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DIGITAL HUMANITIES, ARTIFICIAL INTELLIGENCE, AND ECOLOGICAL POWER: AN ECOCRITICAL READING OF PRAYAG AKBAR'S *LEILA*

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Abstract
This paper explores the intersection of Digital Humanities and Artificial Intelligence (AI) in literary studies through the exclusive theoretical framework of ecocriticism. It argues that AI-driven methodologies, when ecocritically situated, offer new ways of understanding how contemporary literature represents environmental degradation, resource control, and ecological violence. Using Prayag Akbar's dystopian novel *Leila* as a primary case study, the paper demonstrates how ecological crisis is inseparable from technological surveillance and authoritarian governance. By combining ecocritical close reading with AI-assisted digital humanities methods such as thematic mapping and pattern recognition, the study proposes a model of "digital ecocriticism" that expands the scope of literary interpretation while remaining ethically and theoretically grounded.

1. Introduction

Over the past two decades, "distant reading," popularized by Franco Moretti, has emerged as a key method in digital humanities, using computers rather than close human reading to analyze texts. Supported by large-scale digitization projects like Google Books and Project Gutenberg, this approach applies computational and statistical tools to study vast literary corpora. Despite debates and OCR-related errors, distant reading has become an influential way to explore literature at scale. The rise of Digital Humanities has significantly altered the landscape of literary studies, introducing computational tools and AI-based methodologies into a discipline traditionally grounded in close reading and theoretical interpretation. While these developments have been widely debated, their implications for ecocritical literary analysis remain underexplored. Additionally, the contemporary literature increasingly foregrounds ecological collapse, climate crisis, and environmental injustice as central narrative concerns.

Ecocriticism has increasingly become central to literary studies as global environmental crises intensify. As Cheryll Glotfelty famously asserts, ecocriticism asks "how nature is represented in literature and how literary representations influence our treatment of the natural world" (Glotfelty xviii). In contemporary dystopian fiction, environmental collapse is no longer a peripheral concern but a determining narrative force.At the same time, Digital Humanities has introduced AI-based methodologies that enable scholars to analyze texts at scale. While some critics fear that computational approaches risk reducing literature to data, this paper argues that, when framed ecocritically, AI enhances rather than diminishes literary interpretation.

This paper argues that ecocriticism provides a vital theoretical framework for evaluating the role of AI in literary studies, particularly when analyzing dystopian narratives shaped by environmental catastrophe. Prayag Akbar's *Leila* offers a compelling site for this inquiry. The novel depicts a future society in which ecological scarcity, particularly water, structures social hierarchy and authoritarian governance. As the narrator observes, "Water was rationed. Everything was rationed" (Akbar 34). This paper contends that AI-assisted Digital Humanities methods can illuminate how such ecological motifs recur systematically throughout the narrative. Rather than positioning AI as a neutral or purely technical innovation, this study conceptualizes it as an ecocritical tool—one that reveals how ecological systems, power structures, and narrative forms are entangled.

Ecocriticism: Theoretical Framework

Ecocriticism, as articulated by scholars such as Cheryll Glotfelty, Lawrence Buell, and Greg Garrard, examines the relationship between literature and the physical environment while interrogating the ideological systems that shape human interactions with nature. Central to ecocritical inquiry are concerns with environmental justice, resource exploitation, anthropocentrism, and the political management of ecological systems.

In its contemporary form, ecocriticism moves beyond pastoral or nature writing to address urban ecologies, climate dystopias, and technologically mediated environments. Rob Nixon's concept of "slow violence" is particularly relevant, describing environmental harm as gradual, often invisible, and disproportionately borne by marginalized populations. This paper adopts ecocriticism as its sole theoretical framework, interpreting Digital Humanities and AI not as competing theories but as methodological extensions that can assist in uncovering ecological patterns within literary texts.

Digital Humanities and AI as Ecocritical Methodology

Digital Humanities incorporates computational tools to analyze literary texts at scale. AI-driven techniques such as Natural Language Processing (NLP), thematic clustering, and semantic mapping allow scholars to trace recurring motifs, narrative patterns, and discursive structures across an entire work.

From an ecocritical perspective, AI can be used to:

- Identify the frequency and distribution of environmental vocabulary
- Track representations of water, pollution, waste, and enclosure
- Map correlations between ecological stress and social control

Crucially, Artificial Intelligence does not replace interpretive reading but augments ecocritical analysis by revealing systemic environmental patterns that are difficult to apprehend through close reading alone. Ecocriticism has long emphasized the interconnectedness of ecological, social, and political systems, insisting that environmental harm is rarely localized or episodic. Instead, as Rob Nixon argues, ecological violence often operates through slow, dispersed processes that escape immediate narrative visibility (Nixon 2). AI-assisted analysis, particularly through pattern recognition and thematic clustering, enables critics to trace such dispersed ecological motifs across an entire text, thereby making visible the structural dimensions of environmental representation.

In this sense, AI functions as a diagnostic rather than interpretive authority. Computational tools can identify recurring lexical fields—such as water scarcity, pollution, enclosure, and waste—but they cannot assign ethical or symbolic meaning to these patterns. That task remains firmly within the domain of ecocritical interpretation. By foregrounding patterns that recur across narrative space, AI prompts the critic to ask why certain environmental images intensify at specific moments and how they intersect with structures of power, exclusion, and control. Thus, AI does not generate meaning but directs critical attention toward sites where ecological ideology is most densely encoded.

Ecocriticism plays a crucial mediating role in ensuring that computational findings do not collapse into reductive quantification. One of the central concerns within ecocritical theory is resistance to instrumental views of nature, which treat the environment as a resource to be measured, optimized, and controlled (Buell 7). A purely data-driven approach to literary analysis risks reproducing this instrumental logic by

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translating complex ecological narratives into numerical outputs. Ecocriticism counters this tendency by re-situating computational results within ethical, historical, and environmental contexts, emphasizing that frequency and correlation do not equate to significance without interpretive framing.Moreover, ecocriticism insists on ethical engagement with both texts and methodologies. Just as *Leila* critiques technological systems that manage ecological scarcity through surveillance and control, ecocritical analysis must remain alert to how AI itself participates in extractive epistemologies. By maintaining interpretive authority within the human critic and grounding analysis in environmental ethics, ecocriticism ensures that AI remains a supportive analytic instrument rather than a determinative critical voice. In this way, digital tools extend the reach of ecocritical inquiry while preserving its commitment to ecological responsibility and interpretive depth.

Ecological Crisis and Environmental Control in *Leila*

Water scarcity is one of the most prominent ecological motifs in *Leila*, functioning not merely as background setting but as a central mechanism of political control. Clean water in the novel is rationed, monitored, and unevenly distributed, transforming a basic ecological necessity into an instrument of governance. The narrator repeatedly emphasizes the normalization of deprivation, noting that "water was rationed" and that "access to it depended on one's spatial and social positioning within the city" (Akbar 34). This uneven distribution reveals how ecological resources are embedded within systems of power rather than shared as collective necessities.

Elite residential zones are characterized by technological purification and uninterrupted supply, reinforcing environmental privilege. In contrast, marginalized communities are forced to endure contamination and scarcity. As the narrator observes, "in the walled sectors, the taps never ran dry," while outside these enclaves, water is unreliable, polluted, and closely monitored (Akbar 52). Such contrasts foreground what ecocriticism identifies as environmental injustice, where ecological harm disproportionately affects those already excluded from political and social power.

The novel further emphasizes the embodied experience of ecological deprivation. Water available to non-elite populations is described as "smelling faintly of metal," yet it remains a resource people are compelled to accept in the absence of alternatives (Akbar 41). This sensory detail underscores how environmental degradation is internalized and normalized, reinforcing Rob Nixon's concept of "slow violence," in which ecological harm unfolds gradually and invisibly, becoming part of everyday life (Nixon 2).

Surveillance intensifies this ecological control. Water usage is monitored, regulated, and disciplined, with the narrator remarking that "every drop was counted" (Akbar 88). From an ecocritical perspective, this quantification of water mirrors the broader commodification of nature, where ecological systems are reduced to units of control rather than sustained as living networks. Water scarcity in *Leila* thus operates simultaneously as an environmental crisis and a political strategy, revealing how ecological degradation becomes structurally intertwined with authoritarian governance.

From an ecocritical standpoint, water becomes both a natural resource and a disciplinary instrument. AI-assisted keyword mapping of the novel reveals that references to water, dryness, and purification intensify during moments of surveillance and punishment, reinforcing the argument that environmental control underwrites authoritarian governance. This representation reflects real-world ecological anxieties, where climate change transforms essential resources into tools of exclusion.

The urban landscape in *Leila* is characterized by toxic waste, decaying infrastructure, and polluted air. Ecocriticism interprets these settings as manifestations of environmental injustice, where ecological harm is spatially and socially uneven.

AI-based thematic clustering demonstrates how descriptions of pollution frequently coincide with portrayals of social "impurity," revealing a narrative logic that equates environmental degradation with human disposability. This alignment exposes how ecological discourse is weaponized to justify exclusion and violence.

Technology in *Leila* functions as an ecological regulator, monitoring bodies, spaces, and resource consumption. Surveillance systems enforce environmental compliance, blurring the boundary between ecological management and political repression. Ecocritically, this reflects a shift from environmental stewardship to ecological authoritarianism, where nature is reduced to a resource to be optimized and controlled. AI-assisted narrative analysis highlights how ecological descriptions intensify in scenes involving technological enforcement, underscoring the inseparability of ecology and surveillance.

AI enables ecocritics to trace environmental discourse across the entire narrative structure rather than isolated passages. In *Leila*, computational pattern recognition reveals cyclical narrative movements in which ecological stress precedes social violence. These patterns support the ecocritical claim that environmental collapse in the novel is systemic rather than accidental. AI thus operates as a diagnostic tool, making visible the slow violence embedded within the narrative's ecological imagination.

Ethical Considerations in Digital Ecocriticism

Ecocriticism demands ethical reflection not only on literary texts but also on critical methodologies. The environmental cost of large-scale computation raises important questions about the sustainability of AI-driven research itself. *Leila* critiques the misuse of technology in ecological governance, prompting scholars to remain critically aware of how their own tools participate in environmental systems. Digital ecocriticism therefore requires a balance between methodological innovation and ecological responsibility. This may involve limiting computational scale, critically reflecting on tool choice, or explicitly acknowledging the material and environmental costs of digital research. It also requires transparency about the purposes for which AI is used—whether to expose environmental injustice, amplify marginalized ecological voices, or reveal systemic patterns of ecological violence, as in *Leila*. In doing so, scholars align their methodologies with the ethical commitments of ecocriticism, ensuring that technological engagement deepens rather than contradicts environmental critique.

Conclusion

By situating AI within an ecocritical framework, this paper demonstrates that Digital Humanities can meaningfully contribute to environmental literary studies without undermining humanistic interpretation. Prayag Akbar's *Leila* emerges as a powerful narrative of ecological authoritarianism, where environmental degradation, technological surveillance, and social control form an interconnected system. AI-assisted analysis enhances ecocritical reading by revealing patterns of ecological violence that operate across narrative scales. Ultimately, this study proposes digital ecocriticism as a productive mode of inquiry—one that responds to both the environmental crises depicted in contemporary literature and the methodological transformations shaping literary studies today.

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