audiences, such Fight Club and Pulp Fiction.

Puzzle Films

Willemsen and Kiss claim that film narrative non-linearity is intimately connected with the cognitive ability of spectators in their publication *Keeping Track of Time.* (Willemsen, Steven; Kiss, Miklós, 2020) They identify two types of non-linearity: non-linear storytelling and non-linear story worlds. In this article, we focus on synthesis within non-linear storytelling. Through metaphor theory, we can see that contemporary complex cinema has interactively connected puzzle films with human cognitive processes, such as the script draft of "Inception," which indicates the complex logics of scriptwriting (Figure 1).

Narrative complexity and nonlinearity, in particular, have important relationships. For example, complex temporal structures in fictional stories are frequently divided, reversed, shuffled, multi-layered, looped, and traveled by characters. Non-linearity can be shown in different forms of literature (from modernist to post-modernist) and in TV series and feature films, where the concept is similar and the strategies concern a “sense of time as divisible and subject to manipulation," according to Allan Cameron’s perception. (Cameron, 2008)

Cognitive Questions

In terms of "ecological-cognitive questions," Willemsen and Kiss believe that filmmakers invite viewers' cognitive processes to participate from the active space between a story's structure and formal descriptions. In other words, these cognitive events and brain activities can not only create a variety of temporal patterns and experiences of storytelling but are also associated with different cognitive effects of narrative complexity.

More specifically, Bonato (Mario Bonato, Marco Zorzi and Carlo Umilta., 2012) concluded that studies point to a universal movement to mentally represent time along a "mental timeline." Therefore, conceptual metaphors and mental timelining are both key to non-linear narrative films and non-linearity, which have great impact on story plots and relevant consequences due to cognitive developments and participations between filmmakers and audiences.

In the book *Puzzle Films: Complex Storytelling in the Contemporary Cinema* (Buckland, 2009), Warren Buckland indicates that Aristotle’s theory is a significant influence on "reversal" and "recognition" in story structures. However, Buckland (Buckland, Puzzle Films: Complex Storytelling in Contemporary Cinema, 2009) argues that contemporary puzzle films are beyond the classics of Aristotle’s concept. For instance, within the classical perception of ancient Greek

literature, Aristotle claims that storytelling is set up as story plot 1 and story plot 2. Story plot 1 is usually integrated with story plot 2, which develops the causality and interesting interwoven coincidences for the storyline's consequences in all narrative forms. Nevertheless, contemporary puzzle films should add a "forking path plot" as a critical point, which will have a strong impact on perplexing storylines. For example, Willemsen and Kiss (Kiss, p. 86) indicate that the conceptual logic of the story structure within Christopher Nolan's "*Inception"* is based on spatial metaphors that ask us to grasp a mental demonstration of his hand-drawn plot map for the movie (see figure 1). This is a psychological game to invite spectators to sort out Nolan's puzzle in a maze.

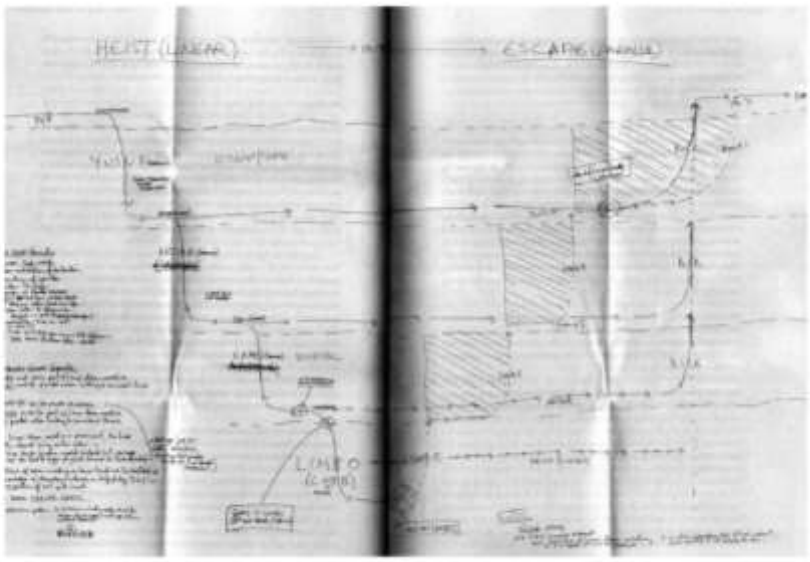

Figure.1. Director Christopher Nolan's hand draft for "Inception," within the multi-layered storylines of puzzle films; the source is Kiss, M. (2017). *Impossible puzzle films: a cognitive approach to contemporary complex cinema.*

The question then appears: how do puzzle plots go beyond Aristotle's definition of the complex plot? Buckland (Buckland, Hollywood Puzzle Films, 2014) considers the disputes about this question; chapters in *Puzzle Films* demonstrate that those films contain non-linearity, time loops, and shattered spatial–temporal sequences. Puzzle films blur the boundaries between different levels of reality and are riddled with crack plots, tricks, complicated structures, uncertainty, and explicit coincidence. In the end, the complexity of puzzle films operates on

two aspects: time and space. Non-linear narrative film has become a key for puzzle films, which use the above strategies to distort the patterns of narrative films and shape the non-linearity. Further, puzzle films generally present uncertainty and probability as story plots to create hypothesis for spectators. For instance, the Hollywood film *Lake House* places in doubt events, the psychological stability of the characters, and the accuracy of things that seem to be true, which contradict things that the protagonists and viewers see. Puzzle films thrive on epistemic uncertainty, as mentioned in Buckland's *Hollywood Puzzle Films.* Consequently, within the puzzle film tradition, moviegoers often manipulate story plots through the hypotheses and cognitive comprehension of the protagonists, and that often leads the storylines through their non-linear narrative status. As a result, moviegoers will feel shocked and astonished by the consequences of movie plots. This seems to be an interesting game between filmmakers and audiences.

After drinking too much coffee, Christopher Nolan claims that he will never know what is really going on with the truth for Leonard in his film Memento. Claire Molloy (Molloy, 2022) analyzes the innovative narrative form of *Memento*, a feature film that achieved a 7-million box office from March to May 2001. This film not only demonstrates experimental editing patterns but also an interesting storytelling practice in American independent films. Due to the duplication of viewings and the clarifications and responses from spectators and film markets, *Memento* has become a core film study within the cognitive science category. Claire Molloy (Molloy, 2022) mentions that Nolan's aim is to make *Memento* deliberately "ambiguous" and "challenging" in terms of its narrative organization. Meanwhile, these reconstructive narrations, which rebuild other story plots, seem to be a popular game for audiences. As a result, writing a puzzle film as non-narrative storytelling can appeal to spectators looking to solve puzzles. A complex implication can be a key for non-narrative films, at the mean time non-linearity can be a great statistical methodology for puzzle film studies.

Method

Non-Linearity and data visualization

Kim (Kim, 2018) presents the story curve tool to demonstrate the patterns of nonlinear narrative through data visualisations. They also describe *Story Explorer* (Figure 2) as a tool that can organise the chronological scenes in a movie script for users and explore the methods of non-linear narrative movies.

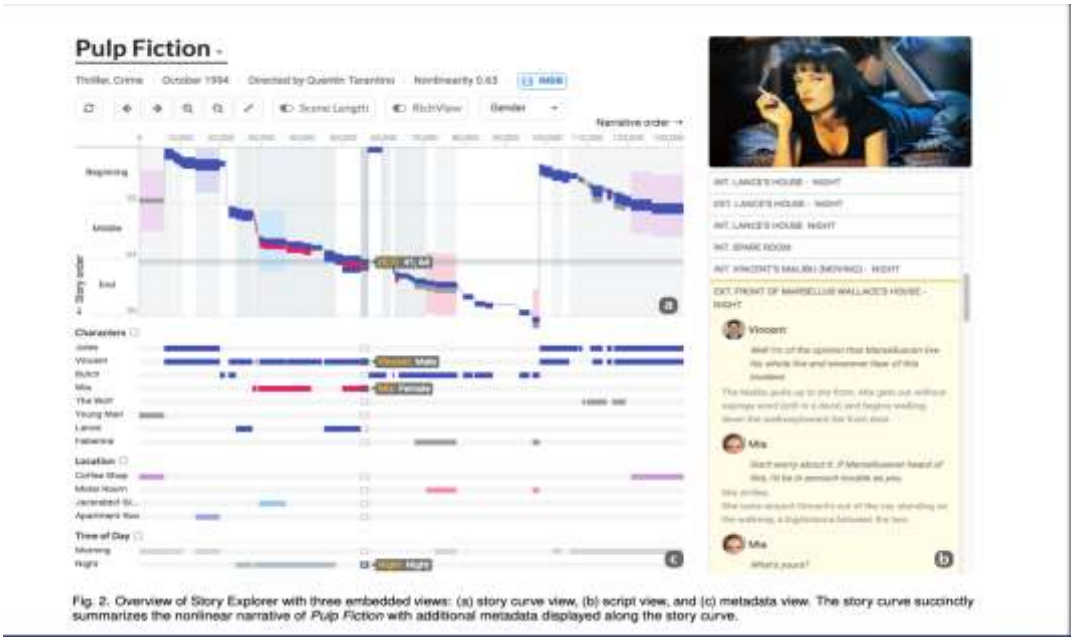

Figure 2 *Pulp Fiction*'s non-linearity, the data is from *IEEE Transactions on Visualization and Computer Graphics*, 24(1), pp.595-604.

Three categories are visible from the perspective of Story Explorer:
(a)story curve, (b)script view, and (c)metadata view. The (a) story curve uses data visualization tools to illustrate the concepts of non-linear narrative in Pulp Fiction. We can compare the chronological order with the narrative order by looking at the beginning, middle, and end of the timeline. The length of each character's scene, which is a component of frequency in non-linearity, is also shown. The non-linearity value for Pulp Fiction is thus 0.63. Memento has a non-linearity of 0.81, but Pulp Fiction appears to have a lower frequency of non-linearity, demonstrating that in Memento, emotions, and curves considerably fluctuate within non-linearity and pertinent storytelling situations. Nolan's script and multi-layers scriptwriting structures, that seems to be shaping like complex calculations within his hand draft(figure1). On the other hand, algorism also offers an innovative way to observe the structures of puzzle films via computer science.

Discussion

Comparatively, Todd McGowan (McGowan, 2011) indicates that *Pulp Fiction* is a good example of how creative power can be liberated from chronology. *Pulp Fiction* is a bridge that builds cinema's unique relationship with time. Thus, non-linearity here refers to temporality,

rather than spatial essentials. *Pulp Fiction* creates the disruptiveness of time itself with the intention of exploring the deep relationship between temporal events and non-narrative film.
In Jason Gendler's (Gendler, 2019)review of *Impossible Puzzle Films – A Cognitive Approach to Contemporary Complex Cinema* by Willemsen and Kiss, published in *Projections*, he signifies that narrative complexity has been a trend in academic cinema studies over the past 15 years. The research starts with the 'puzzle films' and 'forking path narratives' of David Bordwell, after which Warren Buckland indicates that moviegoers will often manipulate the story plots through the hypothesis and cognitive comprehension from protagonists. It develops the interesting connections between film viewing and cognitive science, therefore, psychology and neuroscience academic fields have also chosen film as their target study for human brain activity.
Kiss and Willemsen (Kiss, p. 179) argue that cinema intervenes in this debate in two ways: first, through the cognitive and psychological impact of complex narratives, and second, by focusing intensely on impossible puzzle films. A narrower subset is puzzle films: complex cinema has a specific structure and will provide a unique viewing experience within "pervasive paradoxes."

Result

The fictitious universe that contradicts our current understanding of the real world is presented in non-linear story worlds. Although they do not represent physical impossibilities, they do primarily contain logical impossibilities, such as mutually exclusive versions of occurrences, looping temporal lines, and alternate paradoxes. A hazy presentation experience causes all cognitive misunderstandings because powerful logical impossibilities disrupt some essential ideas, such the "logic of causation." As a result, audience participation interacts with the intricacy and cognitive effects of puzzle films.
In essence, impossible puzzle films must have a flawless design of narrative complexity in order to successfully use non-linear narrative storytelling. This is an intriguing topic that has inspired researchers and pertinent studies in various domains.
We can see the evidence that non-linearity rates and non-linear narrative films can be accurately examined by statistics and digital tools based on the "story curve" and Kim's scientific study (Kim, 2018). In other words, this outcome may demonstrate that an AI tool can create the precise scenes and narrative arcs for non-linear narrative films yet adhering to the rigorous design.

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