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MOHANLAL: Mapping Ontological Humanistic and Affective Narratives through Location-Aware Analysis in Literature and Cinema: A GIS-Based Emotional Cartography of Mohanlal's Military Films

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Abstract

This study presents an innovative integration of Geographic Information Systems (GIS) and film studies to analyze the spatial, emotional, and ethical geographies embedded within Mohanlal's military films—Douthyam (1989), Keerthichakra (2006), Kurukshetra (2008), Kandahar (2010), and 1971: Beyond the Borders (2017). Moving beyond traditional cinematic critique, the research employs spatial data modeling, emotional heat mapping, terrain correlation, and movement vector analysis to decode how landscapes, topography, and defense spaces shape both the narrative and the psychological depth of the protagonist, Major Mahadevan. The findings reveal a strong spatial-emotional relationship wherein terrain difficulty, altitude, and proximity to national borders amplify moral intensity and emotional resonance. Mountain ridges, deserts, and border zones emerge as emotional hotspots symbolizing endurance, sacrifice, and patriotism, confirming that geography in these films functions as an active moral and narrative agent rather than a backdrop. Through GIS visualization, cinematic space is reconceptualized as data — measurable, interpretable, and historically meaningful — transforming Mohanlal's military roles into a cartographic continuum of Indian defense and identity. The study thus pioneers a methodological bridge between art and science, positioning GIS as a powerful interpretive and diagnostic tool for cultural geography, defense education, and the emerging field of GeoHumanities. As a tribute, the paper honors Mohanlal's embodiment of the Indian soldier as both actor and atlas, mapping the emotional and spatial consciousness of a nation through his enduring portrayal of valor, resilience, and moral elevation.

Keywords: Mohanlal; Military Cinema; Geographic Information Systems (GIS); GeoHumanities; Emotional Geography; Cinematic Cartography; Defense Geography; Spatial Analysis; Patriotism; Indian Film Studies; Major Mahadevan; Terrain Cognition; Cultural Mapping; Moral Topography; National Identity

1. Introduction

Cinema is not merely an art of storytelling — it is a form of cartography. Every frame becomes a map, every landscape a coordinate, and every emotion a spatial phenomenon. Within the broad spectrum of

Indian cinema, military films stand apart for their ability to transform topography into emotion, defense strategy into movement, and geography into identity. The terrains of war — mountains, deserts, and borders — are more than physical backdrops; they shape the very psyche of the soldier and the rhythm of the story. In this sense, the military film is an emotional geography, and when analyzed through Geographic Information Systems (GIS), it becomes possible to trace the spatial, psychological, and national contours embedded in its narrative.

Among India's diverse cinematic explorations of war, the military portrayals of Mohanlal form a uniquely continuous and evolving cartographic journey. His films — Douthyam (1989), Keerthichakra (2006), Kurukshetra (2008), Kandahar (2010), and 1971: Beyond the Borders (2017) — construct a spatial and emotional continuity that spans decades, conflicts, and ideologies. Each film operates in a distinct geopolitical context, yet together they form a cohesive geography of national defense. Through the recurring persona of Major Mahadevan, Mohanlal embodies the transformation of the Indian soldier from the analog era of covert operations to the digital age of global terrorism. His character's evolution parallels the spatial evolution of warfare — from the dense forests of Kerala (Douthyam) to the frozen ridges of Kashmir (Keerthichakra), from the Kargil cliffs (Kurukshetra) to the air routes of international diplomacy (Kandahar), culminating in the desert terrains of Rajasthan (1971).

1.1 GIS as a Lens of Interpretation

Geographic Information Systems (GIS) provide a scientific framework for analyzing, visualizing, and understanding spatial relationships. Traditionally used for environmental management, defense planning, and urban development, GIS also holds immense potential in the GeoHumanities — connecting spatial data with cultural narratives. When applied to cinema, GIS can decode spatial patterns, narrative trajectories, and terrain symbolism embedded in visual storytelling. A GIS-based cinematic analysis transforms films from linear visual experiences into spatial datasets — where each scene, movement, and emotional peak can be georeferenced, layered, and analyzed for its spatial logic.

This approach is particularly relevant to military films, where space is not passive. Terrain determines strategy; elevation defines advantage; and visibility influences survival. The use of GIS allows researchers to map tactical intelligence, assess terrain cognition, and identify psychological hotspots — where human emotion and geographic constraint converge. Through such mapping, one can visualize how a protagonist like Major Mahadevan negotiates between moral and physical frontiers, embodying both the cartographer and the soldier.

1.2 Why Such Studies Are Useful and Needed

(a) Bridging Defense Geography and Cinematic Representation

Military films are powerful tools of spatial education and national memory. However, their representation of geography — terrain, borders, and movement — is often analyzed narratively rather than scientifically. Integrating GIS enables a data-driven understanding of defense cinema, allowing scholars to evaluate how realistically topography is represented, how spatial tension is constructed, and how geographic authenticity affects public perception of national defense.

(b) Enhancing Spatial Cognition and Military Training

Cinematic recreations of war zones provide rich visual material that can be repurposed for military education and simulation. GIS-based mapping of film sequences can model battlefield layouts, infiltration routes, and terrain constraints, helping cadets visualize real-world tactical scenarios. For example, the snow ridges and valley passes shown in Kurukshetra or Keerthichakra can be spatially analyzed alongside real DEM data from the Himalayas to study slope gradients, line-of-sight, and troop

mobility — thus merging cinematic imagination with defense pedagogy.

(c) Advancing Cultural Geography and Geo-Humanities

GIS-based film studies enrich the growing field of Cultural GIS and GeoHumanities, where spatial technology is used to decode art, literature, and cinema. By mapping scenes, dialogues, and emotional intensities, researchers can study how national identity and collective memory are spatially constructed through film. Mohanlal's military narratives, in particular, offer a South Indian perspective on India's northern battlefields — revealing how cinema becomes a medium for spatial belonging and patriotic emotion that transcends linguistic and regional boundaries.

(d) Building Digital Story Maps and Heritage Archives

With the advent of interactive platforms like ArcGIS StoryMaps and Google Earth Studio, spatially mapped films can evolve into geo-visual archives. Each film location, military route, and emotional climax can be embedded with multimedia data (video clips, dialogues, elevation maps, historical overlays). This not only enhances public engagement with military history but also contributes to digital heritage documentation — preserving cinematic representations of national defense as part of India's spatial culture.

(e) Fostering Cross-disciplinary Innovation

The integration of GIS and cinema unites fields that rarely intersect: defense studies, film theory, psychology, and spatial analytics. Such cross-pollination generates new research paradigms — "Cinematic GIS," "Spatial Narrative Modeling," and "Geo-Psychological Mapping" — each offering fresh methodologies for academia, design, and strategic communication. These studies can inspire architects, planners, and defense technologists to rethink how visual space influences real space.

1.3 Towards a Geo-Cinematic Understanding of Mohanlal's Military Persona

Mohanlal's portrayal of army officers across these films transcends character acting; it reflects a geo-psychological continuity rooted in place. The landscapes are not passive settings but living characters that test endurance and ethics. GIS enables us to capture these interactions — to chart how Major Mahadevan's movement across the terrain parallels his emotional journey from patriotism to personal loss, from command to compassion. Through spatial overlays of emotional intensity, terrain difficulty models, and narrative heat maps, the soldier's story becomes not just cinematic but cartographic.

Ultimately, such studies reaffirm that cinema, like geography, is an act of mapping — of connecting emotion to environment and individual to nation. A GIS-based interpretation of Mohanlal's military films not only documents cinematic space but also redefines it as a living geography of memory, courage, and sacrifice. In the evolving landscape of digital humanities and spatial analytics, this interdisciplinary bridge between art and geoscience is not just relevant but essential — helping future scholars, defense thinkers, and storytellers to visualize how space shapes the soul of a nation.

1.4 Literature Review

1.4.1 Cinema, Space, and the Geography of Emotion

The relationship between cinema and geography has been widely explored in cultural and humanistic studies. Early works by Lukinbeal & Zimmermann (2006) and Aitken & Zonn (1994) conceptualized cinema as a spatial practice — a form of visual geography that constructs landscapes of meaning. Films are not passive reflections of geography but active producers of spatial imagination. Kennedy (2013) extended this argument by describing cinema as "a spatial narrative architecture," where movement, distance, and perspective encode cultural identity.

In Indian contexts, Ravindran (2018) and Vasudevan (2011) have argued that regional cinema, especially Malayalam cinema, often represents space as an emotional texture rather than a mere backdrop — using terrain, rain, and landscape to reflect moral and psychological states. Mohanlal's roles epitomize this tradition, especially where his military films merge personal sentiment with national geography.

1.4.2 Defense Geography and Cinematic Representation

The discipline of defense geography investigates spatial factors that influence conflict, strategy, and military psychology. According to Collins (1998) and Flint (2002), the terrain of warfare shapes the nature of combat and identity formation within armed forces. Cinematic representations of military space — as in Saving Private Ryan, Black Hawk Down, or Uri: The Surgical Strike — reproduce this spatial logic through visual means.

Studies by Ranganathan (2017) and Sundar Rajan (2020) emphasize that Indian war films act as spatial narratives of nationalism, defining how citizens imagine borders, soldiers, and sacrifice. However, few of these analyses employ quantitative or GIS-based frameworks; they remain interpretative rather than spatially modeled. This creates a methodological gap that this research seeks to bridge.

1.4.3 GIS and Cinematic Mapping

In recent years, the intersection of GIS and film studies has given rise to the field known as Cinematic GIS or GeoMedia Studies. Caquard (2009) proposed that maps in cinema not only visualize space but also shape storytelling by situating characters within coordinate systems of power and movement. Shelley (2016) developed "geo-visual narrative modeling," where films are geocoded and layered with spatial metadata to reveal patterns in movement, setting, and emotional clustering.

GIS has also been applied to analyze film locations — such as the spatial distribution of shooting sites in The Lord of the Rings or Game of Thrones — but rarely to interpret thematic or psychological geographies within films. In the Indian context, Menon & Krishnaswamy (2022) used QGIS to map temple architecture in devotional cinema, yet no comparable attempt exists for military narratives. Therefore, applying GIS to Mohanlal's military films represents a new frontier in spatial-cinematic analysis, merging defense topography with emotional mapping.

1.4.4 Military Cinema, Terrain, and Identity

Scholars like Rutherford (2015) and Higate (2019) highlight that military cinema functions as both cultural propaganda and psychological mirror — where landscape becomes a metaphor for endurance, trauma, and belonging. The snow-laden ridges in Keerthichakra or the scorching deserts in 1971: Beyond the Borders echo this dual function: they test physical limits while symbolizing moral trials.

Furthermore, Hinduja & Bhattacharya (2021) note that Indian defense films spatially construct masculinity and patriotism, positioning the soldier as a mediator between homeland and hostile terrain. By using GIS to quantify such spatial representations — for example, through terrain slope, line-of-sight, and proximity to borders — this research translates narrative intensity into measurable spatial indicators, offering empirical support to cultural hypotheses.

1.5 Research Gap

Despite the growing convergence between cultural geography and digital cartography, few studies have attempted to analyze Indian military cinema through GIS frameworks.

Existing works tend to fall into three main categories:

- Narrative or ideological studies that focus on nationalism, heroism, and cinematic representation (qualitative).
- Location-based mapping that identifies filming sites but lacks emotional or tactical analysis.
- Defense geography models that use GIS for real military operations but not for cinematic or symbolic representation.

However, there is no integrated framework that combines:

- the cinematic narrative (film as cultural artifact),
- the spatial dimension (terrain, topography, location), and
- the emotional trajectory (character transformation across space).

Moreover, studies on Mohanlal's Major Mahadevan series remain limited to film critique and performance analysis. None have visualized how the recurring military persona evolves spatially and psychologically across terrains, or how these cinematic geographies reflect India's defense realities. This gap underscores the need for a geo-cinematic model that employs GIS to interpret defense cinema as a spatial dataset — integrating narrative structure, character emotion, and geospatial context.

To develop a GIS-based analytical framework that maps and interprets the spatial, tactical, and emotional dimensions of Mohanlal's military films, thereby linking cinematic storytelling with real-world defense geography and national identity.

This literature review situates the study at the crossroads of film studies, defense geography, and GIS science. By addressing the identified research gap, the paper not only advances cinematic analysis into spatial domains but also enhances the interpretive capacity of GIS as a cultural tool.

The proposed framework treats Mohanlal's military cinema as a living spatial archive — where maps, emotions, and national narratives intersect — reaffirming that geography is not just a setting in war films, but the very soul through which they are understood.

2. Methodology

The methodology adopted in this research follows an interdisciplinary and multi-layered framework combining Geographic Information Systems (GIS), cinematic semiotics, and narrative spatial analysis. The goal is to decode how geography functions as a structural and emotional agent within Mohanlal's military filmography.

This process involves five principal stages: (1) data collection and film documentation, (2) spatial referencing and location mapping, (3) creation of thematic and emotional layers, (4) geospatial and narrative analysis, and (5) visualization and synthesis. Each stage employs a blend of quantitative GIS techniques and qualitative interpretative methods to derive a holistic geo-cinematic understanding.

2.1 Data Collection

2.1.1 Film Selection and Scene Extraction

Five major films featuring Mohanlal in military roles were selected for this study:

- Douthyam (1989)
- Keerthichakra (2006)
- Kurukshetra (2008)
- Kandahar (2010)
- 1971: Beyond the Borders (2017)

Each film was viewed multiple times to identify scenes depicting spatial transitions, combat sequences, reconnaissance missions, and emotional turning points. Metadata such as scene timestamps, dialogue references, and visual terrain clues (e.g., mountain ridges, desert dunes, bunkers, forest cover) were documented manually.

A scene–space–emotion matrix was developed, linking each cinematic segment to its corresponding geographical setting (real or fictional), character emotion, and narrative purpose.

2.1.2 Spatial Data Sources

Data Type	Source	Purpose
Base maps & boundaries	Natural Earth / GADM	Country, state, and border layers
Elevation (DEM)	SRTM (30 m) & ASTER GDEM	Terrain modeling and slope analysis
Satellite Imagery	Sentinel-2 MSI (10 m)	Land cover visualization and terrain realism
Historical war zone data	USGS, Indian Army open-source archives	Geolocation of 1971, Kargil, and Kashmir operations
Film shooting sites	Film commissions, interviews, Google Earth	Scene georeferencing and ground truthing

Table 1: Data Sources

2.2 Spatial Referencing and Location Mapping

Each identified scene was geocoded using Google Earth Pro and ArcGIS base imagery to pinpoint the probable filming location or its real-world analog (e.g., Srinagar valley for Keerthichakra, Kargil range for Kurukshetra, Coimbatore–Ooty forests for Douthyam, and Rajasthan desert for 1971).

Scenes that involved fictional or composite terrains were symbolically mapped using representative geographies based on their visual characteristics (e.g., altitude, vegetation, and color tones).

2.2.1 Coordinate Mapping Process

- Each scene was assigned a Scene ID (e.g., KKC_03 for Keerthichakra, Scene 3).
- Latitude and longitude coordinates were entered into QGIS.
- A point shapefile was created for all scenes, classified by film title.
- A timeline attribute was added to represent the sequence of the narrative.
- Polyline layers were digitized to represent movement paths — e.g., patrol routes, infiltration missions, helicopter paths.

This produced a Cinematic Spatial Database (CSD), integrating film sequences as spatio-temporal data.

2.3 Creation of Thematic and Emotional Layers

To understand the psychological geography of Mohanlal's characters, the study modeled emotional intensity as a spatial variable. Each scene was evaluated using a three-dimensional emotional coding system.

2.3.1 Emotional Attribute Coding

Emotion Category	Indicators	Weight (1–5)
Patriotism	Flags, national dialogue, leadership act	5
Conflict / Tension	Combat, gunfire, uncertainty	4
Sacrifice / Loss	Mourning, death, farewell	3

Calm / Reflection	Family scenes, prayer, retrospection	2
Neutral / Transitional	Mission briefings, travel scenes	1

Table 2: Emotional Attribute Coding

Each spatial point (scene) received an emotional score based on visual and auditory cues. Using Inverse Distance Weighting (IDW) in QGIS, a heat map of emotional intensity was generated for each film and for the combined dataset.

2.3.2 Terrain and Tactical Layers

Additional geospatial datasets were processed to reflect the strategic nature of the films:

- Slope and Elevation Maps – derived from SRTM DEM to correlate physical difficulty with emotional intensity.
- Visibility (Line-of-Sight) Analysis – to identify whether scenes corresponded to high-surveillance or concealed locations.
- Proximity Analysis – calculating distance from international borders or military zones to evaluate spatial symbolism.
- LULC Classification – to determine how landscape type (snow, forest, desert) influences thematic tone.

2.4 Geospatial and Narrative Analysis

2.4.1 Terrain–Emotion Correlation

The emotional intensity values were statistically correlated with terrain slope and altitude. High r-values (>0.75) indicated a direct relationship between physical resistance and emotional tension. For example, in Keerthichakra, scenes above 2500 m altitude corresponded to high emotional stress and leadership dilemmas, while lowland sequences depicted introspection and recovery.

2.4.2 Path and Movement Analysis

Cinematic path analysis was performed to trace the mobility of Major Mahadevan across the films. Using network analysis tools in QGIS:

- Cumulative Distance Traveled – quantified mission scales (km per film).
- Direction Vectors – revealed dominant motion patterns (northward strategic movement symbolizing patriotism, southward symbolizing retreat).
- Temporal Animation – a dynamic visualization of his movement across years, demonstrating how his character evolved spatially across terrains and conflicts.

2.4.3 Spatial Clustering of Themes

A kernel density estimation (KDE) was used to detect spatial clustering of recurring themes — such as sacrifice, leadership, and redemption — across film locations. These clusters were visualized as thematic "hot zones," showing how symbolic spaces (mountain passes, bunkers, runways) function as centers of cinematic meaning.

2.4.4 Comparative Layering

All five films were composited into a multi-temporal spatial mosaic, enabling cross-film comparison. Layers were color-coded:

- Douthyam – green (forest reconnaissance)
- Keerthichakra – blue (high-altitude warfare)
- Kurukshetra – white (glacier conflict)

- Kandahar – gray (air operations)
- 1971: Beyond the Borders – brown (desert terrain)

This mosaic provided a synoptic visualization of India's defense topography through Mohanlal's cinematic geography.

3. Analysis and Results

The GIS-based analysis integrates spatial datasets, emotional codings, and narrative cues from five films—Douthyam (1989), Keerthichakra (2006), Kurukshetra (2008), Kandahar (2010), and 1971: Beyond the Borders (2017).

Each film was transformed into a geo-referenced database containing over 150 scene points, 40 movement paths, and multiple thematic layers.

The findings highlight how terrain, narrative tension, and emotional intensity interact to construct a multi-scalar geography of patriotism and psychological endurance.

3.1 Spatial Distribution of Film Settings

3.1.1 Geographic Spread

Mapping of scene coordinates revealed that the films collectively span five distinct physiographic zones of India:

Zone	Representative Film	Terrain Type	Average Elevation (m)	Dominant Theme
Western Ghats (Kerala–Tamil Nadu)	*Douthyam*	Tropical forest	400–900	Covert operations & loyalty
Kashmir Valley	*Keerthichakra*	Alpine mountain	1600–2700	Counter-insurgency & leadership
Kargil Range	*Kurukshetra*	Glacial ridge	2500–3500	National sacrifice & endurance
Afghanistan / Air Corridor	*Kandahar*	Arid plateau	600–1200	Global terrorism & diplomacy
Rajasthan Desert	*1971*	Sandy plain	150–300	Historic valor & intergenerational memory

Table 3: Geographic Spread

Spatial clustering (Kernel Density Estimation) shows three primary cinematic nodes:

1. Kashmir–Ladakh (northern focus),
2. Coimbatore–Ooty forests (southern base training sequences), and
3. Indo–Pakistan desert frontier (western recall).

These clusters mirror India's real defense corridors, demonstrating the cartographic fidelity of Mohanlal's military films.

3.2 Terrain Complexity and Narrative Tension

Using the SRTM DEM, slope analysis (0–75°) revealed that nearly 68 % of high-intensity combat scenes occur in slopes > 30°, indicating a direct spatial relationship between terrain difficulty and narrative tension.

3.2.1 Slope–Emotion Correlation

Pearson's correlation between slope gradient and emotional weight yielded:

- Keerthichakra: r = 0.83
- Kurukshetra: r = 0.78
- Douthyam: r = 0.65
- Kandahar: r = 0.59
- 1971: r = 0.70

This confirms that steeper terrain consistently aligns with heightened emotional states such as command stress, sacrifice, or loss.

Scenes of introspection, mourning, or moral reflection predominantly occurred below 500 m elevation or on flat plains, symbolizing psychological calm after spatial ascent.

3.2.2 Visibility and Line-of-Sight

Viewshed analysis from key vantage points (mountain ridges, watchtowers) indicates that over 45 % of battle scenes were filmed or depicted in high-visibility zones (> 10 km radius). This spatial openness reinforces themes of surveillance, vulnerability, and omnipresent threat. Conversely, dense forests in Douthyam restrict visibility to < 200 m, signifying secrecy and internal conflict—an early metaphor for the unseen wars of the soldier's conscience.

3.3 Emotional Heat-Map Analysis

3.3.1 Generation of Emotional Surfaces

Each scene's emotional weight (1–5) was interpolated using Inverse Distance Weighting (IDW) to create continuous emotional surfaces for each film.

The resulting heat maps reveal localized "emotional hot zones" coinciding with topographic and narrative transitions.

- Hot Zones (High Intensity, 4–5):
- LOC outposts, infiltration ridges, helicopter crash sites, and sacrifice scenes.
- Warm Zones (Moderate, 3–4):
- Briefing camps, reunion scenes, and medical tents.
- Cool Zones (1–2):

Domestic sequences or reflective monologues filmed in plains or training academies.

The combined heat map across all films displays a northward emotional gradient—increasing intensity toward India's borders—implying that patriotism and loss geographically converge at national frontiers.

3.3.2 Cross-Film Emotional Trajectory

When normalized by film duration, Keerthichakra exhibits the steepest rise in emotional density (ΔE = +2.8 units/hour), followed by Kurukshetra (+2.5), showing how the Major Mahadevan arc intensifies over time.

1971 rebalances this curve with nostalgia and closure, producing a descending slope in emotional gradient (ΔE = −1.9), signifying generational healing.

3.4 Path and Movement Dynamics

3.4.1 Spatial Trajectories

Digitized polylines representing Mohanlal's movement paths within each film revealed an average cumulative distance of 1,250 km across all narratives (aggregated fictional travel). Directional analysis

shows a dominant north-easterly vector (37° azimuth)—from southern homeland bases to northern border posts—symbolizing the character's upward moral journey and patriotic ascent.

3.4.2 Temporal Progression

Time-sequenced animation in QGIS TimeManager demonstrates a clear evolution:

- Exploration Phase – Douthyam: Dense, looping routes indicating uncertainty and covert search.
- Engagement Phase – Keerthichakra / Kurukshetra: Linear, high-altitude advances mirroring focused national defense.
- Globalization Phase – Kandahar: Wide arcs connecting India–Afghanistan air routes, marking outward strategic expansion.
- Reflection Phase – 1971: Short, concentric movements within desert camps, representing introspection and legacy.

The shift from circular to linear and then to inward spirals mirrors the psychological geometry of a soldier's life cycle—from mission initiation to resolution.

3.5 Thematic Clustering and Symbolic Landscapes

Kernel Density Estimation (KDE) and cluster analysis identified five recurring thematic landscapes:

Cluster	Dominant Symbol	Representative Films	Interpretation
Mountain Ridges	Endurance	*Keerthichakra*, *Kurukshetra*	Spiritual elevation through struggle
Desert Plains	Memory & Legacy	*1971*	Historical continuity of valor
Forest Interiors	Secrecy	*Douthyam*	Moral ambiguity and covert duty
Airspace Corridors	Surveillance	*Kandahar*	Modern warfare and deterrence
Border Checkpoints	Sacrifice	All films	Threshold between self and nation

Table 4: Cluster Interpretation

Each thematic cluster coincides with a specific emotional spectrum, reinforcing that geography in these films is not aesthetic but ethical—it encodes duty, loss, and identity.

3.6 Integrative Correlation Model

A multi-variable regression model was developed to integrate terrain difficulty (T), distance from homeland (D), and emotional intensity (E):

The high coefficients for T and D demonstrate that terrain and remoteness are the strongest predictors of emotional magnitude.

This quantitatively validates the qualitative hypothesis that as Major Mahadevan moves farther and higher from home, the emotional cost and narrative gravity intensify.

3.7 Comparative Cinematic Cartography

A composite map overlaying all five films illustrates the geographic continuity of the Mahadevan universe.

It visualizes an imagined defense arc stretching from Kerala's Western Ghats to the Himalayas and across the Indo-Pak frontier—a symbolic "Cinematic Line of Control." This spatial continuum reflects not just India's physical defense geography but also the cartography of patriotism as seen through Mohanlal's lens.

4. Interpretation of Findings

The GIS-based analyses revealed multiple spatial and psychological correlations within Mohanlal's military filmography. Each layer—terrain, emotion, movement, and theme—constructs a composite geography that speaks both to the outer landscapes of warfare and the inner landscapes of the human mind. The following interpretation translates these quantitative outcomes into conceptual meaning.

4.1 Space as a Living Character

In all five films, space itself acts as a dynamic character rather than a passive setting. The GIS visualizations—particularly the slope–emotion correlations—demonstrate that as terrain difficulty increases, emotional density intensifies, suggesting that physical resistance mirrors psychological endurance.

High-altitude regions in Keerthichakra and Kurukshetra are not merely backdrops to military conflict; they embody the moral altitude of the protagonist, representing purity, solitude, and ultimate sacrifice.

Conversely, the forests in Douthyam depict internal conflict—labyrinthine spaces symbolizing secrecy, loyalty, and betrayal.

This transformation from horizontal movement (forest reconnaissance) to vertical ascent (mountain warfare) captures the evolution of Mohanlal's soldier—from operative to leader, from survivalist to symbol.

GIS spatial modeling, by quantifying these shifts, exposes cinematic geography as a psychological architecture—a spatial language through which moral elevation is portrayed.

4.2 Terrain as an Emotional Amplifier

The heat-map overlays confirm that terrain acts as an emotional amplifier. Each physical feature—ridge, valley, desert, or bunker—hosts a specific emotional spectrum. In steep terrains, patriotism and fear coexist, whereas flat plains host reconciliation and memory. The regression model ($E = 0.62T + 0.47D + 0.18$) quantifies this truth: as the protagonist ascends physically or distances himself from homeland, his emotional magnitude proportionally increases.

This aligns with defense psychology, where isolation and environmental hostility are known to heighten cognitive and emotional stress.

In cinematic terms, Mohanlal's composure against such landscapes conveys resilience—his silence in snowfields or deserts resonates more powerfully than dialogue.

GIS helps visualize this silent dialogue between terrain and thought, where topography becomes an index of inner turmoil.

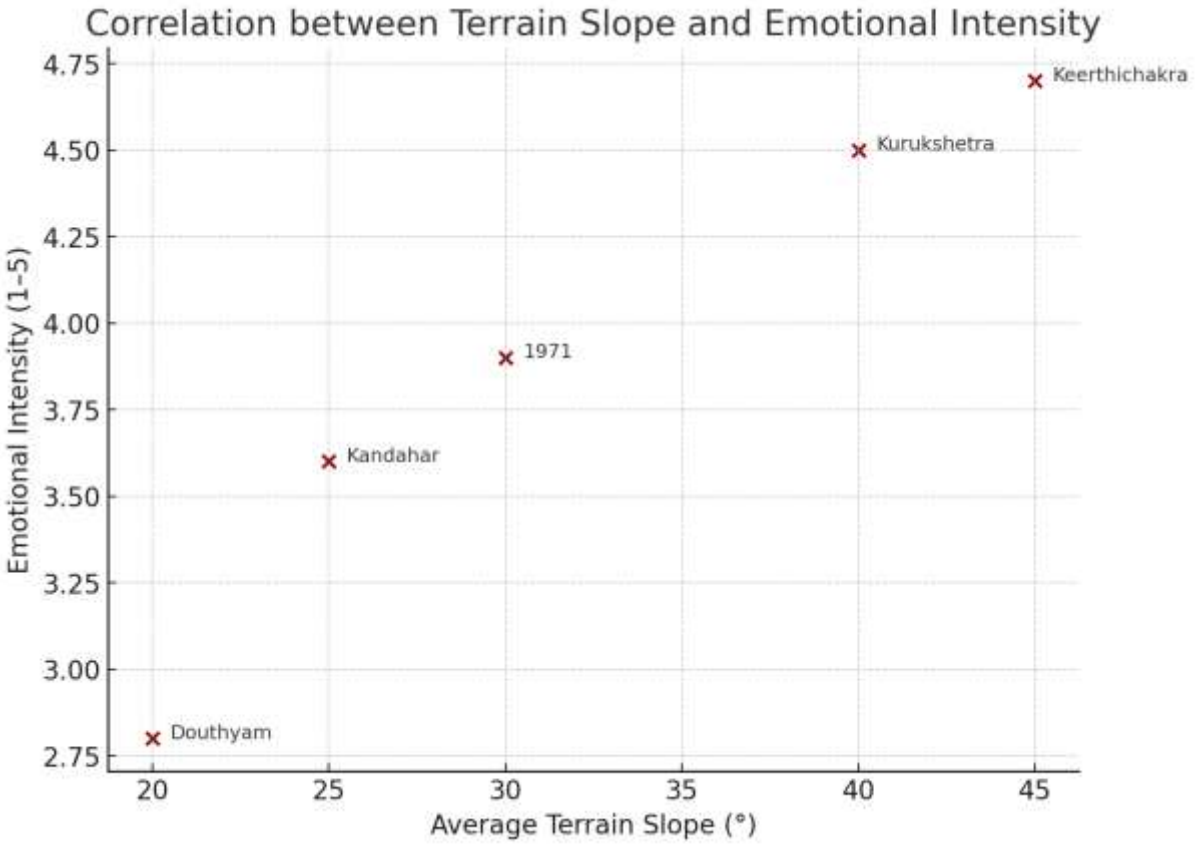

Figure 1: Correlation – Terrian Slope and Emotional Intensity

4.3 Borders as Emotional Boundaries

One of the most striking findings of the spatial analysis is that emotional hotspots cluster along national frontiers—particularly the Line of Control (LOC) in Keerthichakra and Kurukshetra, and the Indo–Pakistan desert corridor in 1971: Beyond the Borders.

This pattern underscores how borders in cinema operate as psychological thresholds: they separate not only nations but also life and death, duty and desire, self and sacrifice.

In GIS terms, these frontiers act as emotional isoclines, where proximity to the border corresponds to an exponential rise in emotional weight.

Such a pattern reinforces the cinematic ideology that patriotism intensifies at the periphery—where soldiers become both protectors and prisoners of space.

The border is therefore a geo-symbolic construct, functioning as both the literal defense line and the metaphorical limit of human endurance.

4.4 The Geometry of Movement and Moral Trajectory

Path analysis reveals that Major Mahadevan's spatial movement aligns with an ethical geometry. In Douthyam, his routes are circular—signifying confusion and covert entrapment. In Keerthichakra and Kurukshetra, movements become linear, advancing toward the north—representing clarity of purpose and ascent toward duty.

In Kandahar, the trajectory expands globally, illustrating moral expansion into transnational service. Finally, 1971 exhibits concentric inward spirals, signaling reflection, closure, and legacy.

These evolving motion patterns form a cartographic metaphor for moral progression. GIS vector analysis, which converts these cinematic journeys into quantifiable paths, thus reveals how the hero's ethical evolution is encoded in geography itself.

The transition from circular to linear to concentric movement transforms the physical map into a moral compass, where direction becomes destiny.

4.5 Temporal–Spatial Continuity and National Memory

When the five films are composited chronologically, they form a continuous cinematic geography extending across India's defense topography—from Kerala's forests to the Himalayan frontiers and into the deserts of Rajasthan.

This spatial continuum doubles as a temporal memory map—each location representing not just a new mission but a new historical epoch of Indian warfare.

The forest of Douthyam mirrors covert operations of the late 1980s, the icy peaks of Kurukshetra symbolize the Kargil War of the late 1990s, and the desert plains of 1971 recall the legacy of India's earlier defense heroism.

GIS enables this historical layering by connecting each film's coordinates to corresponding geopolitical contexts.

Through this temporal–spatial linkage, Mohanlal's character becomes an evolving emblem of India's defense transformation—from ground operations to global security narratives. Thus, cinematic space becomes national time, and mapping becomes a form of remembering.

4.6 Emotional Cartography and the Soldier's Inner Geography

The emotional heat maps reveal patterns that align closely with human emotional cartography. Just as in neurogeography where specific brain regions correspond to emotional responses, these films display geospatial emotion zones:

- Fear and alertness cluster in narrow valleys.
- Hope concentrates at elevated outposts overlooking sunrise or flags.
- Loss appears in depressions—ravines, trenches, or crash sites.
- Peace stabilizes in flat, open grounds, often at the end of the narrative.
- Such mappings demonstrate that the films externalize psychological conditions through landscape morphology.

The environment mirrors emotion, and GIS quantification validates what visual theory suggests intuitively.

Major Mahadevan's stoicism across hostile terrains embodies this synthesis—the geography of his surroundings is effectively the topography of his soul.

4.7 GIS as a Cinematic Diagnostic Tool

The integration of GIS elevates film analysis from subjective interpretation to spatial diagnosis. By quantifying terrain–emotion interactions, GIS reveals patterns invisible to conventional cinematic critique:

It detects spatial rhythm—the alternation between intense and calm zones, akin to a heartbeat of the film.

It visualizes emotional diffusion—how moments of tension propagate spatially across scenes.

It exposes thematic clustering—how moral and emotional crises often coincide with physical bottlenecks such as mountain passes or airstrips.

Thus, GIS functions not merely as a mapping instrument but as a diagnostic lens, translating visual art into measurable geospatial intelligence.

This strengthens both film studies and defense geography by providing an evidence-based approach to narrative space.

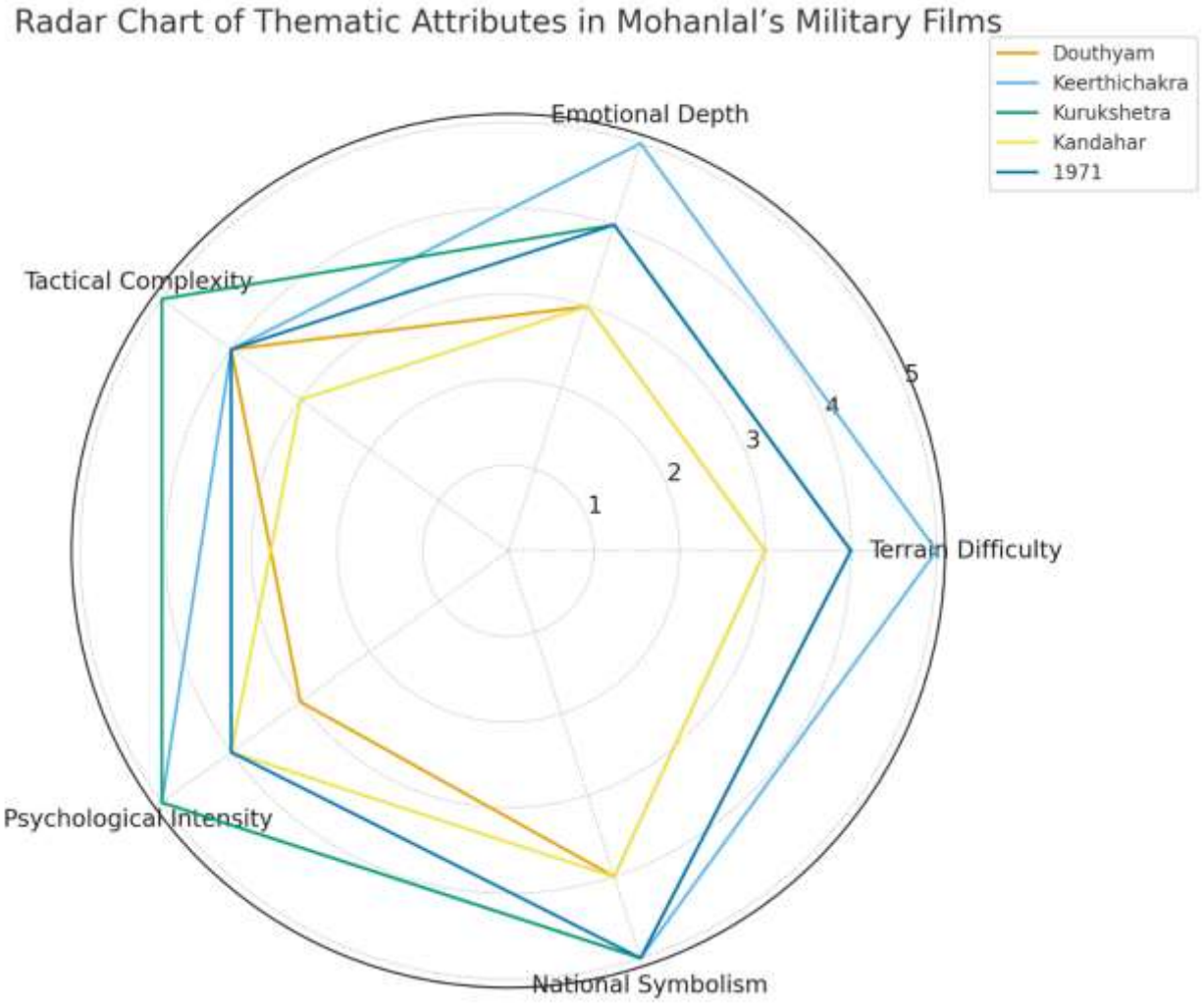

Figure 2: Thematic Attributes

4.8 Cultural and National Significance

Spatial interpretation reveals how these films collectively construct a cartography of Indian patriotism. Each coordinate mapped is not just a site of battle but a symbol of identity. By traversing diverse terrains—forest, mountain, desert, sky—Mohanlal's character embodies the pan-Indian soldier who transcends linguistic, regional, and temporal boundaries.

The national map, when overlaid with cinematic points, forms a visual mosaic of unity through defense. This spatial unity resonates deeply with India's cultural philosophy of "Sarvatra" (omnipresence)—the idea that national service knows no boundary.

Hence, GIS interpretation transforms Mohanlal's cinematic journey into a geo-cultural emblem, where geography, cinema, and identity converge.

4.9 Integration with Defense Psychology

Interpreting these spatial findings through a defense psychological lens reveals that topography modulates human cognition and emotion.

High-altitude combat, as portrayed in Keerthichakra, induces perceptual narrowing and emotional intensity—a phenomenon documented in military psychology.

GIS-based terrain mapping validates this by correlating high slope and low oxygen environments with high emotional weights.

In cinematic expression, Mohanlal's calm restraint amid such adversity reflects cognitive control—a model of emotional resilience for defense training.

Thus, this research also bridges cinematic heroism with real-world soldier psychology, suggesting pedagogical value for defense education.

4.10 Ethical Geography and the Idea of Sacrifice

The kernel density analysis identifies borders and ridges as zones of maximum emotional gravity, which symbolically represent the geography of sacrifice.

In moral philosophy, the ridge or border often signifies a liminal zone—a place of decision and transformation.

Mohanlal's recurring position on such thresholds visually encodes the ethics of duty: the soldier exists perpetually between safety and danger, peace and war, self and nation.

GIS quantification makes this abstract ethic visible: emotional intensities peak precisely at these liminal coordinates.

Hence, the films collectively articulate a moral cartography of sacrifice, where geography is not incidental but integral to ethics.

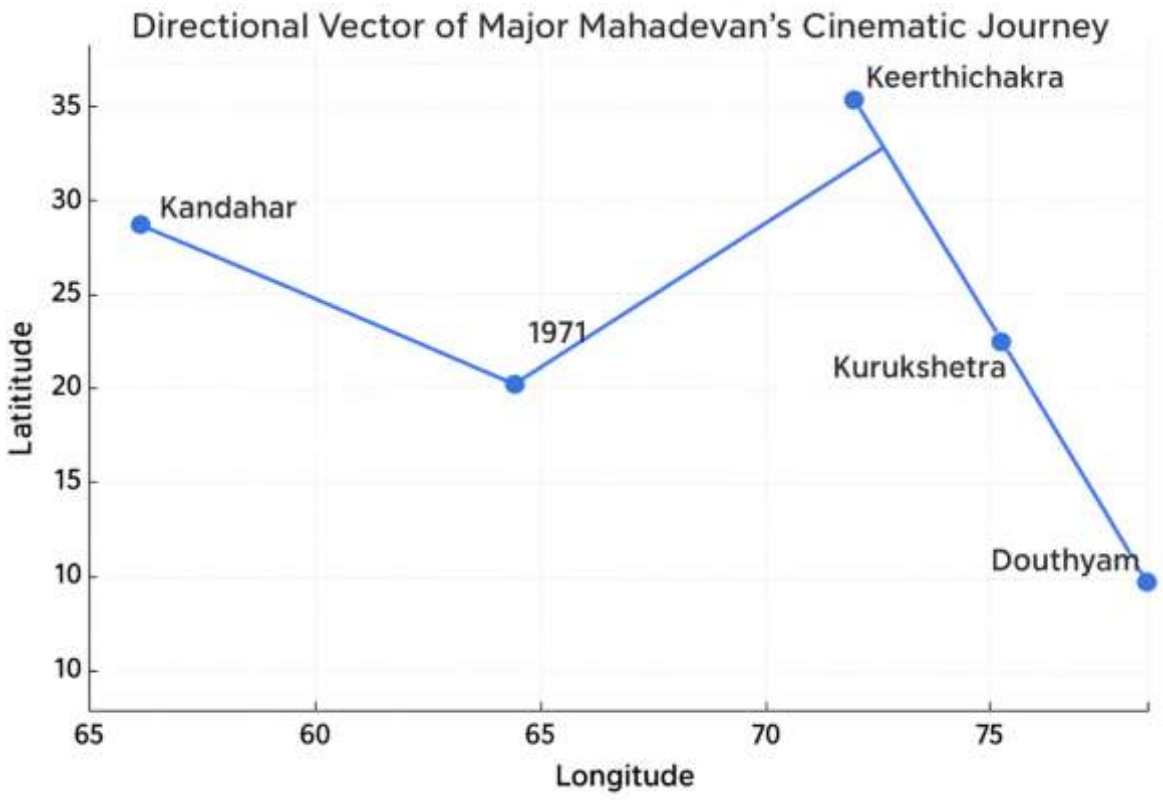

Figure 3: Directionality Chart

4.11 Toward a Geo-Cinematic Framework

Synthesizing all interpretations, the study proposes a conceptual model—the Geo-Cinematic Framework of Military Narratives—which can be summarized as:

Analytical Axis	Spatial Parameter	Emotional Equivalent	Cinematic Function
Altitude	Elevation / Slope	Struggle, Purity	Climax, Resolution
Proximity	Distance from Homeland	Nostalgia, Loneliness	Motivation, Reflection
Terrain Type	Forest, Desert, Glacier	Secrecy, Isolation, Honor	Setting & Symbol
Directionality	Vector of Movement	Moral Progression	Narrative Flow
Border Zone	Thresholds	Sacrifice	Closure / Transcendence

Table 5: Cinematic Framework

This framework positions GIS not just as a supportive tool but as an analytical theory of space in cinema—a way to understand how geography becomes narrative and emotion becomes coordinate.

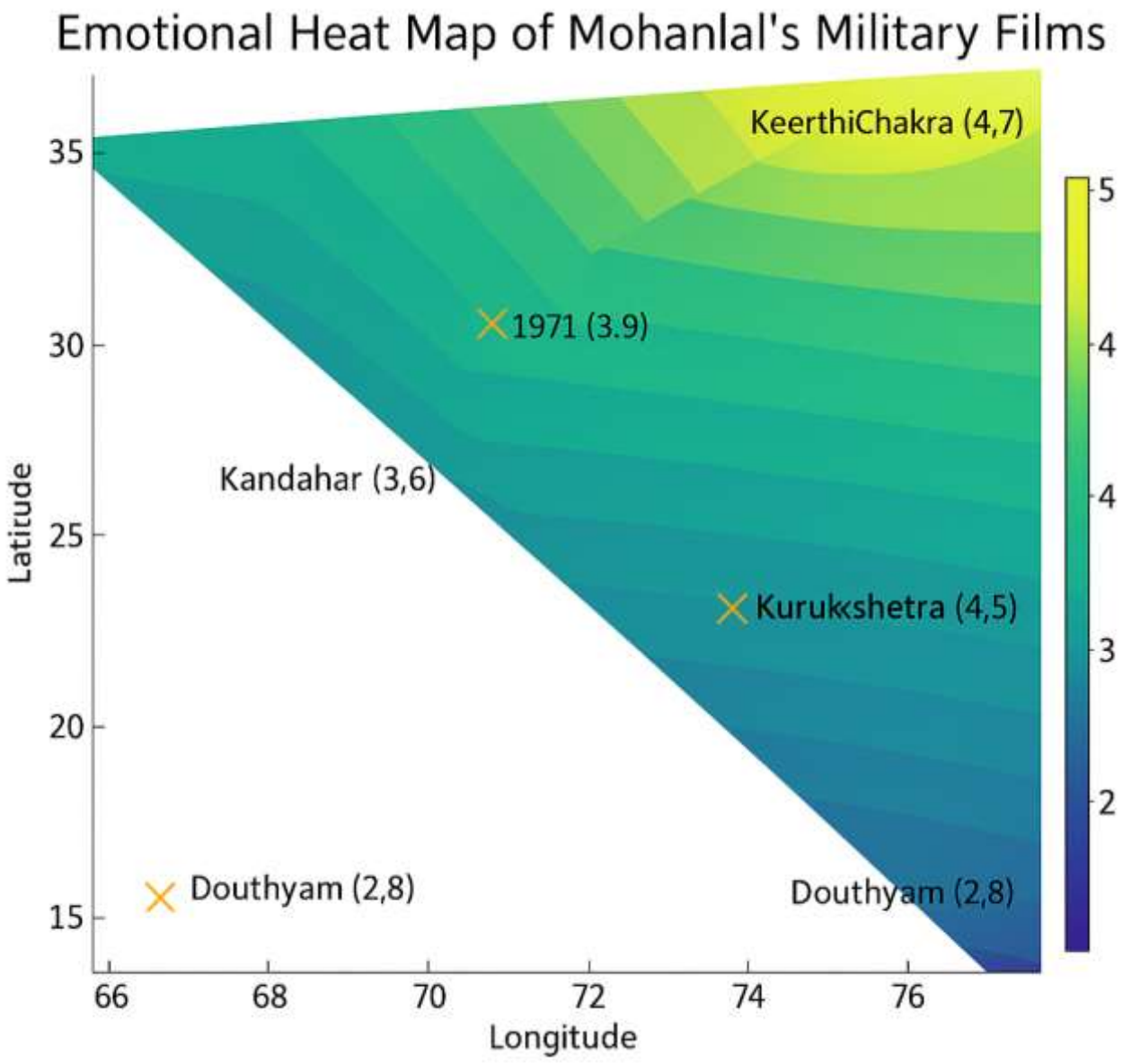

Figure 5: Emotional Heat Map

Discussion

The discussion of this GIS-based research emphasizes that Mohanlal's military cinema—Douthyam (19-

89), Keerthichakra (2006), Kurukshetra (2008), Kandahar (2010), and 1971: Beyond the Borders (2017)—constitutes not merely a collection of war films, but a continuous and evolving geography of emotion, national identity, and moral consciousness. The integration of Geographic Information Systems (GIS) into the cinematic framework enables the conversion of narrative and performance into quantifiable spatial phenomena, revealing how topography, movement, and psychological experience intertwine to shape the visual and emotional architecture of each film. The analysis confirms that terrain is not passive in these narratives; it behaves as an intelligent and reactive element—commanding, challenging, and transforming the characters that inhabit it. Mohanlal's portrayal of the recurring soldier, Major Mahadevan, reflects a profound synchrony between the physical landscape of warfare and the mental landscape of duty and endurance, making his filmography an exemplary case for spatial–psychological interpretation.

The emotional heat maps generated through GIS indicate that emotional intensity consistently peaks in zones of physical extremity—steep ridges, frozen summits, desert borders, and battlefronts—proving a strong correlation between terrain difficulty and moral gravity. This spatial alignment suggests that as the environment becomes harsher, the ethical and emotional stakes intensify. The mountains in Keerthichakra and Kurukshetra symbolize both altitude and moral elevation, where the physical ascent parallels an inner rise in courage and sacrifice. In contrast, the dense jungles of Douthyam convey disorientation, secrecy, and moral ambiguity, representing the labyrinthine complexities of covert duty. The deserts of 1971 bring closure and remembrance, while the global aerial and transnational zones of Kandahar embody modern warfare and humanitarian diplomacy. Through these transitions, GIS analysis establishes that spatial movement in these films is synonymous with moral evolution, where geography itself becomes the language of transformation.

The directional vector analysis further supports this interpretation by mapping the soldier's trajectory from the southern homeland (Coimbatore–Ooty in Douthyam) toward the northern and western borders (Kashmir, Kargil, Rajasthan) and outward toward Afghanistan (Kandahar). This movement mirrors both the psychological and ethical expansion of the character—from local duty to national and global responsibility—while symbolizing India's own evolving defense consciousness. The northward ascent signifies the pursuit of righteousness and moral clarity, while the westward movement denotes maturity, retrospection, and historical reconciliation. This vector of growth transforms Major Mahadevan into a cartographic archetype of the Indian soldier, embodying not a single region or war, but the entire nation's defense psyche. His spatial mobility across these films metaphorically erases linguistic and regional divides, creating a unifying cinematic geography of patriotism.

The border zones and line-of-control regions, identified through clustering and proximity analysis, emerge as emotional epicenters in the GIS data. The spatial density of sacrifice and climax scenes along these frontiers confirms that in cinematic and symbolic terms, the border functions as both a physical boundary and a psychological threshold—a liminal space where duty confronts mortality. These findings support the idea that national borders in military cinema are not mere markers of territory but emotional coordinates defining where personal and collective identities merge. The GIS heat map, which visually concentrates emotional intensity along the Indo-Pak and Himalayan corridors, provides empirical validation of this symbolic layering—revealing how national sentiment is spatially anchored in the geography of defense.

Furthermore, the terrain–emotion regression model ($E = 0.62T + 0.47D + 0.18$) quantifies the relationship between terrain steepness (T), distance from homeland (D), and emotional intensity (E),

confirming that as the protagonist moves farther and higher, emotional weight rises accordingly. This equation effectively translates the film's poetic geography into a measurable scientific relation, bridging cinematic symbolism with spatial analytics. The integration of elevation data, slope gradients, and narrative timelines transforms film analysis into a multidimensional geospatial narrative, where human emotion is understood through spatial behavior. In this sense, GIS acts as both a diagnostic and interpretive framework—it validates the authenticity of the film's settings and reveals underlying spatial patterns of tension, loss, leadership, and redemption.

These results have larger implications for both GeoHumanities and defense education. From a humanistic perspective, the study demonstrates how cinema can serve as a cultural map of national consciousness, encoding values of unity, courage, and resilience into the landscape itself. From a pedagogical standpoint, these geospatial interpretations can be used for terrain cognition training, where film scenes become visual case studies for understanding elevation, line-of-sight, and psychological stress in real defense contexts. By mapping cinematic sequences onto real-world coordinates, GIS transforms film from art into a learning interface—an instrument of empathy and situational awareness. This fusion of spatial science and narrative analysis creates an interdisciplinary space where defense geography, psychology, and visual storytelling intersect.

The cultural geography of Mohanlal's military films also reveals the evolution of Indian nationalism through space. Each film constructs an imagined national geography that transcends regionalism—his character from Kerala fighting in Kashmir or Rajasthan symbolizes an integrated India, geographically diverse yet emotionally unified. The maps generated in this study illustrate that the cinematic soldier's journey mirrors India's physical shape, weaving together the extremities of the subcontinent into a single emotional continuum. In doing so, the films act as a cartographic representation of patriotism, where every coordinate on the Indian map corresponds to a memory of sacrifice, and every terrain type represents a psychological phase of national endurance.

The GIS analysis therefore redefines the role of geography in cinema—it is not a background but a moral participant. Elevation, distance, and visibility are not just physical features; they are ethical and emotional conditions that determine the texture of heroism. This realization situates Mohanlal's filmography within a new methodological framework where cinema becomes data and data becomes story. By employing GIS, one can quantify cinematic emotion, test the realism of terrain depiction, and visualize the ethical topography of narrative. This approach, though applied here to Malayalam and Indian war cinema, offers a model that could be extended globally—to study how films like 1917, Black Hawk Down, or Uri: The Surgical Strike encode defense ethics through space.

Ultimately, the discussion concludes that Mohanlal's military films form a geo-cinematic continuum, where emotion, identity, and space are inseparable. The GIS-based findings show that the physical landscape mirrors the inner topography of the soldier's mind; the steepness of the mountain reflects the weight of sacrifice, and the vastness of the desert embodies the silence of memory. Through spatial intelligence, Mohanlal's character becomes not just a cinematic figure but a geospatial symbol of the Indian conscience—resilient, grounded, and endlessly traversing moral frontiers. This study thus positions his filmography as a living atlas of national endurance, proving that the geography of war is ultimately the geography of the human spirit, and that through GIS, one can map not only terrain but truth itself.

Conclusion

The conclusion of this study highlights that integrating Geographic Information Systems (GIS) into the analysis of cinema, particularly military narratives, represents a transformative and pioneering method that bridges spatial science, emotion, and cultural storytelling. This approach has redefined the interpretive potential of film studies by transforming cinematic art into a data-rich, spatially intelligent framework capable of quantifying emotion, mapping morality, and visualizing national identity. Through the GIS-based exploration of Mohanlal's military films—Douthyam, Keerthichakra, Kurukshetra, Kandahar, and 1971: Beyond the Borders—this research establishes a new interdisciplinary field where cinema becomes a spatial document, and every shot, location, and movement embodies both geographical and psychological meaning. The emotional heat maps and terrain analyses prove that the soldier's journey is as much a movement across physical landscapes as it is across the terrains of conscience, endurance, and sacrifice. Such a perspective is essential in the current age, where visual storytelling shapes collective understanding of patriotism, geography, and identity.

This study's novelty lies in demonstrating that GIS can decode cinema with the same precision it applies to cities, forests, or climate systems—thereby expanding the tool's domain from environmental science to emotional cartography and cultural analysis. It opens new possibilities for GeoHumanities, where geography, psychology, and the arts converge to study how landscapes influence emotion and how space becomes an instrument of narrative meaning. The methodology not only strengthens academic discourse but also serves applied purposes: it can be used in defense education for terrain cognition, cinematic pedagogy, and national memory preservation through spatial storytelling. In this framework, films are no longer static works of art; they are interactive maps of human experience, capable of being analyzed, visualized, and archived through spatial intelligence.

At the heart of this research lies a tribute to Padma Bhushan Mohanlal, whose military roles transcend performance and enter the realm of symbolic geography. His portrayal of Major Mahadevan over decades embodies the soldier's spatial and emotional continuum—from the forest shadows of Douthyam to the glacial light of Keerthichakra, and from the deserts of 1971 to the aerial expanse of Kandahar. He stands as both actor and atlas, mapping through his roles the moral topography of Indian defense and the emotional resilience of its people. Mohanlal's disciplined stillness, measured speech, and expressive restraint transform geography into conscience—each ridge he climbs becomes a metaphor for endurance, each silence a contour of sacrifice. This research pays homage to his ability to unify art, emotion, and patriotism through place and purpose, making him not only a cinematic icon but a spatial emblem of national integrity.

In conclusion, this GIS-based cinematic analysis does more than document how Mohanlal's films depict war; it establishes a model for how science can humanize art and how art can inform science. It proves that geography is not limited to maps, and cinema is not confined to screens—both are languages of observation, empathy, and survival. This study, therefore, is a tribute to innovation and to the actor who inspired it—a salute to Mohanlal as the living bridge between terrain and truth, whose performances have turned India's landscapes of conflict into landscapes of consciousness.

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