

# Classification of Rural Landscape Characteristics from a Tourist Perspective: A Case Study of Yanshou Town, Beijing City

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**Abstract** Under the backdrop of rural revitalization, rural landscapes serve as the core attraction of rural tourism, with their quality directly influencing visitor experiences. However, current rural landscape planning often adheres to the traditional “top-down” material zoning model, and neglects the perceptual experiences from the visitor’s perspective, leading to a misalignment between landscape offerings and public emotional value demands. To address this core issue, Yanshou Town in Changping District, Beijing is taken as the research object in this paper, and a classification and reconstruction method for rural landscape features from a visitor-oriented perspective is explored. By scraping relevant travelogue data from RedNote, the study constructs an unsupervised machine learning framework based on the LDA topic model, conducting in-depth clustering of the semantic space perceived by visitors. The rural landscapes of Yanshou Town from the perspective of tourists are categorized into five types: mountainous agricultural and forestry landscapes, historical and cultural landscapes, seasonal floral landscapes, artistic experiential landscapes, and linear recreational landscapes. Each category is analyzed individually, and corresponding improvement suggestions are provided, offering a reference pathway for the precise governance and differentiated enhancement of rural landscape spaces in Yanshou Town.

**Keywords** Rural landscape classification, Tourist perception, Yanshou Town, LDA topic model

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2026 marks the ninth year of the comprehensive implementation of the rural revitalization strategy and the tenth year of advancing the *Beijing Master Plan for Urban Development* (2016–2035). The coordinated execution of these two major strategies has driven the high-quality development of rural tourism industries and landscape construction in suburban Beijing. As a core attraction, the experiential quality of rural landscapes directly affects tourists’ willingness to stay and the overall benefits of rural tourism industry<sup>[1]</sup>.

However, current rural landscape planning is mostly limited to the “top-down” planner paradigm, and overly relies on static physical spatial zoning or standard material resource classification. This kind of thinking tends to mechanically divide the physical environment, lacking consideration for public perception<sup>[2-3]</sup>. Therefore, this paper takes Yanshou Town in Beijing as the empirical object. By introducing big data mining technology and LDA topic model, tourist experience notes on social platforms are deeply clustered. The core advantage of this method lies in its ability to break through the static limitations of traditional material classification, reveal the deep binding relationship between landscape elements and spatial behavior from the perspective of tourists from bottom to top<sup>[4-5]</sup>, and construct a rural landscape classification system that adapts to real needs, providing theoretical support for the precise

governance and differentiated improvement of landscape space in Yanshou Town.

## 1 Data acquisition and preprocessing

Based on an octopus collector, using the RedNote platform as the data source and the names of various villages in Yanshou Town as search terms, travel book titles and texts from 2023 to 2026 were crawled, and a total of 2,383 original text data were obtained. To ensure data quality and research effectiveness, a set of strict cleaning process has been implemented for raw data. On the one hand, invalid notes with duplicate publications, advertising marketing, and short word counts have been removed. On the other hand, a “forward and reverse filtering mechanism” was established. Relevant content about Yanshou Town was retained through matching place name keywords, and irrelevant texts that mention the same location were eliminated through reverse judgment. In the end, a total of 1,256 valid research data were retained, accounting for 52.71% of the total.

## 2 Analysis of overall perceived characteristics

Through the coverage statistics of 1,256 valid travelogue texts after deduplication, it is found that tourists’ perception of the rural landscape in Yanshou Town shows multidimensional characteristic tendencies (Fig1, Table 1).

Firstly, the natural base and outdoor activities constitute the most core perceptual carrier, with high coverage of “hiking” (36.39%), “mountain climbing” (26.75%), and “recreational trails” (20.70%). It indicates that the outdoor activity experience in Yanshou Town is the core focus of tourists, and the mountainous environment is the core scene for carrying out such activities. In addition, tourists’ perception horizon also extends to micro life scenes and social interactions. The widespread emergence of terms such as “rural settlements” (24.76%), “parent-child friendliness” (17.75%), and “pets” (8.84%) reveals that rural spaces are increasingly supporting family leisure and social interaction, objectively reflecting that in addition to natural foundations, tourists are also concerned about the compatibility of rural spaces with modern lifestyles and the adaptability of social scenes. Finally, the frequent mentions of place names such as “Dahei Mountain” (13.85%), “Yinshan Pagoda Forest” (9.79%), and “Wangbaochuan” (8.68%) indicate the core tourist attractions or villages in Yanshou Town. These specific geographical coordinates form the physical anchor points for tourists to perceive rural landscapes.

## 3 Perception dimension extraction based on LDA model

After completing the basic word frequency statistics, the LDA topic model is introduced for unsupervised clustering of texts<sup>[6-7]</sup>. Through

iterative calculations, it is found that when the number of topics increases with the value of  $K$ , the topic consistency index reaches its peak at  $K=5$  (Fig.2). Taking into account the clarity of features and the avoidance of semantic overlap, the optimal number of topic clusters  $K=5$  is ultimately determined through research.

To further validate the robustness of the classification results, the pyLDAvis tool<sup>[8]</sup> is used to map the five topics to a two-dimensional space based on principal component analysis (PCA) (Fig.3). The bubble area in the figure reflects the marginal probability of each landscape dimension in the entire sample, and the larger the bubble, the greater the weight of that topic in tourists' perceptions. The visualization results show that the five bubbles representing different feature dimensions are distributed discretely and without overlap in the coordinate system, proving that the extracted feature dimensions have high independence and discriminant validity, ensuring that the classification system can accurately cover the diverse landscape of Yanshou Town from macro natural background to micro social perception, and verifying the effectiveness of the model training.

#### 4 Classification and connotation analysis of rural landscape features

Based on the weight distribution listed in Table 2 and the co-occurrence network diagram of keywords (Fig.4), the deep connotations of these five types of landscape features are

analyzed below.

(1) Landscape of mountainous agricultural and forestry settlements. This dimension reflects the blending relationship between natural foundations and agricultural production, outlining the most basic rural landscape of Yanshou Town. The word group covers two types of elements simultaneously: one is natural style words such as "mountains", "mountaineering", and "mountain landscapes", and the other is words pointing to agricultural villages such as "Nanzhuang Village", "yellow chestnut", and "picking". Their co-occurrence indicates that in the macro perception of tourists, mountain ecology and agricultural and forestry products are not isolated visual objects. While people engage in outdoor activities, they interact with the village through methods such as picking. This combination indicates that in the logic of tourist experience, the natural base and local products present a highly integrated feature.

(2) Historical and cultural heritage landscape. This dimension captures the spatial coexistence between cultural entities and tourism service facilities, revealing the close entanglement between historical resources and reception functions in Yanshou Town. In the word group, historical and cultural entities such as "Yinshan Pagoda Forest" and "temple", as well as leisure vocabulary such as "rural accommodation", "folk house", and "courtyard", are grouped under the same theme. This clustering points to the true itinerary arrangement of tourists: cultural tourism rarely occurs independently, usually

accompanied by food and accommodation facilities in surrounding villages. It can be seen that the historical landscape of Yanshou Town is no longer an isolated walled scenic area, but is integrated with the courtyards and old houses used by villagers in their daily lives, jointly constructing a composite micro vacation scene.

(3) Seasonal flowers and trees viewing landscape. This dimension highlights the phased visual attraction driven by phenological changes, with strong seasonal colors and clear spatial orientation. The word group binds plant seasonal words such as "peach blossom", "*Y. denudata*", and "flower viewing" with spaces such as "Dahei Mountain" and "park". This co-occurrence truly reflects the characteristic of tourists' perception of being dominated by phenological rhythms: during specific periods of spring, the Dahe Mountain leaps from a plain mountain background to a core attraction due to its spectacular seasonal blossoms. It can be said that the dynamic alternation of plant seasons plays a key role in shaping the attractiveness of regional landscapes at specific stages.

(4) Rural art living landscape. This dimension presents the collision and combination of traditional rural environment and modern consumer aesthetics, reflecting the upgrading of business models and experiential transformation brought about by rural micro renewal. A binary structure has formed within the word group: there are both words carrying the original rural background such as "dirt road" and "aroma of street food", as well as a large number of words

**Table 1 High-frequency words and proportion of articles**

| High-frequency word  | Proportion of articles | High-frequency word  | Proportion of articles | High-frequency word   | Proportion of articles | High-frequency word | Proportion of articles | High-frequency word | Proportion of articles |
|----------------------|------------------------|----------------------|------------------------|-----------------------|------------------------|---------------------|------------------------|---------------------|------------------------|
| Hiking               | 457 (36.39%)           | Recreation trail     | 260 (20.70%)           | Flower viewing        | 176 (14.01%)           | Pet                 | 111 (8.84%)            | Viewing platform    | 86 (6.85%)             |
| Sightseeing check-in | 433 (34.47%)           | Mountain landscape   | 248 (19.75%)           | Dahei Mountain        | 174 (13.85%)           | Wangbaochuan        | 109 (8.68%)            | Reservoir           | 76 (6.05%)             |
| Parking facilities   | 366 (29.14%)           | Difficulty of hiking | 234 (18.63%)           | Park                  | 149 (11.86%)           | Yanshou Temple      | 108 (8.60%)            | Yellow chestnut     | 73 (5.81%)             |
| Outdoors             | 345 (27.47%)           | Family-friendly      | 223 (17.75%)           | Cycling               | 136 (10.83%)           | Step                | 104 (8.28%)            | Xinzhuan Village    | 68 (5.41%)             |
| Mountaineering       | 336 (26.75%)           | Peach blossom        | 207 (16.48%)           | Highway               | 129 (10.27%)           | Rural accommodation | 103 (8.20%)            | Chestnut            | 54 (4.30%)             |
| Rural settlement     | 311 (24.76%)           | Road trip            | 196 (15.61%)           | Yinshan Pagoda Forest | 123 (9.79%)            | Supply              | 92 (7.32%)             | Magnolia            | 33 (2.63%)             |

**Table 2 Weight allocation for different landscape features**

| Mountain agriculture and forestry | Weight  | History and culture   | Weight  | Seasonal flowers and trees | Weight  | Local or native art or handicraft | Weight  | Linear recreation     | Weight  |
|-----------------------------------|---------|-----------------------|---------|----------------------------|---------|-----------------------------------|---------|-----------------------|---------|
| Nanzhuang Village                 | 0.011 8 | Yinshan Pagoda Forest | 0.012 7 | Dahei Mountain             | 0.018 9 | Rural market                      | 0.007 2 | Cycling               | 0.024 1 |
| Yellow chestnut                   | 0.011 6 | Rural accommodation   | 0.008 0 | Park                       | 0.017 4 | Heishan Roast House               | 0.005 1 | Recreation trail      | 0.019 8 |
| Rural settlement                  | 0.011 4 | Temple                | 0.005 7 | Peach blossom              | 0.013 6 | Dirt road                         | 0.004 8 | Hiking trail          | 0.018 9 |
| Mountaineering                    | 0.009 0 | Folk house            | 0.004 4 | Watershed                  | 0.010 8 | Scenery                           | 0.004 4 | Wangbaochuan          | 0.018 9 |
| Hiking                            | 0.008 5 | Courtyard             | 0.004 3 | <i>Yulania denudata</i>    | 0.008 7 | Life                              | 0.004 1 | Heishanzhai           | 0.011 9 |
| Chestnut                          | 0.006 9 | Monastery             | 0.004 0 | Mountain flowers           | 0.007 7 | Aroma of street food              | 0.004 0 | Difficulty of hiking  | 0.011 8 |
| Mountain landscape                | 0.006 7 | Buddhist temple       | 0.003 5 | Flower viewing             | 0.007 6 | Literature and art                | 0.003 7 | Mountain spring water | 0.009 9 |
| Family-friendly                   | 0.005 5 | Buddhism              | 0.002 8 | <i>Prunus davidiana</i>    | 0.007 1 | Handmade                          | 0.003 6 | Wangbai Road          | 0.007 4 |
| Great mountain                    | 0.004 7 | Old house             | 0.002 6 | Pear blossom               | 0.006 0 | Shop                              | 0.003 4 | Parking facilities    | 0.006 9 |
| Picking                           | 0.003 6 | Pagoda                | 0.002 4 | Cherry blossom             | 0.005 1 | Explore                           | 0.003 1 | Road conditions       | 0.005 4 |

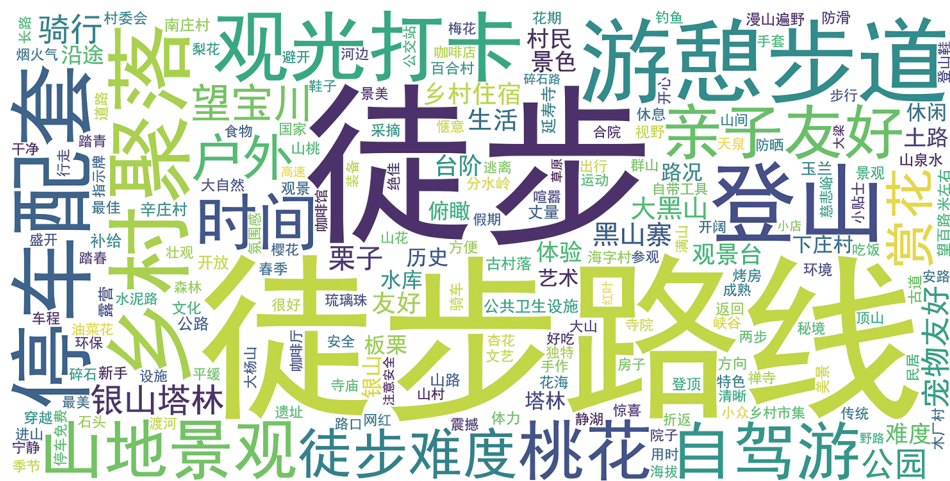


Fig.1 High-frequency word cloud map

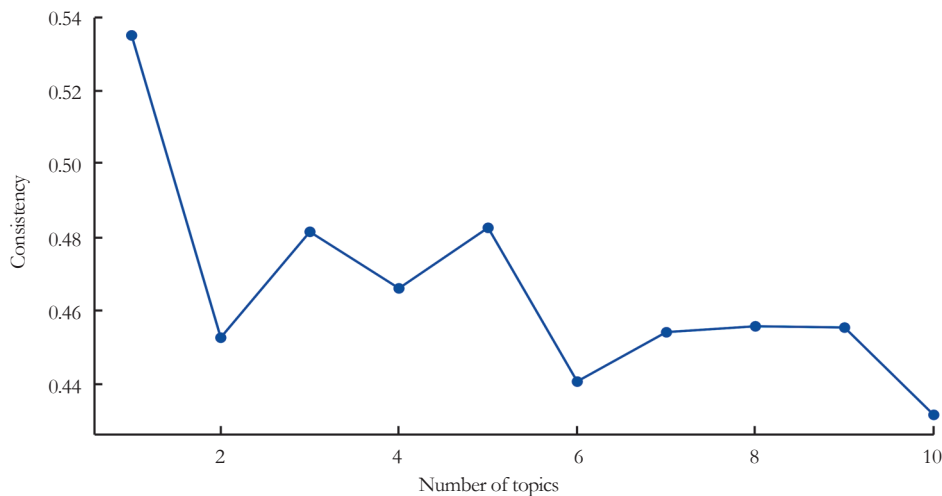


Fig.2 Consistency curve

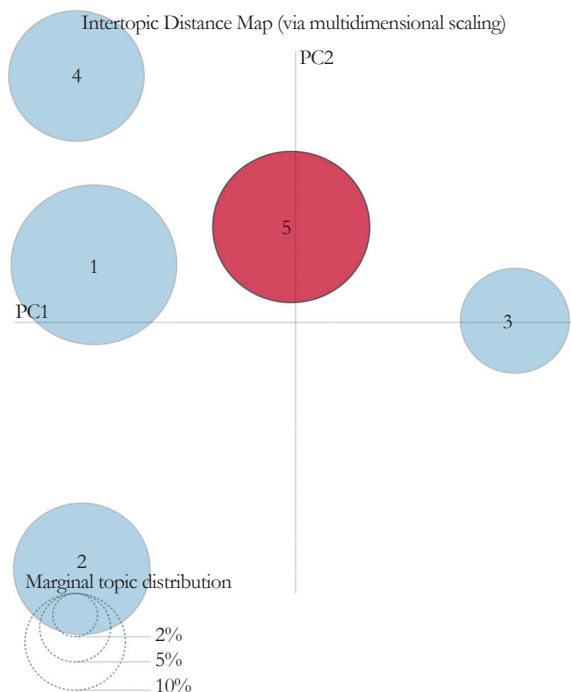


Fig.3 Two-dimensional spatial clustering of theme

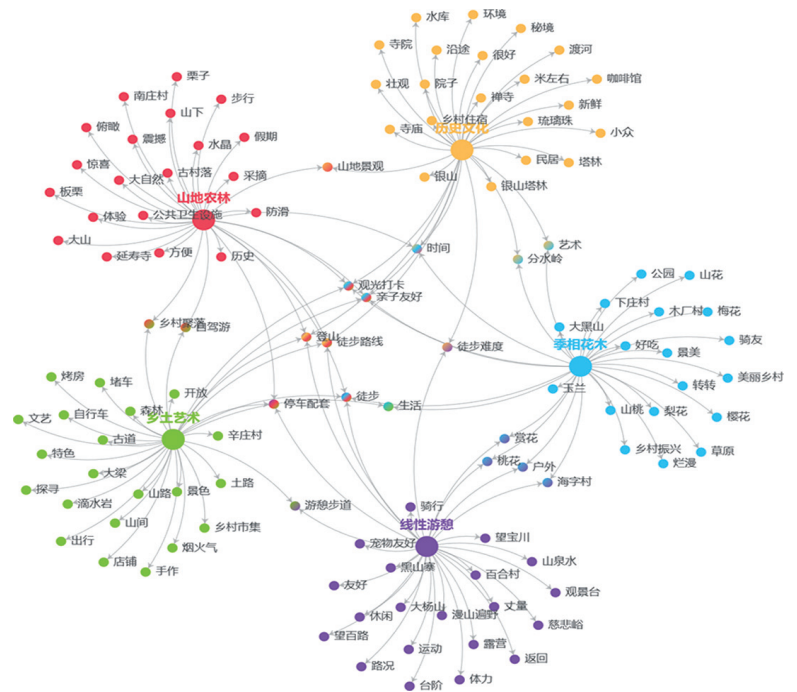


Fig.4 Co-occurrence network of landscape feature elements

with modern aesthetic connotations such as “rural market”, “literature and art”, “handmade”, “Heishan Roast House”. The two types of vocabulary share the same theme, precisely depicting the composite expectations of tourists for “micro vacation”. They want to stay in a simple rural environment and enjoy services with artistic atmosphere. These artistically updated physical nodes are becoming new landscape units that drive rural consumption.

(5) Linear recreational path landscape. This dimension focuses on linear space and the accompanying infrastructure experience, demonstrating the important role played by linear routes or transport corridors in tourism. In the word group, words representing mode of movement such as “cycling”, “recreational trail”, and “hiking route” are grouped together with facility evaluation words such as “road condition”, “difficulty of hiking”, and “parking facilities”. This co-occurrence reflects the tendency of tourists to evaluate linear landscapes: while “on the road” is already a primary form of recreation in Yanshou Town, the comprehensive evaluation of path quality not only depends on the visual aesthetic value along the way, but also on the provision and quality of basic infrastructure such as road surface smoothness and parking facilities.

## 5 Suggestions and conclusions

### 5.1 Suggestions

(1) Landscape of mountainous agricultural

and forestry settlements. Tourists tend to combine hiking and chestnut picking activities, making it difficult to separate the natural base from the local agricultural experience. Therefore, it is necessary to actively connect the spatial connections between forests and agricultural and forestry production areas, and extend the agricultural production space towards recreational functions. It can take the lead in piloting chestnut forests around Nanzhuang Village, transform existing production access roads into simple picking trails, add tool rental points and facilities along the way, reduce the threshold for family tourists to participate in agricultural experiences, and gradually form a stable product combination of “mountaineering+picking”.

(2) Historical and cultural heritage landscapes. When tourists visit cultural relics such as Yinshan Pagoda Forest, they usually look for nearby homestays or accommodations, and cultural entities and recreational facilities are highly integrated into the itinerary. It is suggested to focus on revitalizing the idle courtyard resources of villages surrounding cultural relics, and carry out livable renovations such as plumbing and drainage, insulation, etc. without changing the appearance of stone walls and tile roofs. It should develop small homestays and rural restaurants, and weave enclosed cultural relics and scenic spots with rural living spaces into integrated micro vacation products.

(3) Seasonal flower and tree viewing landscape. Dahei Mountain and similar areas rely heavily on spring blossoms; visitor numbers fluctuate sharply with the flowering season, resulting in marked underuse during the off-season. To balance seasonal dependence, local autumn leaf tree species should be replanted along the main tourist routes while maintaining the advantage of spring flower viewing, extending the visual attraction period to autumn. At the same time, a terrace with a wide view can be chosen to lay a simple lawn and equip with movable seats, providing a space for staying and enjoying the scenery in spring and autumn, and improving the annual utilization efficiency of the site.

(4) Local art living landscape. Tourists value an authentic, lived-in rural atmosphere while also seeking modern aesthetic experiences such as handicrafts and cafes. The local environment and art services should coexist in the same scene. In response to this demand, it is not advisable to carry out large-scale demolition and construction. Instead, it should take nodes

such as the Heishan Roast House as a model, select small remnants such as idle roast houses and buildings, preserve the original building appearance, and transform the interior into lightweight consumption places such as coffee shops and handicraft workshops. Physical nodes that have both local shells and modern service cores could be created, accurately catering to the needs of young customers for internet celebrity check-in and leisure consumption.

(5) Linear recreational path landscape. “Cycling” and “hiking route” always appear simultaneously with “road condition” and “parking facilities”, and infrastructure conditions form rigid constraints on tourist satisfaction. It is suggested concentrating limited funds to prioritize the repair of damaged road surfaces, the installation of bend warning facilities on popular cycling routes such as Wangbaochuan and Heishanzhai, use entrance wasteland to construct ecological parking lots, and support mobile toilets and drinking water supply points. By quickly responding to the strongest basic pain points reflected by tourists, it aims to improve the linear recreational experience from the bottom up.

## 5.2 Conclusions

Taking Yanshou Town as the empirical object, the feasibility of using “UGC data mining+LDA model” for rural landscape feature classification is verified. Unlike traditional top-down static physical zoning, this method can detect the deep binding relationship between landscape elements and spatial behavior from the perspective of tourists. This provides support for the transformation of macro resources to micro scenarios in Yanshou Town, and also contributes a quantifiable and cross regional reusable method logic for rural landscape governance.

(1) At the level of high-frequency word statistical analysis, this method can sensitively capture the entity anchor points and real pain points that tourists are concerned about. Compared with conventional resource surveys, it is faster, and has a more comprehensive coverage. Moreover, it is more likely to expose basic shortcomings such as “road condition” and “parking” that are often overlooked in macro planning. It can also clearly present spatial hotspots projected by actual visitor flows. Its core purpose is to quickly understand the current situation of rural areas and provide a relatively objective reference for filling infrastructure gaps and preliminary construction of core tourism routes.

(2) At the clustering level of the LDA model, the algorithm effectively presents the deep mechanism of “coexistence and isomorphism” between landscape elements, such as the integration of nature-based recreation and agricultural experiences, and the integration of cultural tourism and surrounding accommodation, indicating its good reusability in complex semantic dimensionality reduction. In addition, the model can also be transformed into a long-term dynamic monitoring tool: by regularly capturing time-series data, the evolution of public perception after micro updates in business formats or seasonal changes is continuously tracked, which can further guide targeted correction and iteration of rural landscapes throughout their entire lifecycle.

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