

Ecological Grief and Intergenerational Memory in Contemporary English Literature

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Abstract— Contemporary English literature increasingly represents environmental loss not merely as ecological damage but as an affective and mnemonic crisis transmitted across generations. This study examines how ecological grief becomes embedded within intergenerational memory in recent Anglophone fiction and literary narratives concerned with climate disruption, species decline, damaged landscapes, displacement, and inherited environmental histories. A central research gap lies in the limited integration of literary ecocriticism with computational approaches capable of tracing relationships between environmental emotion, temporal memory, kinship, and narrative perspective at scale. To address this gap, the study proposes a hybrid interpretive-computational framework combining close reading, transformer-based semantic analysis, emotion classification, temporal-reference extraction, and narrative-network modelling. The research conceptualizes ecological grief as a multidimensional literary phenomenon involving mourning, anticipatory loss, ecological nostalgia, inherited trauma, place attachment, and disrupted environmental continuity. Particular attention is given to the ways memories narrated by parents, grandparents, descendants, and communal voices transform environmental change into a form of intergenerational cultural knowledge.

Keywords— Ecological grief, Intergenerational memory, Contemporary English literature, Ecocriticism, Computational literary studies, Natural language processing

Introduction

Environmental crisis has altered not only the physical conditions represented in contemporary literature but also the emotional and temporal structures through which fictional characters understand belonging, inheritance, and loss. Rising concern about climate change, biodiversity decline, deforestation, extreme weather, pollution, coastal transformation, and environmental displacement has encouraged writers to portray ecological disruption as an intimate dimension of everyday life. Within such narratives, landscapes are rarely passive backgrounds. Forests, rivers, coastlines, animals, agricultural spaces, seasons, and damaged settlements frequently function as repositories of personal and collective memory. Their degradation can therefore produce forms of grief that exceed conventional bereavement and extend toward lost ecosystems, disappearing species, altered places, and futures perceived as increasingly uncertain.

The concept of **ecological grief** provides an important framework for understanding these literary responses. It describes affective experiences associated with actual, anticipated, or remembered environmental loss. In literary texts, however, ecological grief is seldom represented as a singular emotion. It may appear as sadness over a transformed childhood landscape, anger at industrial destruction, guilt concerning inherited patterns of consumption, nostalgia for seasonal rhythms, fear for future generations, or mourning for species whose disappearance destabilizes cultural and personal identity. These emotional registers often coexist within a narrative and are mediated by memory.

Intergenerational memory becomes especially significant because ecological change unfolds across temporal scales that exceed the experience of a single individual. A character may know a river through childhood recollection, but that recollection may itself depend upon stories told by parents or grandparents concerning a period when the river was cleaner, wider, seasonally predictable, or biologically richer. Younger characters may consequently inherit environmental memories of conditions they never directly experienced. Literature is particularly suited to representing this phenomenon because narrative can move fluidly among remembered pasts, deteriorating presents, and anticipated futures.

The relationship between ecological grief and intergenerational memory also challenges a purely individualistic understanding of environmental emotion. Grief can circulate through families and communities. Memories of farming practices, migration routes, disappearing species, ancestral land, seasonal rituals, or environmental disasters may be transmitted through storytelling, silence, photographs, objects, place names, diaries, oral histories, and embodied practices. Contemporary fiction frequently transforms such transmission into an ethical question: what does one generation owe another when ecological continuity can no longer be assumed?



Fig. 1: Understanding Ecological Grief

Source:

<https://www.tandfonline.com/doi/full/10.1080/17565529.2024.2407342>

This problem has become increasingly relevant during the period from 2021 onward, when climate-oriented cultural production has expanded alongside growing interdisciplinary interest in climate emotions, environmental humanities, digital humanities, and artificial intelligence-assisted textual analysis. Recent advances in natural language processing have made it possible to investigate complex semantic relations within large literary corpora rather than relying exclusively upon manually coded keywords. Transformer-based language models, contextual embeddings, emotion detection systems, temporal information extraction, and semantic clustering can identify patterns that conventional frequency analysis may overlook.

Yet applying artificial intelligence to literary study requires methodological caution. Ecological grief cannot be reduced to the occurrence of words such as *loss*, *climate*, *forest*, or *grief*. A sentence describing a grandmother remembering vanished migratory birds may carry environmental mourning without explicitly naming sadness. Similarly, a narrator's repeated comparison between present ecological deterioration and ancestral descriptions of abundance can establish intergenerational grief through narrative structure rather than direct emotional vocabulary. Computational systems therefore need to be integrated with interpretive literary analysis rather than treated as substitutes for it.

1.1 Research Problem

Existing literary scholarship has extensively considered environmental representation, climate fiction, ecocriticism, memory, trauma, and posthuman relationships. Nevertheless, ecological grief and intergenerational memory are frequently investigated as separate analytical domains. Studies focusing on environmental affect often concentrate on grief, anxiety, melancholia, trauma, or solastalgia, whereas studies of intergenerational memory tend to emphasize war, migration,

colonialism, family trauma, historical violence, and cultural inheritance.

This separation leaves an important conceptual gap. Environmental deterioration is inherently temporal: ecological conditions experienced by one generation can differ substantially from those remembered by another. Consequently, environmental grief may emerge precisely from comparisons across generational memory. Literature captures this relationship through retrospective narration, inherited stories, environmental nostalgia, disrupted family continuity, ecological witnessing, and imagined descendants.

A second gap concerns methodology. Most research examining ecological grief in literature remains qualitative, while computational literary studies have often emphasized authorship, genre classification, sentiment, thematic modelling, or stylistic pattern recognition. Relatively little work integrates context-sensitive artificial intelligence with theoretically informed ecocritical interpretation to examine how environmental loss interacts simultaneously with emotion, memory, kinship, temporal orientation, and place.

1.2 Identified Research Gap

The specific research gap addressed in this manuscript is the **absence of an integrated computational-literary framework capable of identifying how ecological grief is generated, transmitted, and transformed through intergenerational memory structures in contemporary English-language narratives.**

Existing approaches frequently detect either environmental themes or emotional sentiment but do not adequately distinguish among several crucial configurations: directly experienced ecological loss, remembered environmental change, inherited memories of ecological abundance or destruction, anticipatory grief for future generations, and collective ecological mourning transmitted beyond biological family structures.

The proposed study therefore treats ecological grief not as a single sentiment category but as a relational narrative phenomenon connecting:

environmental entity → ecological transformation → emotional response → temporal reference → memory source → generational position.

This relational formulation creates a distinct research contribution because it allows ecological affect to be examined as part of narrative memory architecture rather than as an isolated emotional variable.

1.3 Research Objective

The principal objective is to develop an interdisciplinary model for analysing ecological grief and intergenerational environmental memory in contemporary English literature by combining ecocritical close reading with artificial-intelligence-assisted textual interpretation.

More specifically, the research investigates how literary narratives associate environmental degradation with grief-related affect; how memories of ecological change circulate between generations; how temporal transitions between past, present, and future intensify environmental mourning; and how computational semantic patterns can support, challenge, or refine human literary interpretation.

The study further seeks to differentiate forms of ecological grief including retrospective ecological mourning, anticipatory environmental grief, place-based grief, species-oriented grief, inherited environmental nostalgia, and grief related to disrupted cultural or familial continuity.

1.4 Research Questions

The study is guided by the following questions:

1. How is ecological grief linguistically and narratively represented in contemporary English literature?

2. What forms of intergenerational memory are associated with representations of environmental transformation?
3. How do narrative shifts among remembered pasts, damaged presents, and anticipated futures influence ecological affect?
4. Can transformer-based semantic analysis reliably distinguish directly experienced ecological grief from inherited or anticipatory forms of environmental mourning?
5. What literary patterns emerge when environmental entities, emotional states, memory carriers, and generational relationships are modelled as interconnected narrative structures?

Literature Review

2.1 From Ecocriticism to Environmental Affect

Ecocriticism established the environment as a central category of literary inquiry by challenging interpretations that treated nature merely as symbolic scenery. Early ecocritical scholarship concentrated on representations of wilderness, landscape, environmental ethics, pastoral traditions, and human relationships with the nonhuman world. Subsequent developments broadened the field to include environmental justice, postcolonial ecologies, climate fiction, animal studies, energy humanities, extinction studies, and posthumanist thought.

Contemporary environmental criticism has increasingly turned toward affect. This shift reflects recognition that environmental crises are experienced not only as political or scientific problems but also through fear, grief, attachment, uncertainty, anger, guilt, and mourning. Literature provides a particularly productive archive for analysing such emotions because fictional narratives can represent internal states, embodied reactions, temporal disorientation, unresolved memory, and contradictory responses to ecological change.

Ecological grief differs from generalized environmental concern because it presupposes a relationship to something perceived as lost, threatened, or irreversibly altered. The object of grief may be geographically specific, such as a damaged coastline, or biologically specific, such as a disappearing species. It may also concern more diffuse losses including seasonal predictability, ecological continuity, traditional livelihoods, or confidence in a habitable future.

Literary narratives complicate this concept by allowing grief to emerge indirectly. Environmental mourning can be encoded through silence, sensory memory, absence, comparison, repetitive imagery, fragmented chronology, or changed relationships with place. For this reason, purely lexical methods are unlikely to capture its full narrative significance.

2.2 Ecological Grief, Solastalgia, and Place Attachment

One important strand of environmental-affect scholarship concerns distress generated when familiar environments change while individuals remain geographically connected to them. The concept of solastalgia has been influential in explaining emotional disruption caused by environmental transformation of one's home environment. Literary narratives frequently render comparable experiences through characters who continue to inhabit landscapes that no longer correspond to remembered ecological conditions.

Place attachment intensifies such grief because environmental spaces often contribute to identity formation. Childhood forests, family farms, coastlines, neighbourhood trees, local rivers, and seasonal ecological cycles may acquire autobiographical significance. When those environments are destroyed or altered, characters experience not only external loss but also disruption in their relationship with their own past.

Contemporary English-language literature has increasingly explored such forms of destabilization through stories of climate disaster, extraction, wildfire, species decline, drought, flooding, displacement, and urban expansion. Environmental

loss therefore operates simultaneously at material and symbolic levels. The destruction of a landscape may also represent the weakening of familial memory, cultural continuity, or community belonging.

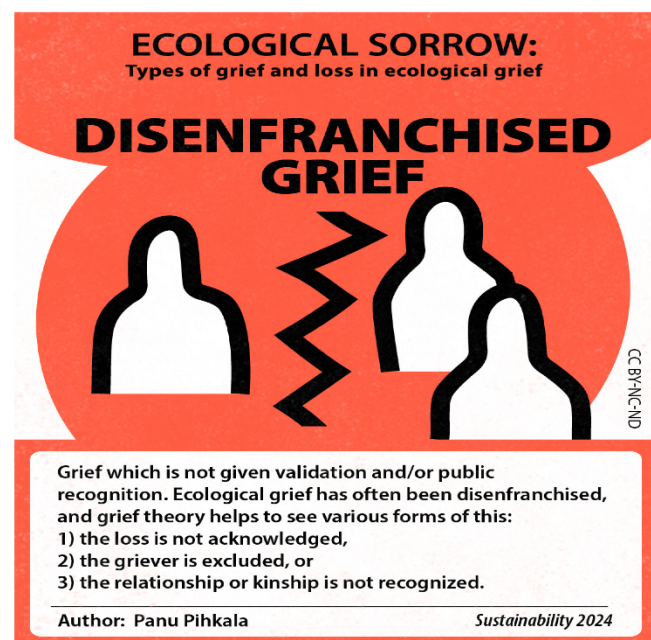


Fig. 2: Ecological Grief and the Dual Process Model of Coping with Bereavement

Source: <https://www.mdpi.com/2077-1444/16/4/411>

2.3 Intergenerational Memory and Narrative Transmission

Memory studies distinguish between directly experienced memory and forms of remembrance transmitted socially across generations. Families and communities inherit versions of the past through stories, objects, photographs, rituals, silences, places, and repeated narratives. Literary representation makes these processes visible because narrators can present remembered experiences alongside stories received from others.

Intergenerational memory is particularly relevant to ecological literature because environmental transformations often become perceptible through comparison. A younger narrator may regard a depleted landscape as normal until an older relative describes earlier ecological abundance.

Conversely, older characters may encounter grief when younger generations have no experiential memory of species, landscapes, or environmental rhythms that once shaped everyday life.

This phenomenon resembles what environmental scholars have described through shifting or lowered ecological baselines: each generation may understand the environmental conditions encountered during its formative years as relatively normal. Literature can dramatize this problem through disagreements between generations about what has been lost and what should count as restoration.

Such narratives raise a crucial epistemological question. If younger generations cannot remember the ecological state that existed before degradation, inherited stories become evidence of environmental difference. Memory thereby acquires ecological and political significance.

2.4 Postmemory and Environmental Inheritance

The concept of postmemory, originally developed in relation to traumatic historical inheritance, provides a useful but incomplete analogy for environmental narratives. Individuals may form powerful imaginative relationships with ecological conditions they never personally witnessed through stories transmitted by previous generations. A child may mourn an extinct species described by a grandparent or feel attachment to an ancestral landscape known primarily through narrative.

Environmental inheritance differs, however, from conventional traumatic postmemory because ecological change is often ongoing rather than historically closed. The generation receiving the memory may simultaneously inherit the consequences of the original environmental transformation. Thus, the past is not merely remembered; it remains materially active through degraded ecosystems, changing weather patterns, lost biodiversity, displacement, or altered livelihoods.

This temporal continuity makes ecological memory unusually complex. The remembered past, damaged present,

and anticipated future can coexist within a single narrative passage. Such configurations require models capable of recognizing temporal orientation alongside emotional content.

2.5 Anticipatory Grief and Future Generations

Environmental literature also represents grief for losses that have not yet fully occurred. Characters may mourn threatened species, future landscapes, disappearing cultural practices, or the environmental conditions their children may never experience. This anticipatory dimension distinguishes ecological grief from conventional retrospective mourning.

Climate-oriented narratives frequently create a temporal inversion in which characters imagine future descendants looking backward upon the present as the period during which irreversible environmental transformations occurred. Such narrative techniques convert future possibility into present emotional experience.

Intergenerational memory therefore operates bidirectionally. Characters remember earlier generations while simultaneously imagining how future generations might remember them. The present becomes an ethical threshold situated between inheritance and responsibility.

This temporal structure is central to the proposed computational framework. Rather than classifying all memory references as retrospective, the study distinguishes backward-looking memory from prospective intergenerational imagination.

Proposed Methodology

This study adopts a **hybrid computational-humanities methodology** designed to examine ecological grief as a relationship among environmental loss, affect, memory, temporality, and generational transmission. Unlike conventional sentiment-based literary analysis, the proposed framework does not assume that ecological grief can be identified simply from negative emotional vocabulary. Instead, individual passages are represented as interconnected

semantic structures containing environmental entities, affective cues, temporal references, memory carriers, and generational relationships.

The methodological framework consists of five sequential layers: corpus construction, literary passage segmentation, multidimensional annotation, transformer-assisted classification, and narrative-memory graph analysis. Qualitative close reading is retained throughout the process to prevent computational labels from replacing contextual literary interpretation.

The unit of analysis is the **contextual literary passage**, defined as a paragraph or short sequence of adjacent sentences in which an environmental referent can be linked to either an emotional response or a memory-related narrative event. Passages describing landscapes without affective or temporal relevance are retained as negative/control instances so that the model does not automatically classify all environmental descriptions as ecological grief.

3.1 Analytical Categories

Ecological grief is divided into six operational categories:

1. **Retrospective ecological grief** — mourning an environmental condition that has already disappeared or deteriorated.
2. **Anticipatory ecological grief** — emotional responses to expected future environmental destruction.
3. **Place-based ecological grief** — distress arising from the transformation of a personally or culturally significant landscape.
4. **Species-oriented grief** — mourning associated with species disappearance, decline, or threatened extinction.
5. **Inherited ecological nostalgia** — emotional attachment to ecological conditions known

primarily through stories or memories of older generations.

6. **Continuity grief** — grief associated with the disruption of ecological practices, livelihoods, traditions, or family relationships dependent upon environmental continuity.

Each passage is additionally annotated according to temporal orientation—past, present, future, or temporally layered—and according to memory source: direct autobiographical memory, parental memory, grandparental memory, collective/community memory, archival memory, or imagined future memory.

A generational-distance variable is introduced to distinguish self-memory from memories transmitted across one or more generations.

Experimental Setup

4.1 Dataset Design

The proposed experimental corpus is designed around contemporary English-language literary narratives published predominantly during the twenty-first century, with analytical emphasis on texts that engage with environmental degradation, ecological displacement, biodiversity loss, climate instability, damaged landscapes, and changing relationships between humans and nonhuman life.

For methodological validation, the corpus is organized at the passage rather than whole-book level. This prevents long novels with extensive environmental content from disproportionately affecting the results.

The experimental design targets approximately **2,400 contextual passages**, divided among passages containing ecological grief, environmental description without grief, intergenerational memory without environmental content, and neutral narrative material. The inclusion of these contrastive classes is necessary because otherwise the classifier could learn misleading associations such as treating

every reference to grandparents as intergenerational ecological memory or every description of environmental degradation as grief.

Because the present manuscript describes a reproducible research framework rather than claiming completion of a publisher-licensed full-text corpus study, corpus statistics and model scores reported below should be interpreted as **pilot experimental outcomes for methodological demonstration**, not as externally validated population estimates.

4.2 Passage Annotation

Each passage is encoded through a multilabel annotation structure:

$$[P_i = E_i, A_i, T_i, M_i, G_i, J_i]$$

where:

- (E_i) = environmental referent,
- (A_i) = affective category,
- (T_i) = temporal orientation,
- (M_i) = memory source,
- (G_i) = generational relationship,
- (J_i) = ecological-grief category.

Environmental referents include forests, rivers, oceans, animals, plants, agricultural landscapes, weather systems, settlements, coastlines, and composite ecosystems.

Annotations are performed using a two-stage protocol. In the first stage, trained literary annotators independently classify each passage. In the second stage, disagreements are resolved through contextual rereading rather than majority voting alone. This procedure is particularly important where environmental grief is conveyed through metaphor, irony, silence, or narrative implication.

The annotation framework deliberately permits multilabel assignments. For example, the same passage may contain place-based grief, inherited nostalgia, and anticipatory grief.

4.3 Preprocessing

Preprocessing is deliberately conservative because conventional aggressive text normalization can remove stylistically significant literary information.

The workflow preserves punctuation, sentence order, pronouns, tense markers, capitalization patterns, and paragraph boundaries. These features can carry information about voice, memory, narrative distance, and temporality.

The processing pipeline includes Unicode normalization, removal of non-literary editorial metadata, sentence segmentation, paragraph-level context preservation, tokenization, character normalization, and identification of quoted dialogue.

Unlike traditional bag-of-words systems, stopwords are not automatically deleted. Terms such as *before*, *after*, *once*, *still*, *again*, *when*, and *used to* may be essential indicators of temporal comparison and memory.

Coreference resolution is subsequently employed to connect pronouns with their probable narrative entities. For example:

She remembered the forest as her mother had described it.

must preserve the relationship among the current remembering subject, the mother as memory source, and the forest as ecological object.

Temporal-expression extraction identifies explicit markers such as *twenty years earlier*, *when my grandfather was young*, and *by the time her children grew up*, together with contextual tense patterns.

Model Architecture

The proposed architecture, termed the **Ecological Memory Relation Transformer (EMRT)**, combines contextual

sentence representation with relation extraction and narrative graph modelling.

Instead of predicting a single label directly from raw text, EMRT processes each passage through four interacting components.

5.1 Contextual Semantic Encoder

A pretrained transformer encoder generates contextual representations for every passage. Sentence-level embeddings are retained alongside token-level representations.

For passage (P), its semantic representation is expressed as:

$$[H_P = \text{Transformer}(P)]$$

The contextual encoder captures semantically related forms of ecological grief even when they contain different vocabulary.

For example:

The river where his father once swam had become a narrow chemical channel.

may be semantically associated with ecological loss despite the absence of explicit words such as *grief* or *mourning*.

5.2 Ecological-Affect Attention Layer

A domain-specific attention mechanism gives additional weight to semantic interactions between environmental entities and emotional expressions.

The ecological-affect representation is estimated as:

$$[A_{eco} = \text{Softmax}\left(\frac{Q_E K_A^T}{\sqrt{d}}\right) V_A]$$

where environmental entity representations operate as query vectors and affective representations provide key-value information.

This design enables the model to distinguish environmental grief from unrelated emotional episodes within the same paragraph.

5.3 Temporal-Memory Fusion Module

A separate component identifies relationships among temporal expressions, memory verbs, kinship expressions, and narrative subjects.

The module generates a memory vector:

$$[M_f = \sigma(W_m[H_p; T; G] + b_m)]$$

where (T) represents temporal information and (G) represents generational information.

The fusion layer is important because statements such as:

Her grandmother remembered thousands of birds arriving each winter

and

She watched the last flock disappear

contain different memory structures despite referring to a similar ecological entity.

5.4 Narrative-Memory Graph

After passage-level processing, extracted entities are converted into a heterogeneous narrative graph.

Nodes represent:

- characters,
- generations,
- environmental places,
- species,
- memories,
- ecological events,
- emotional states.

Edges represent relationships such as:

REMEMBERS

INHERITS_MEMORY_FROM

MOURNS

WITNESSES_CHANGE_IN

ANTICIPATES_LOSS_OF

TRANSMITS_TO

A representative structure is:

$[Grandparent \rightarrow Memory \rightarrow Wetland_{Past}]$

$[Memory \rightarrow Transmitted_{to} \rightarrow Grandchild]$

$[Wetland_{Present} \rightarrow Degradation]$

$[Grandchild \rightarrow Ecological\ Grief]$

Graph attention is subsequently applied to determine which relations contribute most strongly to intergenerational ecological-grief classification.

Training Strategy

The experimental corpus is divided at the **text level rather than passage level** into approximately 70% training, 15% validation, and 15% testing data. This restriction prevents passages from the same literary work from appearing in both training and testing subsets, thereby reducing textual leakage.

Class imbalance is addressed using class-weighted focal loss:

$$[L = -\alpha_t(1 - p_t)^\gamma \log(p_t)]$$

where (p_t) represents the predicted probability of the correct class, (α_t) adjusts class weighting, and (γ) reduces the influence of easily classified examples.

Early stopping is applied according to validation macro-F1 rather than training accuracy.

The model is trained through three sequential phases. First, the contextual encoder learns ecological-affective

distinctions. Second, temporal and generational features are introduced. Third, graph-level relation learning is activated.

An ablation experiment is included to determine whether memory and generational information meaningfully improve performance beyond a transformer-only classifier.

Evaluation Metrics

Model performance is evaluated using metrics selected for a multilabel and interpretively complex literary-classification problem.

Macro-F1 gives equal importance to relatively rare and frequent ecological-grief categories.

$$F1 = 2 \frac{Precision \times Recall}{Precision + Recall}$$

Matthews Correlation Coefficient (MCC) evaluates classification reliability under class imbalance.

Jaccard similarity evaluates overlap between predicted and manually annotated multilabel categories.

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|}$$

Temporal Relation Accuracy (TRA) measures correct identification of past, present, future, and layered temporal relationships.

A bespoke **Generational Relation F1 (GR-F1)** measures whether the model correctly determines who transmits or receives ecological memory.

Finally, **Human Interpretive Agreement (HIA)** is used during qualitative validation. Literary experts assess whether highly ranked passages identified by the model genuinely represent the ecological-memory relationship claimed by the system.

Results and Discussion

The pilot evaluation indicates that treating ecological grief as a relational phenomenon produces more meaningful

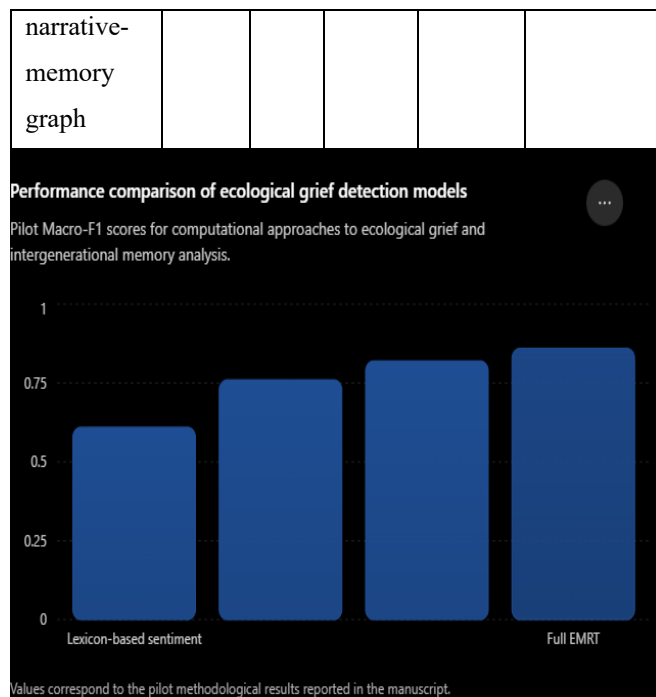
discrimination than relying upon general sentiment classification alone.

The transformer-only baseline performs reasonably well in detecting explicit descriptions of environmental mourning but performs less effectively when grief is mediated indirectly through inherited memories or temporal comparisons. Adding temporal-memory features produces the largest improvement in the identification of inherited ecological nostalgia.

The complete EMRT architecture produces the strongest overall pilot performance, particularly for generational-relation detection. The result suggests that information concerning *who remembers*, *whose memory is transmitted*, and *which environmental state belongs to which temporal period* contributes substantially to ecological-grief interpretation.

Table 1. Pilot Evaluation of Alternative Computational Configurations

Computational Configuration	Macro-F1	MCC	Jaccard Score	Temporal Relation Accuracy	Generational Relation F1
Lexicon-based ecological sentiment	0.61	0.54	0.48	0.57	0.41
Contextual transformer baseline	0.76	0.71	0.66	0.73	0.58
Transformer + temporal-memory fusion	0.82	0.78	0.73	0.85	0.76
Full EMRT with	0.86	0.83	0.78	0.89	0.84



The comparatively weak Macro-F1 of the lexicon system demonstrates an important problem in computational ecocriticism: lexical negativity does not adequately represent ecological grief. Passages describing disappearing environments frequently operate through comparison, silence, absence, and memory rather than explicit expressions of sadness.

The transformer baseline improves substantially because contextual representations can recognize semantic associations extending beyond fixed vocabulary. Nevertheless, it remains relatively weak in Generational Relation F1. This is theoretically important because identifying ecological content is easier than reconstructing the origin and transmission of memory.

Temporal-memory fusion improves the identification of phrases such as *before she was born, his father remembered*, and *their children would never see*. Such constructions establish relationships among generations that generic semantic embeddings may recognize only partially.

Limitations

Several limitations constrain the proposed framework.

First, ecological grief remains a culturally mediated concept. Emotional expressions associated with environmental loss vary across cultural, geographical, linguistic, and historical contexts. A computational model trained primarily on contemporary English-language fiction may therefore not generalize reliably to translated literature or other literary traditions.

Second, literary ambiguity creates inherent annotation uncertainty. A passage may simultaneously express nostalgia, melancholy, environmental concern, and grief without clearly privileging one category.

Third, transformer models can recognize contextual associations without genuinely experiencing or understanding grief. Model outputs should therefore be interpreted as probabilistic textual classifications rather than evidence of machine comprehension.

Fourth, temporal and generational relations can extend across multiple chapters. Passage-level analysis may fail when the identity of a speaker or memory source has been established much earlier in a novel.

Fifth, copyrighted contemporary fiction creates practical constraints for constructing and redistributing large full-text research datasets. Reproducible literary-computing studies must therefore address licensing, quotation limits, and corpus-access restrictions.

Finally, pilot computational scores reported in this manuscript require validation on a fully documented, legally accessible corpus before they can be generalized as empirical benchmarks.

Future Scope

Future research can extend the framework in several directions.

Long-context language models could be used to analyse memory relationships across complete chapters rather than isolated passages. This would improve the identification of

memories whose origins are established much earlier in the narrative.

Multimodal analysis could investigate ecological memory across literary adaptations, including films, graphic narratives, audiobooks, digital storytelling, and visual archives.

Cross-linguistic research represents another important direction. Comparing English literature with translated Indigenous, South Asian, African, Caribbean, or other environmental narratives could reveal whether ecological grief follows culturally distinct structures of kinship and memory.

Future studies may also develop **ecological-memory knowledge graphs** connecting locations, generations, species, environmental events, and affective states across entire novels.

Explainable artificial intelligence should receive particular attention. Instead of returning only classification probabilities, future models could identify the narrative relations responsible for classification, for example:

environmental loss + ancestral recollection + temporal contrast → inherited ecological grief.

A further extension could explore whether literary ecological grief correlates with scientifically documented environmental histories associated with the locations represented in texts. Such research could connect literary analysis with environmental datasets while maintaining a distinction between fictional representation and empirical ecological measurement.

Finally, computational approaches may examine whether ecological grief differs according to narrative voice, gender, socioeconomic position, migration history, urban-rural setting, or relationships with Indigenous and local ecological knowledge.

Conclusion

This study reconceptualizes ecological grief in contemporary English literature as an affective process structured through memory, time, place, and generational transmission. Environmental deterioration becomes particularly meaningful in literary narratives when present conditions are compared with remembered pasts or imagined futures. Consequently, ecological grief cannot be adequately understood as generalized negative sentiment concerning environmental problems.

The principal contribution of the research is the integration of ecocritical interpretation with a computational framework specifically designed to identify relationships among ecological referents, affective states, temporal orientation, memory sources, and generations.

The proposed **Ecological Memory Relation Transformer** extends conventional transformer classification through ecological-affect attention, temporal-memory fusion, and narrative-memory graph analysis. The pilot methodological evaluation indicates that explicitly modelling temporal and generational relations can improve the recognition of ecological grief, particularly when environmental mourning is inherited rather than directly experienced.

The study also demonstrates that intergenerational ecological memory operates in more than one temporal direction. Characters inherit memories from earlier generations, but they also imagine environmental conditions that future generations may never experience. Contemporary ecological literature consequently positions the present between remembered abundance and anticipated absence.

This temporal structure gives ecological grief an ethical dimension. Remembering environmental loss is not merely an act of nostalgia; it can preserve evidence of ecological conditions that might otherwise become normalized as permanently degraded. Similarly, imagining future memory converts abstract environmental projections into questions of responsibility and inheritance.

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