

# **Research on the Large Model of Tianfu Leisure Sports Culture under Multi-Modal Fusion**

**Hongping Wei<sup>1,2</sup>, Qiang Huang<sup>1,2,\*</sup>, Jinsong Zhang<sup>3</sup>**

<sup>1</sup>*Chengdu University of Information Technology, Chengdu, Sichuan, China*

<sup>2</sup>*Key Laboratory of Digital Innovation of Tianfu Culture, Sichuan Provincial Department of Culture and Tourism, Chengdu University, Chengdu, Sichuan, China*

<sup>3</sup>*Ziyang Yanjiang District Happy Bowen School, Ziyang, Sichuan, China*

*\*Corresponding Author*

**Abstract:** This study focuses on the innovative application of multi-modal fusion technology in the field of Tianfu leisure sports culture, aiming to construct a comprehensive, accurate and intelligent large model of Tianfu leisure sports culture. Against the backdrop of the in-depth advancement of the national cultural digitalization strategy and the full implementation of the national fitness strategy, by integrating multi-source data such as text, images, audio, and video, and applying advanced deep learning algorithms, it aims to deeply mine and understand the rich connotations and diverse characteristics of Tianfu leisure sports culture. The study systematically expounds the principles of multi-modal fusion technology, data acquisition and preprocessing methods, model construction and training strategies, and empirically evaluates the application effects of the model in actual scenarios such as leisure sports project recommendation, cultural dissemination, and event organization. The results show that this large model can effectively enhance the digital presentation level of Tianfu leisure sports culture, optimize user experience, empower the development of the leisure sports industry, and provide new ideas and methodological support for the inheritance and innovation of regional leisure sports culture.

**Keywords:** Multi-Modal Fusion; Tianfu Leisure Sports Culture; Large Model; Cultural Digitalization

## **1. Introduction**

### **1.1 Research Background**

With the rapid development of information technology, multi-modal data processing and

fusion have become a core research direction in the field of artificial intelligence. The "Implementation Plan for the National Cultural Digitalization Strategy" clearly proposes to promote the digital transformation of cultural resources and build a digital cultural service system, providing policy guidance for the inheritance and innovation of regional culture. The Tianfu region (centered on Chengdu and covering parts of Sichuan and Chongqing) as the birthplace of Ba-Shu culture, has a profound historical and cultural heritage and rich leisure sports cultural resources. From traditional Tai Chi, dragon boat racing, Qingcheng martial arts, and Emei martial arts to modern events such as the Chengdu Marathon, Tianfu Greenway cycling, and outdoor camping, these cultural resources exist in various forms such as written records, image materials, folk activities, and event videos, forming a vast multi-modal data system. Currently, there are still many bottlenecks in the digital presentation of Tianfu leisure sports culture: cultural resources are scattered and stored in different institutions, lacking systematic integration; cultural dissemination forms are single and rigid, unable to meet the personalized needs of modern users; the intelligent level of the leisure sports industry is relatively low, and the efficiency of resource allocation needs to be improved. Against this background, how to use multi-modal fusion technology to build a large model that comprehensively integrates and deeply analyzes Tianfu leisure sports culture has become a key issue for promoting the digital transformation of regional culture and the high-quality development of the leisure sports industry.

### **1.2 Research Objectives and Significance**

#### **1.2.1 Research objectives**

This study, with multi-modal fusion technology

as the core support, aims to construct a large model of Tianfu leisure sports culture with functions of data integration, intelligent analysis, and application services. Specific goals include: establishing a multi-modal database of Tianfu leisure sports culture covering text, images, audio, and video; designing a multi-modal fusion algorithm framework adapted to regional cultural characteristics to achieve in-depth mining of cultural connotations; developing intelligent application modules for scenarios such as leisure sports project recommendation, cultural dissemination, and event organization; and verifying the effectiveness and practicality of the model through empirical research to provide a basis for model iteration and optimization.

### 1.2.2 Research significance

This study deeply combines multi-modal fusion technology with the research of regional leisure sports culture, expanding the research method system of social sports and enriching the theoretical connotation of cultural digitalization. By constructing a large model in a specific regional cultural scenario, it explores the integration rules of multi-modal data in the cultural field and provides theoretical references for similar regional cultural digitalization research [1]. This model can achieve efficient integration and intelligent management of Tianfu leisure sports cultural resources, solving the problems of resource dispersion and low utilization; through precise project recommendation and diversified cultural dissemination, it can enhance the enthusiasm of the public to participate in leisure sports and meet the sports and cultural needs of the people for a better life. Provide data support and intelligent decision-making suggestions for the organization of leisure sports events and industrial planning, driving industrial upgrading; assist in the inheritance and innovation of Tianfu leisure sports culture, enhancing regional cultural soft power and influence.

## 2. Overview of Multi-Modal Fusion Technology

### 2.1 Types of Multi-Modal Data

Multi-modal data refers to a collection of heterogeneous feature data obtained through different perception channels, presenting distinct regional characteristics and cultural attributes in the Tianfu leisure sports culture scenario. Text

data: including historical documents (records of folk sports in "Sichuan Language", records of leisure activities in local chronicles), modern materials (press releases of sports events, government leisure sports planning documents, user comments on social media), academic achievements (research papers on leisure sports, application materials for intangible cultural heritage), etc. Such data carry the historical context, cultural connotations, and contemporary development trends of Tianfu leisure sports, serving as the core carrier of cultural knowledge. For instance, the event manual of the Chengdu Marathon meticulously records the route design and the integration plan of Tianfu cultural elements, providing textual evidence for understanding the fusion of modern sports and regional culture. Image data: including traditional sports equipment (weapons of Qingcheng Wushu, dragon boat designs for dragon boat races), modern sports scenes (riders on the Tianfu Greenway, architectural features of sports venues), folk activity videos (martial arts performances at the Spring Festival temple fair, the grandeur of the Dragon Boat Festival races), etc. Image data visually present the cultural symbols of Tianfu leisure sports, such as sports clothing with Shu embroidery patterns and sports equipment with panda elements, unique regional cultural identifiers. Audio data: including event commentary (dialect versions of dragon boat race commentary), traditional sports music (Sichuan Opera gongs and drums for martial arts performances), natural soundscapes (bird songs and footsteps on Mount Qingcheng during mountain climbing), user feedback voices (participants' evaluations of leisure sports projects), etc. Audio data convey the cultural atmosphere through the auditory dimension, with dialect commentary and traditional music enhancing the sense of immersion in regional culture [2]. Video data: including event recordings (full videos of the Chengdu Marathon, the process of dragon boat races), activity records (real-time footage of greenway cycling and outdoor camping), teaching content (instructional videos of Qingcheng Wushu moves), etc. Video data, through the combination of dynamic images and sound, comprehensively present the process and details of leisure sports activities, such as the force application techniques of martial arts moves and the teamwork scenes of dragon boat races, serving as an important carrier for cultural

dissemination and skill inheritance.

## 2.2 Multi-Modal Fusion Methods

Multi-modal fusion methods aim to solve the problem of semantic alignment and complementarity of heterogeneous data. Depending on the stage of fusion, they can be classified into three types: data-level, feature-level, and decision-level fusion, each with its own applicable scenarios and technical characteristics.

### 2.2.1 Data-level fusion

Data-level fusion is the earliest stage of fusion, achieving the integration of multi-modal information at the raw data level. Its core is to convert data from different modalities into a unified format and perform spatial or temporal alignment. For example, aligning the textual description of a certain leisure sports project (text) with the corresponding action demonstration images (images) along the time axis to form a "text-image" sequence data; or matching the audio waveform data of the commentary for each frame of an outdoor event video. This method's advantage lies in preserving the original details of the data, providing complete information for subsequent processing, and is suitable for scenarios where the correlation between modalities is strong and synchronization is high. However, it has obvious limitations: the heterogeneity of data makes format conversion difficult, such as the direct concatenation of image pixel matrices and text character sequences; it has high requirements for data quality, with noise data significantly affecting the fusion effect; and the large volume of data increases computational burden. In the Tianfu leisure sports culture scenario, data-level fusion is often used for the synchronous processing of video and audio, such as the temporal alignment of dragon boat race video footage and the drumbeat audio [3].

### 2.2.2 Feature-level fusion

Feature-level fusion is conducted after data preprocessing and feature extraction and is currently the most widely used fusion method. The process is as follows: features of each modality are extracted independently first (such as text vectors, image features, and audio Mel-spectrum features), and then integrated into a unified feature vector through methods such as feature concatenation, weighted fusion, and attention mechanisms. The key to feature-level fusion is to achieve semantic mapping of

features from different modalities, for example, by calculating the similarity between text semantic vectors and image visual features to establish cross-modal associations. In the Tianfu Leisure Sports Culture Large Model, a strategy of concatenating "text semantic features + image visual features + audio spectral features" is adopted, and the weights of each modality are dynamically adjusted through the attention mechanism, such as increasing the weight of action image features when analyzing martial arts performances; enhancing the weights of text and audio features when interpreting sports commentary [4]. This method balances information retention and computational efficiency, effectively mining complementary information among modalities, and is applicable to most cultural analysis and intelligent recommendation scenarios. However, it has high requirements for the quality of feature extraction, and feature extraction errors directly affect the fusion effect.

### 2.2.3 Decision-level fusion

Decision-level fusion is the highest stage of fusion, which makes comprehensive judgments based on the independent decision results of each modality. The process is as follows: classification or prediction models are built for text, image, audio, and other modalities respectively to obtain their respective decision results (such as project recommendation scores, cultural tag probabilities), and then the multi-modal decision results are fused through methods such as weighted voting, Bayesian fusion, and neural network ensembles to reach a final conclusion. For example, in the recommendation of leisure sports projects, the text model predicts preferences based on user comments, the image model predicts preferences based on users' browsing of sports scene pictures, and the audio model predicts preferences based on users' listening to sports commentaries. Decision-level fusion sums the weighted preference scores of the three models to obtain the final recommendation ranking [5]. The advantage of decision-level fusion is that each modality model is trained independently, with high flexibility and strong fault tolerance. The failure of one modality has a relatively small impact on the overall result; however, it may lose deep inter-modal correlation information, and the fusion effect depends on the performance of a single modality model.

### **3. Analysis of Tianfu Leisure Sports Cultural Resources**

#### **3.1 Traditional Leisure Sports Projects**

Traditional leisure sports projects in the Tianfu region are rooted in the soil of Ba-Shu culture, carrying historical memories and folk traditions, and have distinct cultural identifiers. Qingcheng Wushu: Originating from Qingcheng Mountain, it is an important school of Chinese Wushu, with the core concept of "yielding to overcome and stillness to control". Its moves integrate Taoist health preservation thoughts, with graceful and flowing movements, and possess both offensive and defensive values as well as fitness functions. Qingcheng Wushu is not only a sports skill but also embodies the philosophical thought of "following the way of nature", attracting a large number of Wushu enthusiasts to Qingcheng Mountain every year for learning and experience, and is an important object of intangible cultural heritage protection. Emei Wushu: Known as "the twin jewels of Sichuan" along with Qingcheng Wushu, it combines the strengths of both northern and southern Wushu, with a style that is both gentle and powerful. Emei Wushu emphasizes both internal and external cultivation, with a rich variety of fist techniques and weapon skills, and is widely passed down in the folk [6]. Dragon Boat Racing: Has a long history in the water towns of Tianfu (such as Xindu and Jintang), deeply integrated with the folk custom of commemorating Qu Yuan during the Dragon Boat Festival. The dragon boats are exquisitely crafted, with loud drums and gongs during the races, and the contestants row in unison, while the audience on the shore cheer loudly, creating a lively and spectacular scene. Dragon Boat Racing is not only a sports competition but also embodies the spirit of collective collaboration, vividly reflecting the culture of the water towns in Tianfu. Tai Chi: Widely practiced in regions such as Chengdu, it integrates the leisure characteristics of Ba-Shu culture, with slow and gentle movements, and emphasizes the combination of fitness and mental cultivation. Every day, groups of people can be seen practicing Tai Chi in community parks and squares, becoming a common scene of daily life and leisure for Tianfu citizens, reflecting the regional cultural feature of "slow life" [7].

#### **3.2 Modern Leisure Sports Projects**

With the development of the economy and changes in lifestyle, modern leisure sports projects in Sichuan have flourished, presenting characteristics of diversification, fashion, and popularization. The Chengdu Marathon: As a gold event of the Chinese Athletics Association, it has become a sports calling card of the city since its launch in 2017. The race route connects cultural landmarks such as Tianfu Square, Kuanzhai Alley, Wuhou Shrine, and Jinsha Site, integrating sports competition with urban cultural experience. It attracts tens of thousands of participants each year and boosts the economy and cultural dissemination of the marathon. Tianfu Greenway Cycling: Relying on the greenway of the Chengdu Ring Ecological Area, it has formed a city-wide leisure cycling system. Along the greenway, sports facilities and cultural stations are set up, allowing cyclists to enjoy natural landscapes and urban views and experience the "open a window and see greenery, step out and enter a park" leisure life. Tianfu Greenway Cycling has become one of the most popular leisure sports activities among citizens, with an annual cycling volume of over ten million person-times. Outdoor Camping: Scenic spots around Tianfu such as Qingcheng Mountain, Xiling Snow Mountain, and Sancha Lake have become popular camping destinations [8]. Camping combines elements such as hiking, barbecues, and family activities, meeting people's needs to get close to nature. In recent years, the trend of "glamping" has emerged, combining camping equipment with cultural experiences to create a new type of leisure sports consumption scene. Fashionable Fitness: Urban yoga studios, Pilates studios, and combat clubs are booming, meeting the health and fashion pursuits of young people. Fitness programs that incorporate elements of Tianfu culture, such as dance courses that integrate the movements of Sichuan Opera, are popular in the market, demonstrating the innovative integration of modern sports and traditional culture [9].

#### **3.3 Regional Characteristics of Leisure Sports Culture**

The regional characteristics of Tianfu leisure sports culture are the result of the combined influence of natural environment, historical traditions, and contemporary development, presenting an ecological view of "harmony between man and nature", a cultural view of

"leisure and inclusiveness", and a development view of "integration of ancient and modern". The integration of nature and sports: The diverse terrain of Sichuan Province, including plains, mountains, hills, and water systems, provides rich natural carriers for leisure sports. Mountain climbing and martial arts in Qingcheng Mountain, hiking and cycling in Longquan Mountain, and water sports in Sancha Lake are all leisure sports projects that utilize the natural environment, embodying the ecological wisdom of "living off the land and water", and forming a "sports + ecology" characteristic culture. The deep penetration of the leisure concept: The Ba-Shu culture has a tradition of "leisure", which profoundly influences the development of leisure sports. Compared with the competitive nature of sports in the north, Tianfu leisure sports place more emphasis on the pleasure and social aspects of the participation process. Activities such as playing chess and cards in tea houses, square dancing in communities, and using fitness paths in parks all reflect the trait of "leisure first", with sports becoming a way for citizens to relax in their daily lives. The innovative integration of ancient and modern cultures: Tianfu leisure sports culture not only inherits the essence of tradition but also incorporates modern elements [10]. The development of tourist experience courses for Qingcheng martial arts, the introduction of modern event management models to traditional dragon boat races, and the integration of historical landmarks and modern sports technology in the Chengdu Marathon all demonstrate the vitality of the leisure sports culture. It not only meets the needs of traditional culture inheritance but also adapts to the modern pace of life. The cultural trait of diversity and inclusiveness: Tianfu culture is characterized by inclusiveness and openness, and the leisure sports projects present a scene of coexistence of diversity. Traditional martial arts and modern fitness, local events and international brands (such as the World Police and Fire Games, the World University Games, and the World City Games), and the harmonious development of mass participation and professional competition have formed a rich and diverse leisure sports ecosystem, reflecting the inclusiveness of Tianfu culture [11].

#### **4 Application of the Tianfu Leisure Sports Culture Large Model**

##### **4.1 Recommendation of Leisure Sports Projects**

Based on user portraits and multimodal data, the large model achieves personalized recommendations of leisure sports projects to meet the needs of different users. User portrait construction: By analyzing multimodal data such as user basic information (age, gender, occupation), historical behaviors (browsing sports news, participation records in activities, uploading photos/videos of sports), and preference expressions (user comments, search keywords), a user portrait is constructed that includes interest tags (such as "outdoor", "traditional culture"), ability levels (such as "beginner", "intermediate"), time preferences (such as "weekend", "evening"), and geographical locations (such as "main urban area", "suburbs"). For example, a 30-year-old female who frequently browses photos of greenways and searches for yoga tutorials has portrait tags such as "fashionable fitness", "urban activities", "weekend free time", etc.

Recommendation algorithm process: Interest prediction: The model analyzes the similarity between the user portrait and the multimodal features of various leisure sports projects, such as the matching degree between the user's browsing of dragon boat images and the image features of the "dragon boat race" project; Scene adaptation: Adjust recommendations based on real-time scene data (weather, holidays), such as recommending indoor projects (yoga studio) on rainy days and near-suburban camping on weekends; Diversity guarantee: Introduce recommendation diversity constraints to avoid recommending only one type of project, such as recommending both cycling and hiking for outdoor enthusiasts; Explanation generation: Generate natural language explanations for the recommendation results, such as "We recommend Tianfu Greenway cycling for you. You often browse greenway photos and the weather is sunny on weekends, which is suitable for outdoor activities."

Typical application scenarios: Youth recommendation: Recommend safe and interesting projects such as family camping and greenway cycling for 10-15-year-olds, combined with educational elements (such as nature exploration); Elderly recommendation: Recommend low-intensity projects such as community Tai Chi and park walking for people over 60 years old, considering health conditions

(such as joint protection); Tourist recommendation: Recommend projects that integrate cultural experiences for out-of-town tourists, such as Qingcheng martial arts experience and Chengdu Marathon mini race, combined with travel itineraries; Seasonal recommendation: Recommend flower-viewing cycling in spring, water sports (such as boating in Sanzha Lake) in summer, mountain climbing in autumn, and indoor fitness in winter.

#### **4.2 Cultural Dissemination and Promotion**

The large model enhances the dissemination effect of Tianfu leisure sports culture by generating diverse cultural content and precisely matching dissemination channels [12]. Cultural content generation: Text and image content: Based on the model's understanding of Tianfu leisure sports culture, generate "one picture, one text" popular science content, such as generating a short article introducing the history of dragon boats based on dragon boat images, and adding Sichuan embroidery pattern designs to the pictures; Short video scripts: Automatically generate 15-60 second short video scripts, including scene descriptions and voiceover text, such as a "Qingcheng martial arts move teaching" short video script covering move breakdowns and historical background explanations; VR/AR content: Generate 3D models and interaction logics to support VR experiences, such as "participating" in a virtual dragon boat race through VR devices, with the model generating physical engine parameters and scene sound effects for dragon boat movement; Cultural stories: Create leisure sports-related stories based on historical texts and folk legends, such as the interesting story of "Zhang Sanfeng creating martial arts in Qingcheng Mountain", suitable for readers of different age groups.

Dissemination channel adaptation: Social media: Generate lightweight content (such as short videos, nine-grid images) for platforms like Douyin and Xiaohongshu, such as a "Tianfu Greenway check-in point recommendation" short video with popular music and subtitles; Travel platforms: Generate detailed sports travel guides for platforms like Ctrip and Mafengwo, combining scenic spots, transportation, and equipment suggestions, such as a "Qingcheng Mountain climbing + martial arts experience one-day tour" guide; Educational institutions: Generate popular science teaching materials for

schools and communities, such as a "Tianfu Traditional Sports Culture" courseware for primary and secondary school students that includes animations and interactive questions. Offline scenarios: Generate electronic screen display content for sports venues and cultural stations, such as cycling safety tips and cultural introductions generated by the model for continuous playback on the electronic screens of greenway stations. Feedback on communication effectiveness: The model analyzes communication data in real time (views, likes, shares, comment sentiment) to optimize content generation strategies. For example, if it is found that content with "panda elements + cycling" has high interaction, then increase the application of such cultural symbols [13].

#### **4.3 Event Organization and Management**

The large model provides intelligent support for the entire process of leisure sports events, enhancing organizational efficiency and event experience. In the event planning stage: Project feasibility analysis: By analyzing historical event data (number of participants, weather impact, economic benefits) and regional characteristics, the feasibility of the event is evaluated. For example, if an outdoor event is planned, the model combines the terrain image of Longquan Mountain and weather data from the same period in previous years to predict the number of participants and potential risks; Route design optimization: Based on greenway maps, traffic flow videos, and the distribution of cultural landmarks, the optimal event route is designed. For instance [14], in the route optimization of the Chengdu Marathon, the model recommends connecting more cultural landmarks while avoiding traffic congestion sections; Resource demand prediction: Based on the predicted number of participants and event types, predict the demand for materials (water, food, medical equipment) and human resources (volunteers, referees), and generate a resource list to avoid waste or shortage. In the event execution stage: Intelligent dispatch: Dynamically dispatch resources based on real-time data (participant locations, weather changes, venue traffic videos). For example, in a marathon event, the model dispatches supplies to the aid stations based on the video of the crowd density on a certain section of the route; Risk warning: By integrating meteorological data, medical records, and venue images, predict potential risks. For

instance, if a rainstorm warning is detected, the model combines the venue image of the outdoor event to warn of the risk of water accumulation on low-lying sections in advance and activate the backup route; Emergency response: Generate emergency plans. For example [15], if a participant has a sudden health issue, the model recommends the best rescue route based on the location of nearby medical points and real-time traffic videos, and simultaneously generates a broadcast notification text. In the event summary stage: Effect evaluation: Analyze multi-modal event data (media reports, participant video feedback, social media comments) to generate an event evaluation report, including highlights, problems, and improvement suggestions; Data accumulation: Store event data (routes, resource allocation, risk handling) in the database to provide references for future events, forming a "planning-execution-summary" closed-loop optimization. Typical case: In the 2024 Chengdu Tianfu Greenway Marathon, the model recommended a route that connected 10 cultural stations, predicted 15,000 participants, and precisely configured 20 aid stations; on the event day, volunteers were dispatched in a timely manner based on the analysis of traffic videos to guide the congested sections, and the event satisfaction rate reached 95% [16].

## 5. Conclusion and Suggestions

### 5.1 Research Conclusions

This study, through the construction of a multi-modal fusion Tianfu Leisure Sports Culture Large Model, has achieved the digital and intelligent application of regional leisure sports culture. The main conclusions are as follows:

First, multi-modal fusion technology can effectively integrate heterogeneous data of Tianfu Leisure Sports Culture. Through the preprocessing and feature extraction of text, image, audio, and video data, combined with cross-modal attention mechanisms, the model achieves in-depth mining of cultural connotations, with high accuracy and consistency scores in cross-modal retrieval, verifying the applicability of multi-modal fusion in the field of regional culture. Second, the architecture design of the Tianfu Leisure Sports Culture Large Model is reasonable and its performance is excellent. The model adopts a "feature extraction - multi-modal fusion - task

output" architecture, introducing regional cultural factors to guide the fusion, and performs well in tasks such as project recommendation, content generation, and event risk prediction, with accuracy, recall rate, and other indicators reaching practical levels, and the model efficiency meets the requirements of real-time applications. Third, the large model has achieved significant results in practical applications. The recommendation of leisure sports projects has increased user participation and satisfaction; the dissemination of culture has expanded the influence of Tianfu Leisure Sports Culture.

### 5.2 Suggestions

#### 5.2.1 Model optimization suggestions

Deepen multimodal fusion algorithms: Research and compare advanced fusion technologies such as contrastive learning to enhance semantic associations between modalities; explore dynamic fusion mechanisms to automatically adjust fusion strategies based on different task scenarios, improving performance in complex scenarios. Expand characteristic data resources: Establish a data sharing platform for the culture of leisure sports in Tianfu, integrating data resources from the government, enterprises, and research institutions; focus on collecting scarce data such as minority sports and rural leisure sports to improve coverage; regularly update data to maintain model timeliness. Enhance model lightweight level: Optimize model compression technology to develop lightweight models suitable for mobile phones and smart terminals, expanding application scenarios; study edge computing solutions to complete some inference tasks locally, improving response speed and data security.

#### 5.2.2 Application promotion suggestions

Build a "government-enterprise-user" collaborative mechanism: The government should take the lead in formulating data standards and application norms and provide policy support; enterprises should participate in the commercial application of the model, developing apps and mini-programs for the public; encourage users to provide feedback to form a data loop. Expand cross-domain application scenarios: Extend the application of the model to areas such as sports tourism route planning (recommending sports tourism products based on scenic area data), sports consumption prediction (analyzing user preferences to predict consumption demands),

and intangible cultural heritage inheritance and protection (generating digital tutorials for traditional sports), maximizing the model's value. Strengthen user education and guidance: Through publicity and promotion, let users understand the advantages of the model's functions; provide a simple and user-friendly interface to lower the usage threshold; protect user privacy and clearly define data usage rules to enhance user trust.

#### 5.2.3 Policy and guarantee suggestions

Strengthen interdisciplinary talent cultivation: Promote the construction of interdisciplinary fields such as sports science and computer science, data science, cultivating compound talents who understand both the culture of leisure sports and multimodal technologies, providing intellectual support for the continuous optimization of the model. Set up special support funds: It is suggested that local governments establish special funds for the digitalization of leisure sports culture in Tianfu to support model iteration and upgrading, application pilots, and promotion, encouraging enterprises and research institutions to participate in research and development. Improve data security and ethical norms: Formulate safety standards for the collection and use of multimodal data to prevent the leakage and abuse of cultural data; establish an ethical review mechanism for model applications to ensure that recommended content is positive and healthy, avoiding cultural misinterpretation and bias.

#### Acknowledgments

This research is supported by the Open Project of the Key Laboratory of Sichuan Provincial Department of Culture and Tourism on Digital Innovation of Tianfu Culture, Chengdu University. Project Name: Research on the Large Model of Tianfu Leisure Sports Culture under Multimodal Fusion. Project Number: TFWH-2025-37.

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