

Research Article

Visualizing Film Narrative: Applying the C4 Model to "Oi, Ohoi", a Systems Approach to Narrative Structure Analysis

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Abstract

This paper introduces an innovative methodology for film narrative analysis by adapting the C4 model from software engineering to humanities scholarship. Using the hypothetical film "Oi, Ohoi" (2025)-which depicts the life of Edo period female painter Katsushika Oei-as a case study, this research demonstrates how hierarchical system modeling can illuminate complex narrative structures, character relationships, and thematic development. The C4 model's four-level abstraction (Context, Container, Component, Code) enables both macro-level contextual analysis and micro-level examination of specific expressive techniques. This interdisciplinary approach bridges information science and film studies, offering new tools for understanding how narratives function as complex systems. The methodology proves particularly effective for analyzing films with intersecting social, psychological, and artistic dimensions, revealing structural patterns invisible to traditional close reading alone.

Keywords

C4 Model, Film Analysis, Narrative Structure, Systems Thinking, Katsushika Oei, Digital Humanities, Feminist Film Theory, PlantUML

1. Introduction

1.1. Research Problem

Film narratives operate as complex systems where multiple elements-characters, plot, visual design, social context, ideological frameworks-interact to generate meaning. Traditional narrative analysis excels at interpretation but often lacks systematic methods for visualizing these multidimensional structures. Meanwhile, digital humanities has introduced computational approaches, yet these sometimes sacrifice the nuanced interpretation central to humanistic inquiry.

This research proposes a middle path: adapting the C4 model-a hierarchical system description technique from software engineering-to film narrative analysis. The C4 model

(Context, Container, Component, Code) enables systematic visualization of complex structures while preserving analytical depth.

1.2. Case Study: "Oi, Ohoi"

The film "Oi, Ohoi" [1] depicts Katsushika Oei (c.1801-1866), daughter of ukiyo-e master Hokusai. Oei was a talented painter overshadowed by her father's fame, with only ~10 works surviving. The film reconstructs her life, navigating the boundary between historical fact and creative fiction while addressing contemporary concerns about gender, artistic identity, and historical memory.

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This case proves ideal for demonstrating the C4 model's applicability because the narrative operates simultaneously at multiple levels: individual psychology, family dynamics, art world systems, and broader social structures of gender and class.

2. Theoretical Framework

2.1. The C4 Model: Origins and Adaptation

"For detailed documentation of the C4 model and its applications, see Brown (2020) [3]."

Software architect Simon Brown developed the C4 model for describing software systems at different abstraction levels [2]. The model consists of four hierarchical layers:

Level 1: Context Diagram - Shows the system's relationship with its external environment

Level 2: Container Diagram - Depicts major technical components

Level 3: Component Diagram - Details internal structure of containers

Level 4: Code Diagram - Shows implementation-level details

For film analysis, we adapt these levels:

Context: Social/cultural environment, character-world relationships

Container: Major narrative elements (plot, visual expression, sound, performance)

Component: Character psychology, scene structure, symbolic systems

Code: Specific techniques (dialogue, cinematography, editing)

2.2. Methodological Integration

This approach complements rather than replaces traditional narrative theory. Where Genette (1980) analyzes temporal structure and focalization, and Greimas (1983) maps actantial relationships, the C4 model provides visual scaffolding that makes these abstract concepts concrete and relational.

"This approach complements rather than replaces traditional narrative theory. Where Bordwell (1985) [4] examines narration and story construction, Genette (1980) [6] analyzes temporal structure and focalization, and Greimas (1983) [7] maps actantial relationships, the C4 model provides visual scaffolding. The integration offers three advantages:

- 1) *Hierarchical Understanding*: Moving between abstraction levels (forest and trees)
- 2) *Relationship Visualization*: Making implicit connections explicit through diagrams
- 3) *Systematic Comparison*: Enabling comparative analysis across multiple films

3. C4 Analysis of "Oi, Ohoi"

3.1. Context Level: System Environment

The Context diagram positions the film within intersecting temporal and cultural systems:

Historical Layer (Edo Period):

- 1) Art World: Publishers, patrons, painter guilds
- 2) Gender Norms: Patriarchal expectations, women's constrained social roles

Narrative Layer (Film System):

- 1) Reconstruction of historical facts as narrative
- 2) Filmmaker perspective and contemporary values

Reception Layer (Modern Context):

- 1) Feminist discourse and gender equality debates, drawing on foundational work by Mulvey (1975) [8] on gender and cinematic representation
- 2) Art historical research and museum culture

Key Insight: The Context level reveals how the film mediates between past and present. Contemporary feminist consciousness shapes the representation of Edo period gender dynamics, while the film simultaneously contributes to ongoing discussions about women artists' erasure from history as discussed by Nochlin (1971) [9].

3.2. Container Level: Narrative Components

"Following Chatman's (1978) [5] distinction between story and discourse, at the Container level, we identify major structural elements and their interactions:" At the Container level, we identify major structural elements and their interactions:

Primary Containers:

- 1) *Screenplay*: Integrates historical sources and creative interpretation
- 2) *Visual Expression*: Cinematography recreating Oei's chiaroscuro painting style while subverting traditional gendered ways of looking, as theorized by Mulvey (1975) [8]
- 3) *Sound Design*: Environmental authenticity combined with emotional scoring
- 4) *Performance*: Actor embodiment of psychological complexity
- 5) *Editing*: Temporal structuring and rhythm control

Container Relationships:

The screenplay provides foundational structure, directing visual and sonic elements. However, interactions are not simply hierarchical-cinematography influences how scenes are written for subsequent productions, performance interpretation shapes editing choices, and music cues can redefine visual meanings.

Key Insight: Treating narrative elements as "containers" highlights their relative independence while showing necessary integration. Each container could theoretically be replaced (different cinematographer, composer, editor) yet the

system's integrity depends on their coordination.

3.3. Component Level: Character Structure

The Component level examines internal organization, particularly Oei's fragmented identity:

Oei's Multiple Selves:

- 1) *Self as Artist:* Creative passion, technical excellence, pursuit of originality
- 2) *Self as Daughter:* Filial devotion, emotional dependence, need for approval
- 3) *Self as Woman:* Awareness of constraints, resistance to norms, gender identity

Internal Conflict Generation:

These three identity aspects don't peacefully coexist. The artist self demands independence; the daughter self maintains attachment to father. The woman self recognizes social barriers the artist self must transcend. This tension drives character development.

Hokusai's Dual Function:

- 1) *As Mentor:* Transmits technique, models artistic dedication, validates talent
- 2) *As Parent:* Provides emotional anchor, creates dependency, limits autonomy

Key Insight: Component analysis reveals that Hokusai simultaneously enables and constrains Oei's development. The same relationship that nurtures her talent also prevents complete independence—a complexity that simple "helper vs. opponent" binaries miss.

3.4. Code Level: Scene Micro-analysis

At the Code level, we examine specific expressive techniques. Here we analyze the pivotal "Yoshiwara Lattice" scene where Oei gains inspiration for her masterwork.

Scene Structure:

- 1) *Arrival:* Oei approaches Yoshiwara at night (establishing shots, walking rhythm)
- 2) *Observation:* Views courtesans through lattice (POV shots, sustained gaze)
- 3) *Light Perception:* Notices dramatic chiaroscuro (lighting design, visual contrast)
- 4) *Self-Reflection:* Sees her own condition in theirs (facial close-ups, interior monologue)
- 5) *Inspiration:* Vision of future painting crystallizes (visual metaphor, musical crescendo)
- 6) *Return:* Departs transformed (changed body language, resolved expression)

Visual Techniques:

- 1) Lattice patterns divide the frame, creating "picture within picture"
- 2) Light sources positioned to recreate Oei's painting style in cinematic space
- 3) Selective focus emphasizing what Oei notices versus peripheral elements

- 4) Camera gradually moves closer, paralleling psychological intensification

Temporal Manipulation:

- 1) Scene duration (approximately 5 minutes) far exceeds story time
- 2) Extended takes allow contemplative observation
- 3) Minimal dialogue; meaning conveyed through visual attention

Key Insight: Code-level analysis shows how abstract inspiration is rendered concrete through sequential micro-components. Artistic breakthrough isn't mystical but processual: observation + self-recognition + visual perception = creative vision.

The scene's emphasis on perception and systemic constraints resonates with Meadows' (2008) [10] systems thinking framework, highlighting how individual insight emerges from structural conditions.

4. Integrated Analysis: Findings Across Levels

4.1. Vertical Integration: How Levels Interact

The C4 model's power lies in showing connections between levels:

Context → Container: Historical gender constraints (Context) shape narrative focus on Oei's internal perspective and limited social interactions (Container).

Container → Component: The screenplay's choice to minimize dialogue (Container) requires characters express themselves through action and visual composition, deepening psychological complexity (Component).

Component → Code: Oei's internal conflict between independence and attachment (Component) manifests in specific scenes through physical distance from Hokusai, averted gazes, and ambiguous dialogue (Code).

4.2. Horizontal Integration: Systems Thinking

Beyond hierarchical relationships, the model reveals systemic properties, aligning with Meadows (2008) [10] on feedback loops and Moretti's (2013) [11] distant reading approach, which emphasizes patterns emerging from large-scale structures.

Feedback Loops: Oei's artistic success increases Hokusai's pride, which strengthens his desire to keep her close, which limits her independence, which creates psychological tension that fuels her art.

Emergent Properties: The narrative's power emerges not from any single element but from their interaction. Oei's complexity as character results from the intersection of historical context, visual style, performance nuance, and editing rhythm.

Network Effects: Characters exist in webs of relationship.

Oei's identity formation depends on interactions with father, husband, publishers, courtesans-each relationship activating different aspects of self.

5. Methodological Contributions

5.1. Advantages of the C4 Approach

Systematic Visualization:

Diagrams make abstract relationships concrete, facilitating both analysis and communication. Students can literally "see" narrative structure.

Scalability:

The same framework applies to simple short films or complex multi-protagonist narratives. Abstraction levels adjust to material complexity.

Interdisciplinary Bridge:

By using terminology from information science, the method enables dialogue between humanities and technical fields, enriching both, echoing Manovich's (2020) [12] cultural analytics perspective.

Pedagogical Value:

Visual frameworks support teaching. Students can diagram films themselves, externalizing analytical thinking.

5.2. Limitations and Challenges

Simplification Risk:

Diagramming necessarily reduces complexity. Subtle ambiguities, emotional nuances, and aesthetic qualities resist schematization.

Static Representation:

Diagrams freeze dynamic processes. Film's temporal unfolding-rhythm, pace, duration-is difficult to capture in static images.

Analyst Subjectivity:

What counts as "container" or "component" involves interpretive judgment. Different analysts would create different diagrams.

Technical Barriers:

Learning PlantUML and mastering diagram conventions requires initial investment. Not all scholars embrace visual/computational methods.

5.3. Addressing Limitations

Multiple Diagrams:

Rather than one "correct" diagram, creating multiple views from different perspectives acknowledges complexity.

Text Integration:

Diagrams supplement rather than replace prose analysis. Detailed writing preserves nuance.

Methodological Transparency:

Explicitly stating analytical choices and limitations enables critical evaluation.

Iterative Refinement:

Initial diagrams can be revised as analysis deepens, treating visualization as thinking tool rather than final product.

6. Comparative Perspective: Applications Beyond "Oi, Ohoi"

6.1. Female Artist Biopics

The C4 framework illuminates patterns across the female artist biopic subgenre, informed by Mulvey's (1975) [8] critique of gendered spectatorship:

Common Context: All feature protagonists navigating patriarchal art worlds, relationships with dominant male figures, and tension between artistic ambition and social expectations, themes also explored in Yoshida (2001) [13] and Screech (1999) [14] in relation to Edo-period women and visual culture.

Container Variations: *Frida* (2002) emphasizes vibrant color and surrealist imagery; *Sylvia* (2003) uses internal monologue and literary reference; *Big Eyes* (2014) employs courtroom drama structure.

Component Patterns: Recurring character functions include "Male Genius" (who may be mentor, rival, or exploiter), "Female Community" (sources of solidarity or competition), and "Antagonistic Institution" (gallery system, publishing world, academy).

6.2. Beyond Biopics

The methodology applies to diverse narrative forms:

Ensemble Films: Mapping multiple protagonist networks (e.g., *Crash*, *Babel*)

Non-linear Narratives: Visualizing temporal structure (e.g., *Memento*, *Arrival*)

Franchise Systems: Tracking character development across sequels

Interactive Media: Analyzing branching narrative structures in games

7. Conclusion

This research demonstrates that software engineering's C4 model can be productively adapted for film narrative analysis. The hierarchical abstraction framework enables systematic visualization of complex relationships while remaining compatible with traditional humanistic interpretation.

The "Oi, Ohoi" case study shows the method's effectiveness for analyzing films operating at multiple scales simultaneously-from broad historical context to minute expressive techniques. The visual diagrams make implicit structures explicit, facilitating both scholarly analysis and pedagogical application.

Key Contributions:

- 1) *Methodological Innovation*: First systematic application of C4 model to film narrative
- 2) *Interdisciplinary Bridge*: Productive dialogue between information science and humanities
- 3) *Analytical Depth*: Hierarchical framework captures both forest and trees
- 4) *Pedagogical Tool*: Visual method supports teaching and learning

Future Directions:

Further research should develop dynamic modeling (incorporating temporal dimension), interactive tools (enabling user exploration), and comparative databases (facilitating pattern recognition across film corpora). Integration with computational methods (text mining, image analysis, machine learning) could extend the framework's analytical power while maintaining interpretive sophistication.

The ultimate goal is not replacing traditional close reading but augmenting it-providing systematic scaffolding that makes complex structures visible while preserving the richness and ambiguity central to humanistic inquiry.

As Katsushika Oei's paintings demonstrate, structure and creativity are not opposites. The lattices in her work both constrain and enable, providing framework within which light and shadow create beauty. Similarly, analytical frameworks both limit and liberate-offering structures within which insight emerges.

Abbreviations

C4 Context, Container, Component, Code

Author Contributions

Osamu Okumura is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflicts of interest.

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