

Memory Reconstruction: An Exploration of the Regional Cultural Expression in Mountain City Trail Spaces

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Abstract:

The dissolution and reconstruction of spatial and regional cultural characteristics in mountain city trails represent a pivotal issue in urban renewal. Guided by regional culture and drawing on typical trail cases from Chongqing's mountainous cities, this paper identifies three design strategies: terrain adaptation, cultural symbol translation, and scenario-based storytelling. It proposes spatial expression methodologies centered on Dynamic Experiential Sequences. Building on this framework, the study explores how AIGC technology and intelligent interactive media can enhance empathetic communication along trail spaces, deepen public engagement with regional culture, and foster emotional identification—with implications for integrating technological and humanistic approaches in urban renewal under the context of socialist cultural prosperity, thereby mitigating cultural homogenization during urbanization.

Keywords:

Place Memory, Trail Space, Empathetic Communication

1. Introduction

With the acceleration of global urbanization, traditional stone steps and terraces along walking trails in typical mountain cities like Chongqing and Guiyang have been replaced by standardized paving. The clusters of stilted buildings adapted to the terrain have gradually disappeared due to demolition and redevelopment, leaving mountain city trail spaces facing the dilemma of “a thousand paths looking identical” [1]. This homogenization phenomenon disrupts spatial memory, fragments urban daily life scenes, and weakens residents' cultural identification with these trails. Scene theory provides a crucial analytical framework for understanding this issue [2]: a scene is no longer merely a space but a comprehensive environment encompassing spatial layout, content, and experience—serving as a carrier for new lifestyles and experiential consumption. A scene connects individuals with their surroundings, evolving into an “interaction between content and experience” [3], where experiential content and products constitute its core elements. Therefore, trail space renewal should extend beyond physical restoration to systematically establish culturally compelling scene systems.

Currently, intelligent technologies represented by AIGC are reshaping the logic of cultural production and dissemination. Traditional, static methods of material renewal

and symbolic integration struggle to foster deep user empathy or dynamic communication. How to leverage intelligent interaction, digital storytelling, and immersive experiences to transform the regional memories embodied by mountain urban trails into participatory, co-creative, and scalable empathetic communication scenarios has become a pivotal challenge confronting both urban renewal and the flourishing of socialist culture in the AIGC era. Consequently, it is imperative to reshape cultural memory contexts by leveraging the unique characteristics of mountain urban trail spaces and achieve contemporary expressions of traditional cultural symbols.

To address the aforementioned issues, this paper employs a research methodology combining theoretical deduction with case-based empirical analysis. First, it examines the interactive dynamics between regional culture and mountain city trail spaces, elucidating the dual role of trails as cultural carriers. Second, through case studies such as Daijia Alley, Banshanya Line, Nanshan Huangge Ancient Trail, and Guiyang City Wall Trail, the study identifies design strategies for cultivating cultural landscapes in mountain urban trail spaces across three dimensions: terrain adaptation, cultural symbol interpretation, and narrative scene construction. Furthermore, it proposes three spatial expression approaches—“multi-dimensional narrative pathways,” “cultural symbol topology,” and “dynamic experiential sequences”—while exploring how AIGC technology and intelligent interactive media enhance empathetic communication within trail spaces. Finally, the paper summarizes theoretical contributions and practical implications, offering an integrated technical-humanistic approach for mountain city renewal.

2. Regional Culture and Urban Trail Spaces

Regional culture is a spiritual complex shaped by the interplay between a specific natural geographical environment and historical-cultural accumulation. For mountain cities, trail spaces serve not only as essential infrastructure for daily access but also as the most tangible carriers and experiential hubs of regional culture [11]. Clarifying the interactive dynamics between regional culture and urban trail spaces is fundamental to creating cultural memory scenarios, enabling intelligent empowerment, and fostering empathetic communication.

2.1. The Shaping of Urban Trail Spaces by Regional Culture

Regional culture serves as the spiritual core of urban trail spaces, fundamentally determining their spatial configuration, landscape characteristics, and place character [9]. For typical mountainous cities like Chongqing and Guiyang, the shaping power of regional culture manifests primarily in three dimensions: spatial logic, landscape grammar, and place atmosphere. Regional culture constitutes the spiritual essence of urban trail spaces, fundamentally dictating their spatial form, visual features, and ambiance. The mountainous terrain, historical heritage, and urban daily life collectively give mountain city trails their distinctive spatial attributes—characterized by ascending slopes, layered configurations, and a vibrant, everyday atmosphere—setting them apart from the linear, straight trail systems found in plain cities.

2.1.1. Spatial Logic for Terrain Adaptation

Mountain cities are predominantly situated in hilly regions characterized by river erosion and significant elevation differences. Traditional trails follow the natural contours of the terrain, winding through the landscape to create a distinctive spatial

layout marked by “climbing slopes and ascending ridges with layered, three-dimensional organization.” This irregular, non-grid pattern stands in stark contrast to the linear, straight trail systems of plain cities, embodying the survival wisdom accumulated through centuries of human interaction with mountain environments. The Chongqing Mountain City Trail exemplifies this spatial logic: the Daijia Alley utilizes the cliff’s elevation differences to form tiered paths, while its mid-slope route connects multiple attractions along the urban ridge, adapting seamlessly to the terrain’s undulations. This design preserves the original mountain texture while maximizing the natural elevation variations to deliver a dynamic visual experience where the scenery changes with every step, transforming geographical constraints into the trail’s unique spatial identity and continuing the traditional wisdom of adapting urban planning to local conditions [7].

2.1.2. Historically Accumulated Landscape Grammar

The mountain city trail is flanked by architectural remnants from various historical periods, along with distinctive street patterns and public spaces—including stilted houses, through-and-bay structures, defensive embankments, air-raid shelters, and former foreign trading company sites (see Figure 1). The vertical layering and interweaving of these physical elements create a readable “three-dimensional cultural layer,” transforming the trail into an open-air urban history museum. As visitors stroll along, they tread on ancient bluestone pavements of the mountain city, stand beside former foreign trading company sites from the Republican era, and gaze up at modern high-rise residences. This natural integration of multi-period cultural heritage not only preserves the authentic historical trajectory of urban development but also endows each section of the trail with unique cultural identity, making it a living vessel for Chongqing’s collective cultural memory [11].



Figure 1. Public Space with Street and Alley Texture.

Source: “Yuzhongwenlv” WeChat official account

2.1.3. The Atmosphere of Daily Urban Life

The trail serves not merely as a transportation route, but also as a vibrant space where residents interact daily, vendors call out their goods, children play, and the elderly rest [12]. The stone benches beneath the Huangjue tree, tea stalls at corners, and barber shops along the steps—these seemingly ordinary moments of life are precisely the most touching and distinctive cultural elements of mountain city trails. This transforms these trails from mere functional linear spaces into cultural venues that preserve collective memory and foster local identity [9].

2.2. Urban Trails Promote the Development of Regional Culture

Regional culture is not a static, museum-bound heritage; rather, it is a dynamic process continuously activated, interpreted, and recreated through ongoing daily life and spatial practices [12]. As the most accessible and open type of public space, urban trails play an irreplaceable role in promoting the living preservation of regional culture.

2.2.1. Display and Communication Function: The Transformation of Tacit Culture into Explicit Experience

The trail space transforms abstract elements of regional culture—such as dialects, folk customs, historical events, and traditional crafts—into perceptible, participatory, and shareable spatial experiences through design techniques like scene creation, symbolic interpretation, and narrative construction. By embedding dialectal text in pavement paving, installing vintage photo walls at key points, and replicating traditional patterns on rest facilities, intangible cultural heritage becomes naturally “read” by pedestrians during their daily walks, achieving cultural dissemination in a subtle and imperceptible manner.

This mode of dissemination breaks the traditional constraints of regional cultural transmission—such as the need for specialized venues and fixed times—bringing culture from isolated corners into everyday life [8]. Regional cultural symbols, once confined to historical records and the oral traditions of elders, now expand their reach through the footsteps of travelers and social sharing. They gain recognition among people of diverse ages and backgrounds, laying a broad popular foundation for the preservation of regional culture.

2.2.2. The Function of Living Inheritance: From Static Protection to Dynamic Participation

Traditional cultural heritage preservation often employs a “freezing” approach to restoration, which can easily sever cultural ties with contemporary life [11]. In contrast, trail spaces incorporate mixed functions such as light commerce, community activities, cultural performances, and themed markets, enabling traditional culture to remain vibrant through modern use. The “Jinmasi Primary School” in Shancheng Lane has been revitalized into the “Shancheng Story Museum,” serving both as a cultural exhibition space and a hub for community interaction. This transforms the historical building from a cold exhibit into a cultural living room shared by residents and visitors. Such a dynamic, user-driven renewal process turns regional culture from a preserved historical artifact into a living culture continuously integrated into contemporary life, reinterpreted, and recreated [7]. This approach preserves the core characteristics of local culture while infusing it with new contemporary significance, ensuring the continuity and vitality of cultural heritage transmission.

2.2.3. Bidirectional Empowerment Function: Mutual Enhancement Between Cultural Communication and Urban Vitality

The cultural expression of trail spaces is not a one-way “cultural export,” but rather forms a positive cycle with the city’s social and economic vitality. On one hand, the rich regional cultural atmosphere attracts local residents to linger and tourists to visit, stimulating surrounding commerce and community engagement; on the other hand, enhanced spatial vitality in turn provides fertile ground for continuous cultural content

renewal, community participation, and cultural production. This spiral relationship of “culture–space–vitality” embodies the practical application of the “interaction between content and experience” emphasized by scene theory [4].

3. Analysis of Strategies for Constructing Spatial Cultural Scenes of Mountain City Trails Driven by Regional Cultures

The complex natural and geographical conditions of mountain cities inherently determine the intricate and three-dimensional nature of trail spaces. In the era of AIGC and intelligent communication, cultural scenarios are constructed through three core strategies—adapting to terrain, symbolic interpretation, and narrative development—shifting from “physical space restoration” to “cultural memory revitalization,” and ultimately advancing toward “empathetic communication empowered by AI.”

3.1. Adapting to the Topography: Spatial Coupling of Three-Dimensional Cultural Layers

Due to their unique geographical conditions, mountain cities feature more complex and three-dimensional trail spaces. Therefore, the design of cultural landscapes in these trail areas must adapt to the terrain, utilizing a fractal arrangement of steps, ramps, and viewing points to enhance the symbiotic relationship between nature and culture, resulting in a spatial structure akin to a “three-dimensional cultural layer.”

Taking Chongqing’s representative trails as an example, the Mountain City Trail maintains its traditional “horizontal streets and vertical alleys” layout during renovation (see Figure 2), preserving four traditional streets and alleys with a width of 2–3 meters while retaining the topographical features of slopes and ridges, resulting in a three-dimensional street pattern of “four horizontal axes, three vertical axes, six courtyards, and one embankment.” The Chongqing Shiba Ti creates layered, staggered spaces by following the stone staircase contours and topographic elevation differences, showcasing the mountain city’s cross-sectional texture through terraces, courtyards, and eave spaces. Daijia Alley utilizes the cliff face’s elevation gradient to develop cliffside trails and viewing points; similarly, the Guiyang Nanming River Trail leverages the riverbank elevation variations along the Ji Xiulou section to establish tiered viewing platforms and waterside walkways, enhancing the mountainous spatial character and achieving seamless integration of terrain and cultural elements [7].



Figure 2. The traditional “horizontal streets and vertical axes” layout.

Source: WeChat official account “Huazhong Architecture”

3.2. The Translative Expression of Cultural Symbols: From Spiritual Reshaping to Spatial Regeneration

Cultural symbol translation is a systematic process that transforms implicit cultural elements—such as regional history, architectural vocabulary, and folk imagery—into spatial language adaptable to modern functionality and aesthetics through abstraction, refinement, and redesign. The core of this approach lies in preserving the authentic significance of cultural symbols while endowing them with contemporary spatial practicality and expressive power. Depending on its objectives and levels, this translation can be summarized into three parallel dimensions: spiritual revitalization, quality enhancement, and spatial regeneration.

3.2.1. Mental Reshaping

By centering on regional cultural symbols, we reconstruct the memories and emotional connections associated with specific places, thereby awakening their cultural essence. Specifically, core cultural elements such as the Bayu stilted houses, the traditional interlocking bracket structure, the terraced hills of mountain cities, the history of port opening, and local dialects and colloquialisms can be transformed into landscape installations, visual identity systems, and public art. The Kunming Cuihu Trail embodies the city's historical spirit through symbols like the emblem of the Southwest Associated University and frames from Republican-era newspapers; the “Super 80 Street” in the Houbao Community creates a visual identity system using nostalgic symbols such as green-painted trains and enamel cups, evoking collective memory. Through these transformations, the trail becomes a cultural vehicle that carries the city's spirit.

3.2.2. Quality Improvement

The key lies in the meticulous design of spatial interfaces. Functional elements such as trail paving, railings, seating, lighting, and signage are transformed into cultural landscapes, replacing standardized components with symbolic designs that enhance visual aesthetics and artistic ambiance while ensuring safety, accessibility, and rest facilities. The railings on Qingdao's Xiaoyushan Trail feature hollowed-out patterns depicting ocean waves and sailboat silhouettes, integrating historical motifs into the ground paving. This approach combines practicality with cultural significance, achieving an overall enhancement in spatial quality.

3.2.3. Space Regeneration

The focus is on revitalizing existing spaces by endowing them with new functions. Idled buildings, damaged walls, and underutilized sites undergo symbolic renovation, incorporating elements such as cultural exhibitions, light commercial activities, community engagement, and cultural tourism experiences to breathe new life into dilapidated areas. For example, Shancheng Lane's Jinmasi Primary School has transformed its cultural symbols into the “Shancheng Story Hall” and “Time Library” (see Figure 3); the Beibei Jingangbei Trail converts the former riverside path of the abandoned Jinyunshan ancient village into a cultural experience space, preserving the original texture where traditional through-and-interlocking structure houses coexist with the root systems of Huangjue trees, while integrating facilities like light tea shops and handicraft workshops. This spatial regeneration—from ‘abandoned settlements’ to ‘cultural trails’—effectively achieves a dual transformation in both spatial functionality and the spirit of these locations.



Figure 3. Renovation of Jinmasi Primary School in Shancheng Lane.

Source: Yuzhong Release

3.3. Building Narrative Scenarios: From Static Viewing to Intelligent Co-creation

3.3.1. Scenario Creation

Dedicated to preserving the local heritage and creating an immersive spatial atmosphere, the project employs meticulously designed scenography, decorations, and prop selections to craft a unique ambiance and visual impact aligned with the city's IP theme, thereby delivering an immersive experience. Leveraging the trail's original topography and street layout, it retains iconic elements such as terraces, ramparts, courtyard compounds, and Huangjue trees (see Figure 5), and employs local materials and traditional construction techniques to restore the landscape. This approach preserves the rhythmic character and living atmosphere of the mountain streets, effectively guiding visitors and residents to develop an intuitive understanding and sense of belonging to the local culture [7].



Figure 4. Leveraging the trail's original topography and street layout retains iconic elements.

Source: WeChat official account "Huazhong Architecture"

3.3.2. Story Creation

Emphasize uncovering the cultural context's essence and constructing a continuous narrative thread. Through narrative expression and artistic presentation techniques, systematically showcase the temporal progression and historical layers of the trail space. By employing artistic forms such as poetry, music, and visual media, the city's history, culture, and narrative narratives can be integrated into the narrative space, enabling visitors to gain deeper insights into the city's heritage while enjoying the experience. Memory corridors, cultural exhibition walls, and thematic nodes are installed along the trail, allowing users to intuitively perceive the city's developmental

trajectory and cultural depth during their walk and observation, thereby facilitating the transmission of historical memory and a profound interpretation of cultural significance [8].

3.3.3. Interactive Experience

Enhance participatory engagement to improve cultural dissemination effectiveness. By installing interactive installations, experiential nodes, and public participation activities, the static viewing model is transformed, enabling visitors and residents to shift from being “spectators” to “participants,” thereby increasing the space’s appeal and fostering emotional connections. Specifically, historical event display walls and audio-visual interactive installations can be installed along walking paths to guide users into immersive narratives that blend time and space. The integration of interactive elements enhances spatial appeal and experiential quality, facilitates efficient cultural information dissemination, revitalizes regional culture through immersive experiences, strengthens the venue’s spirit and emotional resonance, converts passive observation into active immersion, integrates deeply into urban narrative spaces, and promotes the sustainable inheritance of local culture [12].

3.3.4. Intelligent Co-creation

However, transitioning from passive observation to AIGC-driven empathetic communication, traditional interactive installations often rely on pre-set content and struggle to deliver personalized emotional responses. AIGC technology enables real-time generation of differentiated narrative content and interactive feedback based on users’ behaviors, preferences, and even emotional states [3], facilitating an intelligent shift from “people seeking content” to “content adapting to people.” Smart screen media along the trail can generate customized historical anecdotes, dialect audio clips, or poetic visuals based on visitors’ dwell times, voice inputs, or facial expressions, creating personalized empathetic experiences. Moreover, AIGC integrates user-generated content (UGC) with professionally produced content (PGC), transforming the trail into an open platform for public participation in cultural co-creation. This promotes a shift from one-way cultural presentation to two-way dissemination and collective production, dynamically adjusting lighting, sound effects, and digital content in real-time to resonate emotionally with users—a micro-practice exemplifying how AI empowers socialist cultural prosperity. The AR guided trail at Hong Kong Central Police Station recreates colonial-era courtroom and prison scenes through mobile AR, overlaying historical settings across digital and physical spaces to guide visitors toward deep cultural understanding and emotional connection through immersive interactions.

3.4. Specific methods for spatial representation

3.4.1. Multi-dimensional Narrative Pathways

The essence of pedestrian spaces extends beyond being mere transportation corridors; they serve as narrative media that carry urban memories and individual experiences [12]. The multi-dimensional narrative approach challenges conventional linear timelines by employing spatial juxtaposition and layering to revitalize collective memory. By integrating vertical and horizontal spaces, a multi-dimensional narrative path of “walking—pausing—retrospection” is created, where real-world scenes and virtual symbols complement each other, enhancing the space’s emotional

resonance. Events such as the “Pathway Culture Festival” are organized to stimulate residents’ storytelling and visitors’ experiences, while community co-creation workshops strengthen place identity. The Nanshan Huangge Ancient Trail constructs a spatial narrative thread of ancient commercial and travel life—spanning “the ancient bridge at the mountain foot—mid rest stops—tea pavilions on the mountaintop—old factories and streets” —forming a linear historical narrative that materializes this multidimensional storytelling approach [7], achieved in-depth exploration of spatial significance.

3.4.2. Cultural Symbol Topology

The concept of cultural symbol topology primarily elucidates the intrinsic logic of translation. The aforementioned translation practices, ranging from spiritual reimagining to spatial regeneration, operate through a fundamental mechanism called “cultural symbol topology.” This mechanism involves the variation, reorganization, and networked distribution of cultural symbols within spaces while preserving their authentic essence and adapting to modern functional requirements.

Unlike simple morphological replication or abstract collage, this topological approach emphasizes maintaining the core authenticity of symbols. Elements such as the cantilevered structure of stilted buildings, the rhythmic progression of staircases, and the aesthetic interconnections of traditional beam - and - column frameworks remain intact. Meanwhile, their external forms, material dimensions, and functional adaptations flexibly evolve according to specific spatial contexts. This “formal transformation with preserved essence” enables Ba - Yu cultural symbols to seamlessly integrate into contemporary trail infrastructure while continuously referencing regional identity [5] Chongqing’s Yaba Dongjiang Beach Park translates Yangtze River cultural symbols through its Yangtze River stone sculpture ensemble and local riverstone trail, creating a spatial topology that embodies natural geographical imagery. Xihaoli integrates dialectal text landscapes via stone walls and stone - paved paths (see Figure 5), transforming the physical space into a repository and expression of the mountain city’s memory, thereby demonstrating the practical applicability of the “form changes but essence remains” topological logic at the micro - scale [5].



Figure 5. *The Landscape of Dialectal Writing.*

Source: Zhihu “Commercial Real Estate Quality”; Baidu “Eardrum Mirror”

3.4.3. Dynamic Experiential Sequences

By linking cultural scenes through pedestrian space nodes, a dynamic experiential sequence of “walking—pausing—reflecting” is created (see Figure 6). Dynamic sequences are not merely visual flows but rather comprehensive experiential processes involving auditory, tactile, and olfactory senses. During the progression of spatial sequences, specific sensory cues should be consciously emphasized. When

approaching historical heritage sites, tactile feedback is provided by altering paving materials (e.g., transitioning from asphalt to bluestone pathways), while ambient sounds—such as wind, water, or specific human activity—are employed as auditory landmarks to guide visitors toward gradual immersion in the site’s historical ambiance.

Enhancing emotional resonance through scene design, storytelling, and interactive experiences constitutes the core approach for mountain city pedestrian trails to reconstruct memories, visitors gain a clear understanding of the site’s evolution—from natural landscapes to urban environments, and from traditional to modern contexts.

Art installations, light-and-shade walls, vintage photo displays, reliefs, and video installations bring vanished urban scenes and historical moments to life, transforming latent memories into tangible experiences that awaken emotional connections to the place. Examples include the Light-and-Shade Poetic Monument on the Beibei Jingangbei Trail, preserved artifacts at Shibati, the horse caravan photo wall along the Nanshan Huangge Ancient Road, the historical image wall of Hong Kong’s Hollywood Road Police Dormitory, and the Xindongmen Memorial Stele—all employ visual techniques to revitalize site memories and convert them into easily accessible spatial languages [9]. These elements help the public develop a comprehensive understanding of the site’s historical transformations while walking, enabling the profound historical layers to become truly perceptible and shareable cultural content [12]. The organic integration of scene creation, narrative expression, and participatory engagement strengthens the emotional connection between local communities and users, while deepening public understanding of urban regional culture.

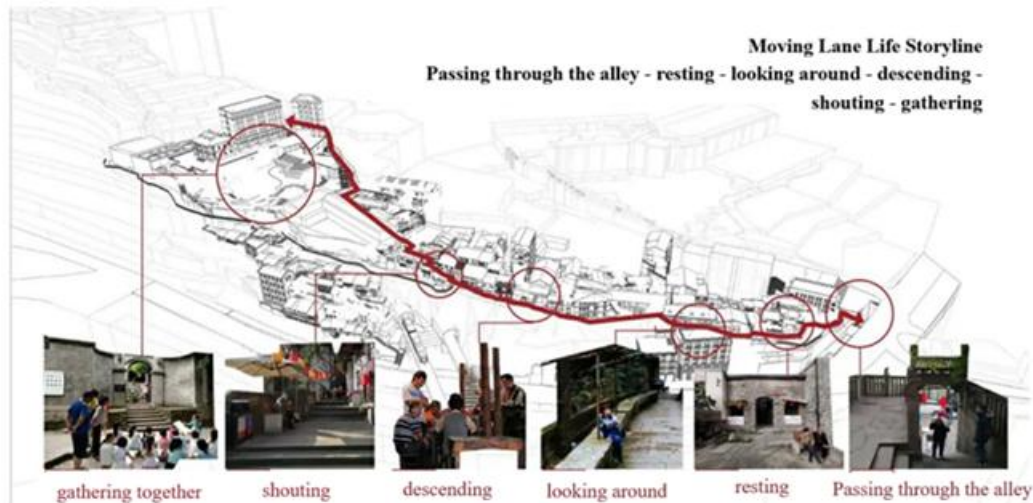


Figure 6. Dynamic Experience Sequence.

3.4.4. Co-Creating Memory: Intelligent Communication and Empathy Networks Empowered by AIGC

Building upon the aforementioned memory activation, translation, and awakening mechanisms, AIGC technology introduces new capabilities of dynamic generation, real-time interaction, and social dissemination into the cultural communication of mountain urban trails. At the intelligent content generation level, large language models and image generation models enable rapid creation of historical scene reconstructions, dialectal narrative texts, and virtual tour audio guides related to the

trails, thereby lowering the threshold for cultural content production and facilitating low-cost, high-frequency narrative updates [3]. Regarding empathetic communication mechanisms, through emotional computing and behavioral sensing, the intelligent system identifies users' emotional states and dynamically adjusts lighting, sound effects, and digital content in the space to create an emotionally resonant atmosphere that strengthens local attachment and cultural identity [10]. Furthermore, the establishment of a social communication ecosystem allows embedded intelligent interaction nodes on the trails to enable tourists to generate personalized digital souvenirs (such as AI-generated poetic illustrations or photos with historical figures) in real time, which can be shared via social media with a single click, fostering user-driven secondary dissemination. This transforms mountain trails from physical spaces into digital cultural IPs, promoting the wider dissemination of socialist regional cultural values [2].

3.4.5. Multidimensional Perception: An Immersive Experience Path Through Cross-Sensory Collaboration

The spatial characteristics of mountain city historical districts and their human-environment relationships are reflected not only in multi-level accessibility but also in the interaction between three-dimensional space and multidimensional perception. Multidimensional perception refers to an individual's ability to recognize and process information across multiple dimensions—including space, time, auditory, and visual stimuli [9]—and has achieved significant advancements in psychology, neuroscience, and artificial intelligence. In neuroscience, researchers investigate how different brain regions collaborate to process multidimensional perceptual inputs; in virtual reality, VR and AR technologies have been extensively validated as effective tools for training and enhancing multidimensional spatial perception; in architectural science, research on spatial perception from a multidimensional perspective, though relatively recent, has demonstrated substantial potential.

The application of multi-dimensional perception progressively enables a comprehensive experience of environmental space through integrated sensory input from vision, hearing, and smell. Current sensory studies of pedestrian pathways predominantly focus on the static, single-dimensional aspect of “visual perception,” lacking a systematic framework that establishes interactive connections between visual perception and urban space. Therefore, in designing pathways for memory activation, it is essential to transcend the singular visual dimension by creating multisensory experiential routes that engage vision, hearing, and olfaction. This involves incorporating environmental soundscapes, tactile ground coverings, and seasonal odor installations at specific points, fostering deep integration between pedestrians' physical perceptions and regional memories, thereby strengthening the emotional foundation for empathetic communication and enhancing the immersion and impact of narrative scenarios [10].

4. Conclusions

This study, grounded in cultural memory theory and scene theory [2], establishes a systematic framework for expressing regional cultural identity through mountain urban trail spaces. It proposes three core strategies—terrain adaptation, symbolic translation, and scene-based storytelling—along with three spatial expression methodologies: multidimensional narrative pathways, cultural symbol topology, and dynamic experiential sequences. The cultural symbol topology elucidates the intrinsic

logic governing the variation, reorganization, and networked distribution of symbols within spatial contexts [5], achieving a dialectical unity between the authenticity of traditional culture and its modern functional adaptability. Case studies of exemplary trails in Chongqing and Guiyang validate the theoretical framework, providing replicable practical pathways for mountain urban trail revitalization. Future research should further explore the deep integration of AIGC with scene theory to develop an integrated trail cultural communication model encompassing “intelligent storytelling—emotional computing—social dissemination. [3]” Through intelligent empowerment, mountain urban trails can not only revitalize and innovatively express regional cultures but also serve as vivid manifestations of socialist cultural prosperity at the micro spatial level. Empathetic communication enhances public cultural confidence, while technological democratization facilitates cultural co-creation, shifting regional cultural preservation from static conservation to dynamic inheritance. This approach helps mountain cities cultivate distinctive spatial characteristics and address cultural homogenization challenges[10], ultimately bridging the gap between “physical trails” and a “digital cultural community.”

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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