

# Mascot Explosive Works and Branding Operation Based on the Popularity of Sports Events-On the Integration and Reform of China's Animation Industry

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## ABSTRACT

Chinese animation has long faced challenges, with foreign animation dominating the market and domestic animation struggling to compete. The rise of new media has driven the industrialization and branding of Chinese animation, linking it to complex social and cultural networks that shape its future competitiveness. Similarly, sports events, as cultural phenomena, hold both entertainment and cultural significance, reflecting societal modernization. This study categorizes mascot design features of sports events into appearance, color, and accessory characteristics, providing theoretical insights to enhance understanding of event culture. Experimental results show that an optimized cellular genetic algorithm improves mascot design, aligning with human aesthetics while promoting the spirit of sports globally.

*Keywords:* Sports events, Mascots, Branding, Cellular genetic algorithm optimization

## 1. Introduction

Based on the objective and realistic basis of the national sports industry policy, the current development status of major sports events and the fact that the sports industry has become a new economic growth pole, the research of this paper is demonstrated from the perspectives of the era appeal, policy boost and value review of the brand building of major sports events in my country [15]. The background, and then pointed out the theoretical and practical significance of this research. Taking this as the origin of the research, it expounds a series of problems such as the research purpose, current situation, object, method, logical frame, and content of the brand construction of sports

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events in my country [9, 16]. With the gradual implementation of the branding operation strategy of major sports events in my country, the lag in the theory of brand building of major sports events has become increasingly apparent [13]. The main manifestations are that the government lacks programmatic theoretical guidance for the brand building policy of major sports events in my country; Wushu associations or organizations at all levels have ambiguous powers and responsibilities in brand building of major sports events; The most serious thing is that some sports event organizers do not understand the characteristics of sports event brands at all, let alone build a brand for sports events [7]. These practical problems seriously restrict the practice of brand building of major sports events in our country. The feasible measures to solve these practical problems are to carry out theoretical research work on the brand building of major sports events in our country as soon as possible, to clarify the regularity of brand building of major sports events in our country, and to clarify the problems of brand building of major sports events in our country. Relevant concepts and theories of brand building of major events, to provide feasible guidance for the practice of brand building of major sports events in my country [8, 1]. Sports with its extraordinary charm is attracting more and more attention today. As the grandest festival of sports, major sports events in the world the scope of influence is the most extensive - from the very beginning of sports to the political, economic, social, cultural, and other fields. In the long history, sports mascots are indispensable cultural treasures for human beings. An in-depth analysis of sports mascots can not only make people better understand the sports culture, but also improve the visual system of the Olympic movement and provide reference and reference for the design of sports mascots [4].

By studying the mascots of past sports events, we can promote continuous innovation and change, make sports mascots shine in history, and further convey the spirit of sports [10]. Through the research on the modeling of mascots of major sports events, the general rules of the modeling characteristics of major sports event mascots are revealed, and the theoretical basis for the creation of mascots of major sports events in the future is provided. Through the systematic analysis of the mascots of previous sports events, the regularity and development trend of the mascots of sports events are studied, and some references are provided for the creation of the mascots of the major sports events in the future. Most modern mascots refer to commercial mascots. Modern commercial mascots are essentially different from traditional folk mascots. The traditional folk mascots highlight the witchcraft concept with the nature of prayer, embody the philosophical thought of yin and yang and five elements, giving people a sense of rigor and shock [5, 14]. The modern mascot can be either concrete or abstract, but it is not illusory [12]. It is the embodiment of the sensibility of the commodity society and is displayed in front of people in a lively and lovely way. It is a combination of form and function, catering to consumers with various value orientations. The design of modern mascots is attached to business, and the form of its existence also has a certain utilitarian effect. But the two are closely related. Modern mascots are the continuation of traditional mascots, inheriting the meaning of traditional mascots to convey auspiciousness. On this basis, they have both commercial value and are the product of the combination of material and spirit. Traditional mascots are the predecessors of modern mascots, the source of their creative thinking, and the foundation of modern mascot design. In people's traditional concepts, mascots only play the role of auspicious blessings and warding off evil spirits [3, 6]. However, in today's information age with rapid economic development, they have essential differences in concept. At present, commercial mascots are developing vigorously and their vitality is increasing day by day. It is developing towards the trend of driving economic development and affecting people's aesthetic inclinations.

To sum up, with the development of the times and the enrichment of design methods, the styles

of mascot design for major sports events are becoming more and more diverse. In addition to the two-dimensional plane expression style, the popular mascot works also have gradient colors and watercolor renderings, imitating 3D light and shadow effects and other drawing methods are also often used by designers. The change of domestic animation has made the design work more popular, and the design style of the mascot has been greatly enriched, and the realization of various effects has become easy. With the rise of modern social network animation, more and more sports event mascots appear in people’s lives with dynamic images.

## 2. Cellular genetic algorithm optimization

Cellular genetic algorithm, referred to as an evolutionary calculation method that combines cellular automata and genetic algorithm. By introducing two-dimensional cellular automata into genetic algorithm, it simulates the dynamic process of biological evolution more realistically, and can process for more complex problems, obtain better solutions to optimization problems. The algorithm not only confines genetic operations such as selection, crossover, and mutation to specific neighborhoods, but also enables individuals in neighborhoods to interact, effectively simulating the complex interaction and influence of local populations during the evolution of species in the biological world. The operation of the standard genetic algorithm is an iterative operation process, and its basic flow is shown in Figure 1.

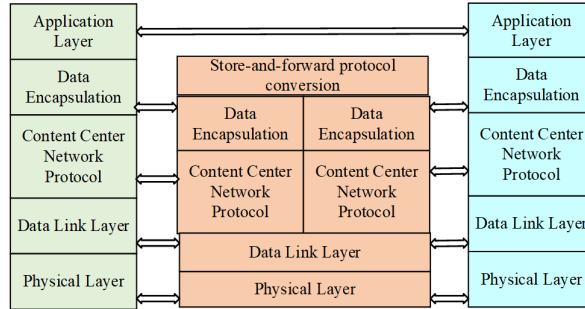


Fig. 1. The flow of standard genetic algorithm optimization

Type neighborhood, which describes a neighborhood with the upper, lower, left, and right cells as neighbors. The neighborhood is defined as

$$N_{\text{Neumann}} = \{V_i = (V_{ix}, V_{iy}) \mid |V_{ix} - V_{ax}| + |V_{iy} - V_{ay}| \leq 1, (V_{ix}, V_{iy}) \in Z^2\}, \quad (1)$$

and

$$N_{\text{Moore}} = \{V_i = (V_{ix}, V_{iy}) \mid |V_{ix} - V_{ox}| \leq 1, |V_{iy} - V_{oy}| \leq 1, (V_{ix}, V_{iy}) \in Z^2\}. \quad (2)$$

Extend the general molar neighborhood radius from to or larger, that is, get ex-tended molar neighbors,

$$N_{\text{Moore}} = \{V_i = (V_{ix}, V_{iy}) \mid |V_{ix} - V_{ox}| + |V_{iy} - V_{oy}| \leq r, (V_{ix}, V_{iy}) \in Z^2\}. \quad (3)$$

$$\begin{cases} X = 0.1 * z * x, \\ Y = 0.1 * z * y, \\ Z = z. \end{cases} \quad (4)$$

Catastrophe theory studies the problem of transformation between different equilibrium states, which have different geometric shapes, hence the name. Among them, cusp mutation, swallowtail mutation

and butterfly mutation are more commonly used. The common mutation type potential functions can be seen in Table 1.

Mutation type	Potential function
Cusp mutation	$V(x) = x^4 + ux^2 + vx$
Swallowtail catastrophe	$V(x) = x^5 + ux^3 + vx^2 + wx$
Butterfly mutation	$V(x) = x^6 + ux^4 + vx^3 + wx^2 + tx$

**Table 1.** Potential functions of common mutation types

First, establish a  $30 \times 11$  matrix with 30 animation companies and 11 evaluation indicators,

$$X = \begin{pmatrix} X_{11} & \cdots & X_{1n} \\ \vdots & \ddots & \vdots \\ X_{m1} & \cdots & X_{mn} \end{pmatrix}_{m \times n}. \quad (5)$$

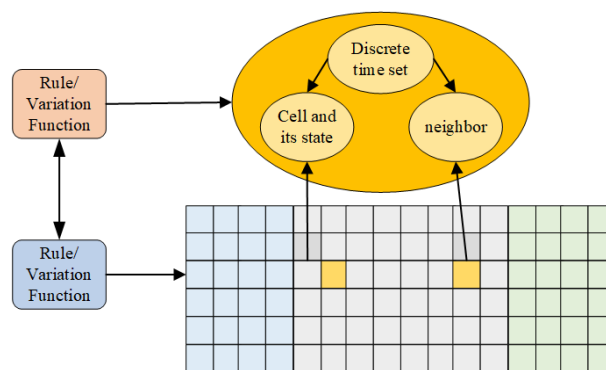
Such as formula, this paper selects  $a=0.0001$ , and obtains the standard translation matrix,

$$x_{ij} = \frac{X_{ij} - \min(X_j)}{\max(X_j) - \min(X_j)}. \quad (6)$$

Then calculate the entropy value of each column of indicators according to the formula,

$$e_j = \frac{-1}{\ln m} \sum_{i=1}^m P_{ij} \ln P_{ij}. \quad (7)$$

The cellular automaton is composed of four parts: the cellular space, the cell and its state, the cellular neighborhood and the evolution rules, and the cellular automaton can be regarded as a transformation of a cellular space and the rules defined in the space. The function is composed, as shown in Figure 2:



**Fig. 2.** The composition of the mascot cellular automaton

### 3. Methods

According to different content and dominant factors, the animation industry can be divided into "small animation", "medium animation" and "big animation". "Little ani-mation" is the definition of "animation" in the traditional sense, that is, animation + comics, which is the core of the animation industry. Without high-quality animation resources, the animation industry would be impossible

[2]. "China Animation" is the complete and mainstream form of the animation industry. It is dominated by animation resources and covers the promotion and marketing of animation and the industrialized operation of derivative products. The "big animation" is the expansion form of the animation industry. It expands the cross-border application of "anime technology" based on "Chinese animation" and is a shift from "anime content derivative" to "anime technology radiation". In the development concept of "big animation", animation 3D technology and virtual reality technology are not only suitable for animation production, but can also be combined with other industries to form new crossindustry animation formats, such as medical animation, educational animation, news animation, military animation, etc. Because the animation art itself has the characteristics of being vivid, lively, and easy to get the attention and likes of the audience, the application prospect of animation technology in other industries is very broad, and the animation industry has an extremely rich extension. On the one hand, the concept of "big animation" is proposed to solve the long-standing development shackles of the animation industry; on the other hand, it is also to realize the deep application of animation art and animation technology. If you want to have breakthrough development, you must consider the rearrangement of industrial strategy [11].

In the construction of sports venues, many school venues have been renovated, and new venues with technical content are built. The former sports venue "Water Drop" is still the representative of this competition venue. The "Water Drop" stadium is responsible for the opening ceremony and track and field competition. Consider the Euclidean distance. For two-dimensional cellular automata, it is widely used and divided into the following three divisions, as shown in Figure 3.

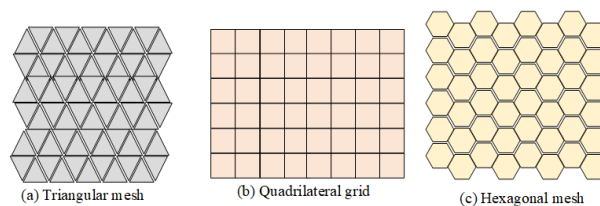


Fig. 3. Three mesh divisions of dimensional cellular automata for sports events

The slogan of the sports event is "Fitness for the whole people, the national games benefit the people", which is the biggest policy culture in the whole preparation plan of the sports event. The Organizing Committee of Sports Events uses two development concepts that are mutually linked and mutually reinforcing, not only to reveal the relationship between the masses and sports, and between sports events and the masses, but also to respond to the country's demands for sports reform, and to closely link it with the goals of sports reform, and gradually realize the development vision of "National Fitness, National Games Benefiting the People". In addition, according to the interviews with relevant event operation experts and field investigations, the city government and the sports event organizing committee have fully demonstrated that the city government and the sports event organizing committee have fully used the combination of market regulation and macro-control in the operation of major sports events. The ability to mediate and dispatch shows the scientific Ty and effectiveness of market and regulation in event operation under the new situation. We divide the neighborhoods of the two-dimensional cellular automata into the following four types with the most used quadratic grid division. As shown in Figure 4.

The shape of the mascot is a very important part of the appearance of the mascot of a sports event. The shape of the shape refers to the basic movement shape in the shape. The development and influence of mascots for major sports events are constantly expanding. As the image ambassadors

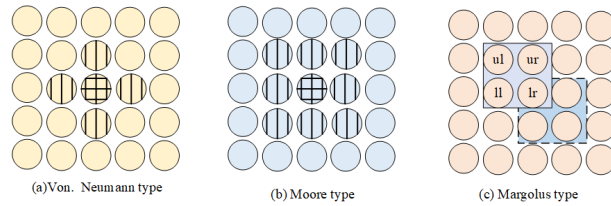


Fig. 4. 2D cellular automata neighborhood partitioned by quadrilateral grid

and superstars of major sports events, the popular mascot products will appear in every different arena and take on different shapes. With the development of the times, the mascots of sports events are also constantly developing and changing. The shape of the mascot itself is developing from static to dynamic, and more and more emphasis is placed on personal subjectivity and the play of imagination. The optimization process of the cellular genetic algorithm is shown in Figure 5.

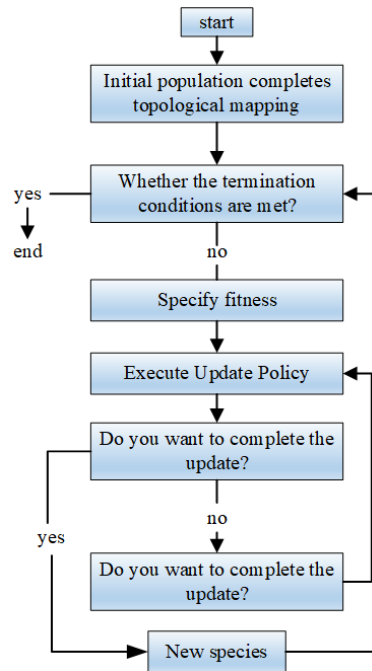


Fig. 5. Optimization process of cellular genetic algorithm for popular mascot products

The charm of sports lies in the continuous movement of human beings to break through themselves, and sports have been recognized all over the world with its unique attraction. With the increase of sports items and the development of science and technology, the styling design of popular sports mascot products is also more dynamic and diverse. Bold and exaggerated dynamic shapes will make the mascots lively and lovely, so the dynamic modeling features in the mascots of sports events are far more eye-catching than the static modeling features. In addition to the basic dynamic shape features walking, running, and jumping, there are also some dynamic shape features that tell people very clearly its form and game items, such as welcome, jump, and run. Figure 6 shows the mutation operation process of selecting a regular expression as the mutation object, and the mutation generates a regular expression, which represents the ratio  $\pi$  in the formula.

Figure 7 shows the optimization of the components of the popular mascot products. The games mascot explosion products with real modern significance did not exist from the beginning but were the product of a certain stage of social development. Because there are many types of sports games, it is necessary to trace the time when the mascots of a specific sports event are produced to find

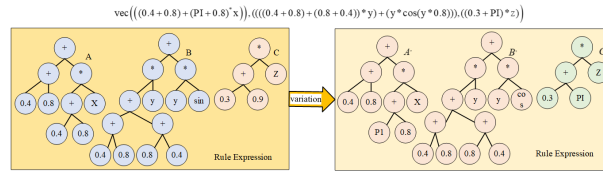


Fig. 6. The expression of selection rules for popular mascot products

out the answer according to the specific classification of a certain sports event. Taking the most representative sports events as an example, it is divided into winter sports events and summer sports events. Figure 8 is the algorithm flow chart of the mascot explosion product implementation.

To sum up, as an external visual symbol, mascot can stimulate people’s visual nerves and meet people’s visual aesthetic needs. It is a special visual symbol with symbolic and metaphorical meanings. Only after people accept and recognize the external image of the popular mascot product, can the distance with people be shortened, and then the deep symbolic meaning can be conveyed.

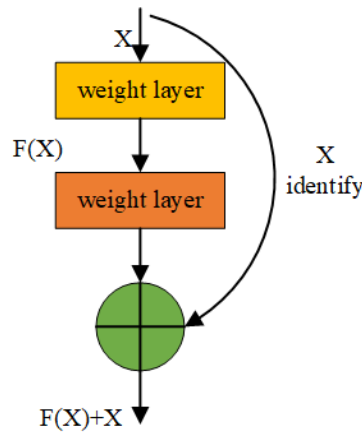


Fig. 7. Optimization of the components of popular mascot products

### 4. Case Study

With the development of society, popular mascot products can be seen everywhere in sports events, Asian Games, University Games. How to make the design of commercial mascots more in line with the current market demand. In a nutshell, first, it must be unique in shape and beautiful in color. The graceful and unique shape is like a skilled dancer, dancing lightly and dancing lightly, which is intoxicating. Beautiful and generous colors will become a prerequisite for attracting people. Only by first attracting the audience can there be in-depth promotion in all aspects, and the experts’ scores on the modeling are shown in Table 2.

Modelling/index	Average score of beauty degree Bea	Ori average score of modeling creativity	Average of total score
No.7 shape	78	84	82
No. 7 new style	83	85	84
Model 12	81	81	81
New model 12	81	85	83

Table 2. The scoring results of the mascot popular product coding style

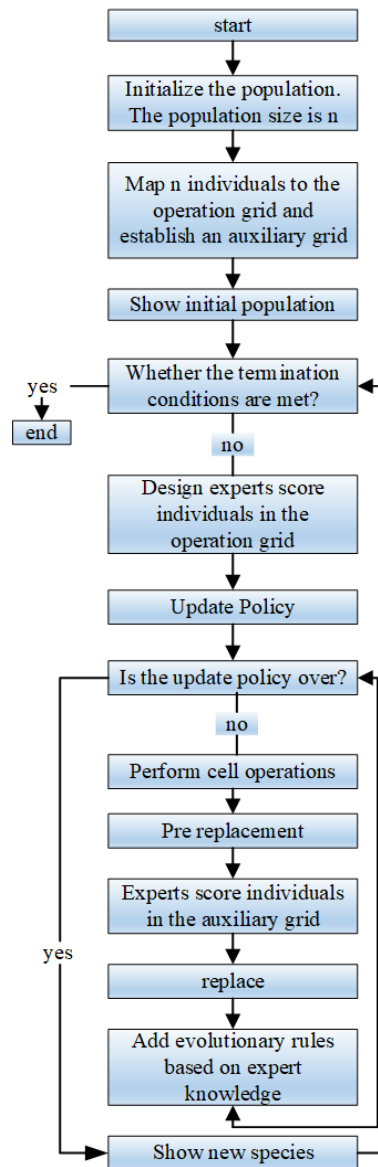


Fig. 8. Flowchart of the implementation algorithm for mascot popular products



The overall demand performance of the animation market is not equal to the enthusiasm of consumers. In the case of negative market demand, consumers are still enthusiastic, but there are also many contradictions. For example, the overall animation industry market is deserted, and consumers love animation with enthusiasm. There are many imported animations, and the output works are far away, as Figure 9.

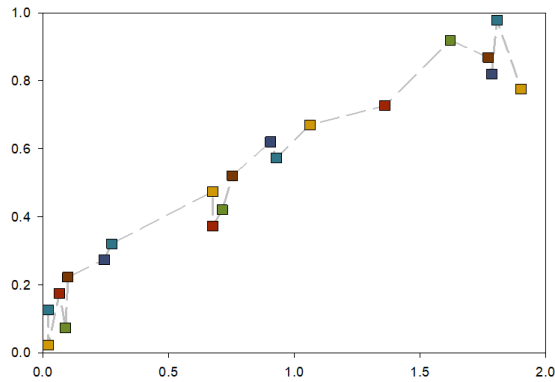


Fig. 9. The preference of animation products in different countries and regions

According to research’s statistics on domestic animation users, Japanese animation is the most popular among Chinese animation users. Whether it is animation or comics, more than 50% of Chinese animation users are fans. However, Chinese animation cultural products, with the blessing of a common cultural background, are still inferior to Japanese animations, as shown in Figure 10.

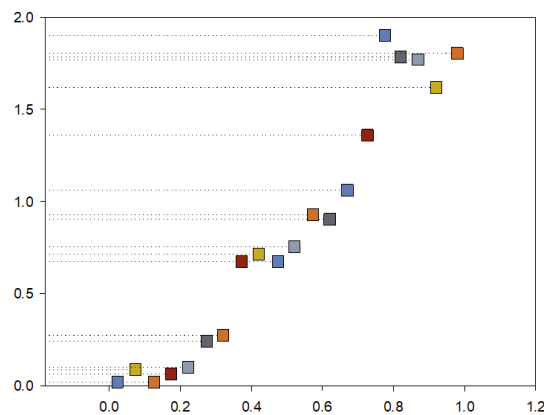


Fig. 10. In 2018, Chinese animation users believed that Guo man had defects

Passing auspicious messages, sustenance of good wishes and pursuit of happiness are inherent functions of mascots. Everyone hopes that their life can be smooth sailing and auspicious and beautiful. From the small to the smooth personal work and the family harmony, to the long-term stability, prosperity and prosperity of the country, people all have hopes and hopes for auspicious culture. Mascots are deeply embedded in people’s daily life by means of auspicious themes, inspiring people to pursue continuous pursuits, and becoming a strong spiritual driving force for positive people to work hard. The role of mascots in life is positive and inspiring. It has broken away from the super-stitious witchcraft concept of traditional mascots. Its image is bright and full of positive energy.

At this time, the "Chinese School", which has an important position in the history of Chinese original animation, has returned to its peak. But it ended in the late 1990s. During this period, the

original Chinese animation not only showed diversified characteristics in terms of works, but also improved the international awareness of animation production units. They actively went abroad to communicate with animation circles in other countries and held international animation art festivals and other activities. However, subject to the influence of the institutional environment, Chinese animation originals still belong to the nature of "cause" and have not formed an "industry". This is mainly because the original animation production units are basically state-owned institutions, and they are relatively backward in production technology, and the profit model is relatively simple, which does not reflect the marketability.

## 5. Conclusion

The complete animation industry chain includes key elements such as production, broadcasting, development of derivative products, and brand sales. However, my country's animation industry still suffers from incoordination between administrative control and market operation, limited positioning of animation channels, incomplete development of derivative products, and incompatibility of animation channels. Weak brand awareness, lack of intellectual property protection and other issues. This is also the reason why domestic animation has absorbed countless social resources but has not produced satisfactory results. China's animation industry will take on a more complex and exciting form. But there is no doubt that soon, China's animation industry will surely take off with the full rejuvenation of China's film and television market, until it is on par with the United States, Japan and other animation powerhouses, recasting the glory of domestic animation. It is hoped that through the research of this topic, everyone will realize that the design of sports mascots should fully consider its potential huge commercial value in advance, so that the design can better serve the economy, and design more and better people's aesthetics. The excellent sports mascots that meet the needs of people's regional culture and consumers' needs provide reference.

## References

- [1] İ. İ. Arıkan, S. Ekici, and V. Tural. Investigation of the effect of sports on media, marketing, consumption and popular culture. *Journal of Human Sciences*, 18(4):644–656, 2021. <https://doi.org/10.14687/jhs.v18i4.6184>.
- [2] V. Bodolica, M. Spraggon, and H. Badi. Extracurricular activities and social entrepreneurial leadership of graduating youth in universities from the middle east. *The International Journal of Management Education*, 19(2):100489, 2021. <https://doi.org/10.1016/j.ijme.2021.100489>.
- [3] J. Byun and B. Leopkey. A resource-based view of post-games legacy strategy: the case of the 2018 pyeongchang olympic games. *Sport in Society*, 24(12):2139–2158, 2021. <https://doi.org/10.1080/17430437.2021.1991324>.
- [4] I. Chiabaut. Tokyo 2020 official mascots and their contribution to the promotion of japan's culture and legacy. *Diagoras: International Academic Journal on Olympic Studies*, 5:88–100, 2021.
- [5] L. R. Davis-Delano, J. P. Gone, and S. A. Fryberg. The psychosocial effects of native american mascots: a comprehensive review of empirical research findings. *Race Ethnicity and Education*, 23(5):613–633, 2020. <https://doi.org/10.1080/13613324.2020.1772221>.

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- [6] J. Horvat. From paul the octopus to achilles the cat—proper names of animals which predict the outcomes of sports competitions. *Folia onomastica Croatica*, (29):73–121, 2020. <https://doi.org/10.21857/mwo1vcjv7y>.
- [7] K. Lee and J. A. Johnson. Ambush marketing in sport taekwondo and how to prevent it. *Ido Movement for Culture. Journal of Martial Arts Anthropology*, 20(4):7–14, 2020.
- [8] D. Lemus-Delgado. International sports events and national identity: the opening ceremony of the taipei universiade. *Sport in Society*, 24(7):1093–1109, 2021. <https://doi.org/10.1080/17430437.2020.1732929>.
- [9] D. Martínez Cevallos, M. Alguacil, and F. Calabuig Moreno. Influence of brand image of a sports event on the recommendation of its participants. *Sustainability*, 12(12):5040, 2020. <https://doi.org/10.3390/su12125040>.
- [10] X. Meng et al. Analysis and enlightenment of sports competitions in suzhou. *Journal of Human Movement Science*, 2(3):54–58, 2021. <https://dx.doi.org/10.23977/jhms.2021.020310>.
- [11] X. Meng and X. Meng. The international communication of cultural symbols in the construction of china’s national image. *National Image: China’s Communication of Cultural Symbols*:131–178, 2020. [https://doi.org/10.1007/978-981-15-3147-7\\_5](https://doi.org/10.1007/978-981-15-3147-7_5).
- [12] T. Pianese. Interpreting sports events from a resource-based view perspective. *International Journal of Sports Marketing and Sponsorship*, 22(2):240–261, 2021. <https://doi.org/10.1108/IJSMS-09-2019-0095>.
- [13] V. Radomskaya and P. L. Pearce. Adding character: the role of destination mascots in tourism development. *Tourism Management*, 84:104248, 2021. <https://doi.org/10.1016/j.tourman.2020.104248>.
- [14] T. Rocha Beardall. Settler simultaneity and anti-indigenous racism at land-grant universities. *Sociology of Race and Ethnicity*, 8(1):197–212, 2022. <https://doi.org/10.1177/233264922111037714>.
- [15] A. Ross and D. Nieborg. Spinning is winning: social casino apps and the platformization of gamble-play. *Journal of Consumer Culture*, 21(1):84–101, 2021. <https://doi.org/10.1177/1469540521993931>.
- [16] I. Theodoropoulou and J. Alos. Expect amazing! branding qatar as a sports tourism destination. *Visual Communication*, 19(1):13–43, 2020. <https://doi.org/10.1177/1470357218775005>.