

Structural Isomorphism Between Mythological and Historical Narratives: A Computational Approach

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1 Abstract

Across time and culture, civilizations appear to move through recurring moral and structural rhythms: ascent, excess, fragmentation, violence, and dissolution. History records these movements as sequences of political choices, institutional failures, and material pressures. Myth, by contrast, seems to speak from a deeper register. Through symbolic figures, sacred conflicts, and cyclical cosmologies, it encodes the same civilizational dynamics in a language that resists literal interpretation. This paper advances a speculative, ontology-driven computational framework that treats mythological and historical narratives as different surface expressions of a shared underlying process. By defining a formal ontology of civilizational actions and mapping narratives onto abstract lifecycle phases, the model traces structural resonances between culturally distant myths and historical trajectories. The results invite the possibility that myths function as condensed cultural simulations—symbolic rehearsals of civilizational rise and collapse that preserve collective insight across generations. From this perspective, history and myth converge not as opposites, but as complementary modes of remembering, revealing a persistent narrative skeleton that shapes how human societies understand their own becoming and undoing. This work contributes to computational humanities by demonstrating a unified symbolic approach to analyzing narrative structure across myth and history.

2 Introduction

Human civilizations have traditionally been examined through timelines, political turning points, and economic transformations, while mythology has been relegated to the domains of literature, folklore, or religious imagination. These modes of inquiry are usually treated as fundamentally separate—one grounded in fact, the other in symbol. Yet this division begins to blur when examined closely. Both historical and mythological narratives repeatedly return to the same motifs: the accumulation and abuse of power, moral corrosion, social fracture, collective violence, and eventual renewal or collapse. Across cultures and epochs, civilizations appear to move along remarkably similar structural paths, largely indifferent to geography or historical distance.

This work advances the idea that myth and history are not opposing narrative forms, but parallel expressions of the same underlying civilizational dynamics. Myths do not merely

invent supernatural dramas; they operate as deep cultural memory systems, encoding collective fears, ethical tensions, and existential threats in symbolic form. History, by contrast, records the material unfolding of these same forces through institutions, conflicts, and social change. Seen this way, both myth and history articulate variations of a shared narrative skeleton—one symbolic, the other concrete—through which human societies make sense of their rise, fragmentation, and disappearance.

To investigate this convergence, we introduce a symbolic, ontology-driven computational framework that models mythological and historical narratives as structured sequences of archetypal events. By abstracting narratives away from their surface details and mapping them onto generalized lifecycle phases, the framework enables formal comparison between mythic cycles and historical trajectories. This approach shifts attention from thematic resemblance to structural isomorphism, revealing how culturally distant stories often unfold according to identical underlying forms.

Using curated corpora of mythological and historical narratives and a phase-based lifecycle model, this work suggests that human civilizations repeatedly traverse a limited set of structural patterns. From this perspective, myths may function as anticipatory cultural simulations—symbolic rehearsals of civilizational breakdown and regeneration that encode hard-earned social knowledge across generations. By unifying myth and history within a single symbolic framework, this research contributes to computational humanities while offering a new lens on the deep narrative structures through which human civilization understands itself, repeats itself, and, at times, forgets itself.

3 Theoretical Background

Scholars of narrative have long argued that stories are not random cultural artifacts, but structured forms that recur across time and place. Joseph Campbell’s idea of the monomyth famously showed that myths from widely separated societies often share the same basic narrative arc, hinting at common psychological and social foundations beneath cultural difference (Campbell, 1949). In a similar vein, Claude Lévi-Strauss approached myth not as a collection of individual tales, but as a system governed by deep structural relationships and binary oppositions (Lévi-Strauss, 1963). From this perspective, myth functions less as folklore and more as a cognitive framework through which societies organize meaning.

A comparable line of thought appears in theories of history and civilization. Thinkers such as Arnold Toynbee and Oswald Spengler rejected the notion of history as a straightforward march of progress, instead portraying civilizations as living systems that rise, fracture, decline, and either collapse or transform (Toynbee, 1987; Spengler, 1926). Their cyclical models emphasize repetition and structural constraint, suggesting that historical change follows recognizable patterns rather than unlimited novelty.

When these two traditions are considered together, an intriguing convergence emerges. Myths seem to encode recurring patterns of collective human experience, while history enacts those same patterns in tangible political, social, and economic forms. From this viewpoint, myth can be understood as a symbolic compression of civilizational dynamics—a narrative simulation of processes that unfold more slowly and visibly in historical time (Assmann, 2011; Eliade, 1959). Despite this alignment, however, mythological and historical narratives are rarely analyzed within a shared formal framework (Berry, 2012; Schreibman et al., 2016).

This work builds on structuralist and cyclical theories by introducing a symbolic, ontology-based model of narrative (Campbell, 1949; Lévi-Strauss, 1963; Toynbee, 1987). By repre-

senting both myths and historical accounts as sequences of archetypal events, the framework makes it possible to compare their structures directly. Rather than focusing on themes or interpretations, the approach emphasizes formal relationships and structural equivalence, opening the door to computational analysis of the underlying “shape” of civilization itself.

4 System Architecture

4.1 Ontological Framework

At the foundation of the system is a controlled symbolic vocabulary that defines what can meaningfully count as an event in a civilizational narrative. Rather than modeling surface-level actions or historical particulars, the ontology captures abstract civilizational functions—such as succession disputes, moral decay, invasion, collapse, or reconstruction. These event types represent roles that recur across cultures and time, independent of specific actors or settings.

To organize this vocabulary, events are grouped into higher-level semantic categories, including power, moral, divine, social, political, violence, identity, and outcome. This categorization provides structure without imposing interpretation: it allows events to be grouped, compared, and validated while remaining semantically flexible.

Formally, let \mathcal{E} be a finite set of admissible event types, and let

$$\kappa : \mathcal{E} \rightarrow \mathcal{C}$$

map each event to a semantic category in the set \mathcal{C} . An ontology management layer enforces closure over \mathcal{E} , rejecting any narrative that introduces undefined events. This constraint is essential, as structural comparison is only meaningful when all narratives are constructed from the same symbolic primitives.

4.2 Narrative Specification

Within this ontology, a narrative is treated as an ordered sequence of symbolic events. Mythological and historical accounts are represented in exactly the same way, differing only in contextual metadata rather than in structural form. This decision is intentional: it prevents assumptions about historical “reality” or mythic “fiction” from influencing the analysis and enforces structural parity between the two domains.

Conceptually, this means that narratives are compared based on *what kinds of civilizational actions occur and how they unfold*, not on who performs them or whether they are factually verifiable. The abstraction reduces complex cultural phenomena into forms that can be analyzed computationally while preserving their structural meaning.

Formally, a narrative N is defined as

$$N = \{e_1, e_2, \dots, e_n\} \text{ with } e_i \in \mathcal{E}.$$

Validation follows directly from the ontology: if any $e_i \notin \mathcal{E}$, the narrative is invalid. This guarantees consistency across all narrative instances.

4.3 Lifecycle Phase Model

While event sequences capture fine-grained narrative detail, many civilizational processes operate at a coarser temporal and structural scale. To model this, the system introduces

a set of lifecycle phases representing broad stages of civilizational evolution, such as decay, rupture, violence, collapse, and reconstruction. These phases do not replace events, but rather summarize their structural role within a larger trajectory.

Each event is associated with a lifecycle phase, allowing detailed narratives to be projected into simplified structural signatures. This makes it possible to compare narratives that differ in length, detail, or symbolism, while still preserving their underlying dynamic pattern.

Formally, let \mathcal{P} denote the set of lifecycle phases, and define a mapping

$$\phi : \mathcal{E} \rightarrow \mathcal{P}.$$

Given a narrative N , its lifecycle representation is

$$L(N) = \langle \phi(e_1), \phi(e_2), \dots, \phi(e_n) \rangle,$$

which may be further compressed by merging contiguous phases or removing repetition. The result is a lifecycle signature that captures the narrative’s structural trajectory rather than its surface detail.

4.4 Analysis Engine

Structural comparison between narratives operates at two complementary levels. At the event level, the system evaluates whether narratives draw on similar symbolic components, regardless of order. This reveals shared narrative ingredients, such as the presence of betrayal, internal conflict, or external invasion.

At the lifecycle level, the system compares phase signatures to determine whether narratives follow similar civilizational trajectories, even when the specific events differ. This distinction is crucial: two narratives may share few events yet exhibit the same pattern of decay, rupture, violence, and collapse.

Formally, event-level similarity is computed over the sets of events contained in each narrative, while lifecycle-level similarity is computed over their corresponding phase representations:

$$S_e(N_1, N_2) = \frac{E(N_1) \cap E(N_2)}{E(N_1) \cup E(N_2)}, \quad S_p(N_1, N_2) = \text{sim}(L(N_1), L(N_2)).$$

By separating these two measures, the framework distinguishes between superficial resemblance and deep structural isomorphism. High lifecycle similarity in the absence of strong event overlap suggests that mythological and historical narratives may instantiate the same underlying civilizational dynamics, expressed through different symbolic forms.

5 Methodology

This section describes the procedures used to construct, encode, and analyze the narrative corpus.

5.1 Corpus Selection

A deliberately limited corpus was selected to prioritize structural interpretability over scale. Narratives were chosen based on civilizational significance, internal structural complexity, and extensive secondary scholarship.

The mythological corpus includes the Mahabharata, Ramayana, the Trojan War cycle, and Ragnarok. The historical corpus includes the Fall of Rome, the French Revolution, the rise and collapse of Nazi Germany, and the Partition of India. This selection provides cultural and temporal diversity while supporting detailed structural analysis.

5.2 Symbolic Encoding

Each narrative was encoded as an ordered sequence of symbolic events defined by the ontology. Narrative particulars were abstracted into archetypal civilizational actions and states (e.g., succession dispute, moral decay, invasion, collapse).

All sequences were validated against the ontology to ensure semantic consistency and comparability across narratives.

5.3 Lifecycle Extraction

Event sequences were mapped onto lifecycle phases using a rule-based analyzer. Phases were activated based on the presence of associated symbolic events, producing a compressed lifecycle representation for each narrative.

This transformation enables structural comparison independent of narrative length or descriptive detail.

5.4 Structural Comparison

Pairwise comparisons were conducted exclusively between mythological and historical narratives. Event-level similarity measured overlap in symbolic components, while lifecycle-level similarity compared phase representations to assess alignment of structural trajectories.

This dual approach distinguishes shared narrative elements from shared civilizational dynamics.

5.5 Result Aggregation

All similarity measures and lifecycle representations were aggregated within a centralized analysis pipeline, enabling identification of structurally aligned narrative pairs and recurring patterns across domains.

6 Results & Discussion

6.1 Structural Parallels Between Myth and History

Application of the symbolic analysis framework revealed substantial structural parallels between several mythological and historical narratives. Despite pronounced differences in cultural context, temporal setting, and narrative content, multiple cases exhibited high alignment at the level of symbolic events. Core archetypal actions—such as betrayal, exile, war, invasion, moral decay, and collapse—recurred consistently across both domains.

For example, both the Mahabharata and the French Revolution encode narrative sequences marked by moral decline, social rupture, internal betrayal, and large-scale violence, despite their distinct cultural origins. Similarly, the Trojan War and the rise and collapse of Nazi Germany share symbolic components related to humiliation, mobilization, invasion,

and destruction. These correspondences indicate that mythological and historical narratives frequently draw upon a shared structural vocabulary of civilizational breakdown.

The recurrence of these symbolic patterns across unrelated narratives suggests that civilizational crises are not purely contingent events. Instead, they appear to follow recurrent internal dynamics that manifest repeatedly across time and geography.

6.2 Lifecycle Trajectories and Collapse Patterns

Lifecycle-level analysis further reinforced these findings. Several myth–history pairs converged on identical lifecycle phase signatures, most commonly following the sequence: decay → rupture → violence → collapse. In some cases, this trajectory extended into reconstruction, indicating post-collapse renewal.

The Norse myth of Ragnarok, for instance, exhibited a lifecycle signature closely aligned with historical collapse-and-recovery trajectories. Importantly, lifecycle-level similarity often remained high even when event-level overlap was moderate. This demonstrates that narratives may differ substantially in surface detail while still exhibiting the same underlying structural form.

This distinction underscores the value of multi-granular analysis. While specific events and symbols vary across cultures, the overall trajectory of civilizational transformation remains comparatively stable.

6.3 Psychological and Civilizational Implications

The observed convergence between mythological and historical structures suggests the presence of recurring psychological and social mechanisms governing civilizational dynamics. Persistent motifs of betrayal, hubris, moral failure, exile, and retribution indicate that internal factors play a central role in processes of civilizational decline, alongside external pressures.

From this perspective, myths may be interpreted as symbolic anticipations of civilizational experience. Rather than functioning solely as religious or literary artifacts, they encode collective anxieties and structural vulnerabilities in narrative form. History, in turn, represents the material realization of these same dynamics.

By abstracting narratives into symbolic sequences and lifecycle phases, the framework reveals that historical change, while contingent and complex, exhibits underlying structural regularities. These regularities are not deterministic laws but probabilistic tendencies emerging from interactions among power, morality, identity, and violence within complex societies.

7 Conclusion

This study introduced a symbolic, ontology-driven computational framework for modeling and comparing mythological and historical narratives as structured sequences of archetypal events. By representing both domains within a unified formal system, the framework enabled direct structural comparison and revealed deep isomorphism between culturally and temporally distinct narratives.

The results indicate that civilizations repeatedly follow a limited set of structural trajectories characterized by decay, rupture, violence, and collapse. These findings support

the interpretation of myths as compressed symbolic representations of historical processes, encoding collective concerns and structural risks prior to their concrete manifestation.

By exposing the shared narrative skeleton underlying myth and history, this work offers a structural lens through which civilizational change may be examined. Rather than treating history as a sequence of isolated events, it may be understood as a patterned process shaped by recurrent underlying dynamics.

7.1 Limitations

- **Limited corpus size**

The narrative corpus is intentionally small in order to support deep structural analysis. While this design choice enhances conceptual clarity, it limits statistical generalization and comprehensive cross-cultural coverage.

- **Interpretive symbolic encoding**

The abstraction of narratives into symbolic events necessarily involves interpretive judgment. Although ontological constraints enforce internal consistency, alternative encodings may produce different similarity outcomes.

- **Coarse lifecycle phase model**

The decay–rupture–violence–collapse–reconstruction model captures major civilizational transitions but does not account for finer-grained sub-phases, feedback dynamics, or extended periods of stability.

- **Rule-based architecture**

The framework currently relies on symbolic, rule-based mechanisms rather than probabilistic or data-driven approaches, limiting its capacity to model uncertainty, variation, or emergent behavior.

7.2 Future Scope

- **Corpus expansion**

Future research will extend the corpus to include additional mythological traditions and historical case studies, improving cross-cultural representativeness and analytical robustness.

- **Graph-based narrative modeling**

Narratives may be represented as directed graphs, enabling motif detection, subgraph matching, and topological analysis of civilizational trajectories.

- **Machine learning integration**

Symbolic narrative sequences may be used to train sequence prediction models, enabling probabilistic exploration of civilizational phase transitions.

- **Ontology refinement**

The ontology may be expanded to incorporate economic, environmental, and technological dimensions of civilizational change.

- **Contemporary application** The framework may be adapted to analyze modern political discourse, media narratives, and ideological movements as ongoing civilizational processes.

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