

Study on the Wushu Motion Analysis and Optimization Method based on Data Mining and Clustering

Xianghui Gong

College of Sports Science, Mudanjiang Normal University, Mudanjiang 157011, China

**Corresponding author(E-mail: mdjgxm@163.com)*

Abstract

The grey relational analysis prediction model can be used to analyze the small sample data and avoid the influence of normal distribution. In this paper, the author analyse the Wushu motion and optimization method based on data mining and clustering. By analyzing the characteristics of the martial arts competition, we can strengthen the focus on the key movements in the training process. At the same time, the use of database technology can make a reasonable arrangement of martial arts, and provide some reference for students' classroom learning. Overall, the application of modern technology can provide an effective way for Wushu competitions and classroom teaching.

Key words: Data mining, Cluster analysis, Wushu action, Scientific method

1. INTRODUCTION

From the technical development of today's Changquan project point of view, with the increase of the coaches scientific training and athlete's physical quality, technical system and exercise style more and more to present the development tendency of modern higher and more difficult, more beautiful, updated. In the training, the trainer pays attention to the athlete's movement, requests the movement not only the difficulty, the beauty, but also pursues the novelty. In the competition, athletes in order to create excellent sports performance, not only the pursuit of high quality finishes action, more attention to new and beautiful action. These are the single action or a combination of artistic charm in the routine, the connection between actions and action of the increase, and the emergence of a large number of repetitive motion, it lost some of its traditional charm of changquan. In the artistic beauty at the same time, ignoring all the action content arrangement, Changquan traditional culture is less and less. Therefore, the current Changquan seems to be a piece only has the external beauty and inner beauty without art. From the concept of "Changquan, in Changquan technology should have a variety of technical movements in many martial arts in particular, to attack and defense China essence highlights martial arts, this is the life source of the development of Modern Wushu, leaving the essence of Wushu routines, the development of modern technology will be the source of water, without trees, the China ancient nationality traditional sports lose their true colors". Therefore, we should not leave the Changquan technical requirements range, bold innovation, make it become rich in content, Wushu competition project is more significant. At the moment, the development of Competitive Wushu is facing a critical period of reform. Changquan is an important part of competitive martial arts, is also facing a crucial transition period of development. Review the past, future oriented, adheres to reform and innovation, is the only way which must be passed to maintain the development of Changquan technology. Therefore, the research and analysis of the trend of technology evolution of Changquan competition rules and perfection of Wushu Changquan project development and training not only has a certain theoretical significance, but also has strong practical significance and practical value.

Study on the trend of Wushu Changquan technology development objective is: first, review and analysis of prototype and transformation technology of Wushu Changquan, effects of competition rules on the development of Changquan technology. Second, some of the factors in the development of technology is not conducive to the systematic analysis of the development trend of the technology and competitive Changquan technology existing in the development of. Third, put forward relevant proposals conducive to the development of Changquan technology. As the competition rules of Changquan standard for evaluation with the requirement of continuous improvement, to promote the development of Wushu Changquan technology and its technical training to provide theoretical reference. Wushu competition routines prompted one of the project's Changquan both have strong living space, and can adapt to the development of International Wushu, so as to promote the promotion of the Chinese martial arts and martial arts to accelerate the pace of internationalization. Wushu is the quintessence of our country. It has a long history, extensive and profound, and is a wonderful flower in the splendid culture of the five thousand year of the Chinese nation. After thousands of years of martial arts in the history of the scouring, the development so far, China's martial arts movement, many schools have different styles, finishing on boxing as many as 130 species, which has a good basis for the masses. Chinese Wushu is a national sport, it is also with Chinese traditional philosophy, ethics, medicine and military science and other related, not only has

the function of general sports fitness regimen, but also has the general sports incomparable educational and cultural value. Internationally, Chinese Kungfu has almost become a representative of Chinese traditional culture and is well known to people all over the world. Competitive Wushu is an important part of China's competitive sports, plays a leading role in the development of Wushu, it is China's "Olympic Plan" in all 28 sports in the only one with a distinctive oriental culture of traditional ethnic sports. It is also the only non Olympic event in China's national games. In order to make Wushu develop faster and better, the relevant departments want to popularize wushu through the most influential Olympic Games in the world sports events. To this end, the relevant departments have done a lot of work, but the martial arts movement failed to apply for inclusion in the Olympic Games official event. In this case the development of Wushu is facing a severe test, martial arts to develop innovation on the basis of the original reform, as an important part of Competitive Wushu Changquan project is no exception. Therefore, the significance of this study are as follows: its theoretical significance lies in understanding the development trend and the factors influencing the development of Changquan technology; its practical significance is to score as the competition rules Changquan standards and regulations required to improve continuously and promote the development of Wushu Changquan technology and its technical training to provide theoretical reference. The development of Competitive Wushu in China since the founding of new China, if many martial artists contribute no national characteristics of the sports system and work together for the development of Wushu construction, there is no rapid development of China's sports wushu. In just a few decades, the creation of competitive martial arts is something that many martial arts experts have never expected. All this is the result of correctly formulating the Wushu development strategy and correctly handling the relationship between Wushu and economy, culture and education. The competitive Changquan is facing the key period of the reform in the course of its development, can learn from different in different periods, to promote the reform and development of the theory and technology of changquan. To help clarify ideas, grasp the development trend in Changquan technology based on the deep analysis of the affecting factors existing in the process of technology development in changquan. Draw some useful inspiration and explore the correct way of development.

Access to all kinds of sports journals, newspapers, books, sports and China journal full-text database search found that our existing research on Changquan technology, mostly concentrated in the teaching and training, and the difficulty of development, especially in the aspect of teaching, there is very little from the rudiment of Changquan technology, has been given to evolution now a complete overview, which is the theoretical basis of our lack of martial arts development. Therefore, expect to be able to review in different period different from Changquan reform course, found the factors that influence the Changquan technology development, as the competition rules and requirements of Changquan standard for evaluation and constantly improve and promote the development of athletic training with Changquan technology and its technology meager strength.

2. DATA MINING AND GREY SYSTEM THEORY

2.1. Gray level information association

The grey system theory to grey number based on grey prediction and grey decision is divided into two parts, including grey prediction using grey prediction model as the core, and the grey decision including grey situation decision, grey hierarchy decision model and grey relational decision, based on the data collection, processing, evaluation, modeling and prediction technology of decision system. In the course of general production and research, researchers in different fields will face different systems, such as macroeconomic systems, financial systems, environmental assessment systems, and crop growth environment systems. The frequently used statistical correlation analysis and regression analysis to study the relationship between different factors of the same system, but requires a large sample data and normal distribution. Sometimes, the available data does not necessarily satisfy the above two conditions. At this point, the grey relational analysis makes up for this deficiency. Grey relational analysis method is based on the principle of geometric proximity and the degree of correlation between factors. This method is known for its requirement of less data points, no linear relationship and typical distribution, and is very popular in practice". The grey correlation analysis is to find the eigenvalues and calculate the correlation coefficients after the dimensionless processing of the reference sequence and the comparison sequence, and find the main factors after comparing the resolution.

If the original data set is very large scale that not a complete read into memory cluster, you can first on a data set of data identification, summarizes some of the data, in order to reduce the memory space occupied by the data, realize the clustering of large data sets. Iterative educing and Clustering Using Hierarchies Balanced is an integrated hierarchical clustering algorithm. Its biggest feature is the use of limited memory resources for efficient clustering of large data sets, while minimizing the cost of I/O. BIRCH algorithm firstly stores the data set in a compact compressed format (clustering feature tree), and then directly on the compressed data structure, and does not need to cluster the original data set. The I/O cost of the algorithm is linear with the size of the data

set. In general, the single pass scan data set can get better clustering results. Optional follow-up of multiple scan can further improve the quality of clustering. In the micro clustering stage, the BIRCH method is characterized by CF (Feature Clustering) to describe a cluster, forming a CF tree. CF tree cannot be more than the amount of information loss in the premise, compression hierarchical structure of the cluster.

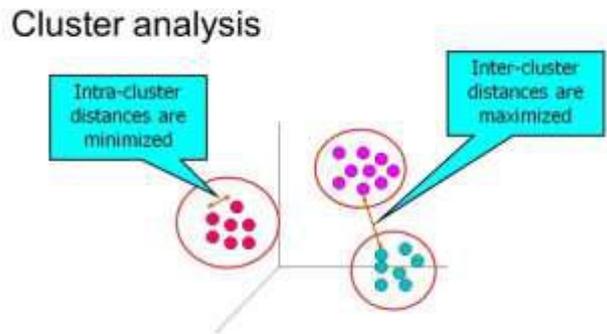


Figure 1. Cluster feature

2.2. Data mining

Data mining is an important part of knowledge discovery. It is found that the data mining is done through the establishment of the mining model and the corresponding algorithm. Nowadays, many kinds of models and algorithms of association rules, classification, clustering, and decision tree and so on are provided in order to select and use. Sampling is a classical statistical technique, has been studied for over a hundred years of history, especially the random sampling technique, there are many basic principles, and describes the effectiveness of random sampling.

In the field of data management, a small part of a subset of data sampling can capture the basic features of the data through extraction to represent the total data set, and according to the sample set to obtain approximate query results, or based on the data mining of the sample set. Figure 1 is a representative sampling method of classification in data mining. The probability is selected according to the data items are the same, the sampling method can be divided into uniform sampling and sampling bias of two. As the name suggests, in the uniform sampling each data item in the same probability of being selected in the sampling bias, selected probability of different elements may be different.

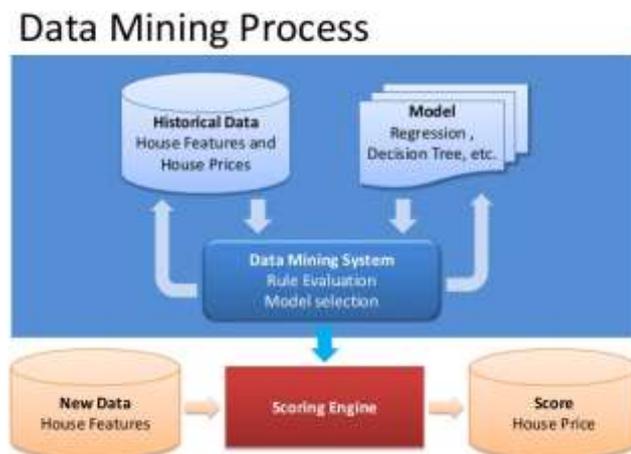


Figure 2. Data mining process

3. RESEARCH DESIGN

3.1. The development of competitive Changquan

In accordance with the standard for evaluation standard for evaluation and regulations enacted in 1973, the competition rules of Wushu Changquan requirements established in 1959 and 1960 the competition rules of Wushu Changquan requirements for a big change, the standard for evaluation by a slight error reduction; significant error reduction; serious error reduction. According to the framework; balance, jump and somersault;

strength; technology content classification coordination, rhythm, spirit, method, style and martial arts routine arrangement and set the corresponding score score. At the same time, a score of "complete difficulty and creative difficulty" was set up. The full set of finishing times has also been adjusted. Standard for evaluation and the provisions of the 1979 the competition rules of Wushu Changquan project requirements were revised based on the 1973 rules, revised the standard for evaluation of the value set is divided into three parts to score.

Until after the 1979 version of the 1991 version of the standard for evaluation of Changquan project without major changes, but for the wrong points scores were adjusted to improve, such as the 1979 rules there is no provision on intentional potential and potential delay time points, the game can not be stopped by the rules, and the rules on 1984 this situation points to be limited by, and other aspects in the redo revisions and full completion time changed to adult group shall not be less than 1 minutes and 20 seconds, children were not less than 1 points. Specific content, score score distribution and completion time of the 1996 national martial arts work conference, in order to improve the competition mechanism, and improve the accuracy of Wushu competition score distinction, promote high, difficult, beautiful, new technology development, adhere to the traditional style of martial arts technology and standardization, and constantly improve the level of competition, by the martial arts movement the management center organized the preparation, examination and approval of the National Sports Commission, issued the 1996 "Wushu competition rules". The scoring method rules and standards in 1996 and 1979 Changquan 1991 version of the rules changes, before several versions of the rules, the score of Changquan: action specifications score 6 points, strength, coordination score 2 points, spirit, rhythm, style, content, structure, layout score of 2. While the 1996 rules will be changed to the standard for evaluation of long boxing movement scores 6.8 points, level of exercise (skill level skills score 1 points, score 1.5 points, the arrangement score 0.5 points) score 3 points, again added innovation difficulty score 0.2 points. At the same time the 1996 rules also stipulate the specified action Changquan competition, will complete the full time fine-tuning for adult group 1 minutes and 20 seconds, 1 minutes and 10 seconds, the young group of children group 1. With the July 13, 2001 Beijing Olympic success of Wushu in order to integrate with the international and Olympic Games, Olympic Games, technology internationalization direction, as one of the Olympic Games for the martial arts to create conditions.

The Wushu Management Center organized the preparation of the 2003 "Wushu competition rules", standard for evaluation of Changquan has made great changes, cut to movement quality; performance level; the three part points to the difficulty. Moreover, the drill level has three grades and nine scores, and points according to the athletes' drills. The degree of difficulty is also set by the degree of difficulty, and different grades of difficulty can be successfully completed, and the corresponding score can be obtained. The specific action specified in the 1996 rules was cancelled, and the difficulty of innovation was added. The standard for evaluation stage Changquan has made great changes, on the basis of the original put forward higher requirements, and detailed rules, strengthen the operability. To match the rapid development of changquan. Specific content, score score distribution and complete the technical characteristics of time to action specifications from analysis of modern competitive Changquan, I refer to a lot of literature, with the analysis and research of different specifications of the action, the author mainly from the upper and lower limbs, torso and head and face four of everyone are analysed and detailed. Through the analysis of these four aspects, it basically covers the technical movements of each part of the body, and has certain practicability.



Figure 3. Competitive Changquan

3.2. Game analysis

Technical features s of Wushu Changquan project on the upper areconverted achievement is "loose" and "straight", "fast". The pressure "pine" is shoulder to relax. Only shoulder to relax in order to better show a range of motion, Changquan technology strength and speed, and the pressure is on the contrary. Changquan demands action is continuous, smooth and elegant, if the shoulder stiffness is difficult to achieve such a request. The

pressure "straight" is the arm straight. Wushu requires one inch longer, if the arm can not be completely straight, then the pressure force cannot be sent and cannot Shunda, farther hit each other, reach far and long strike purpose. The pressure is especially beginners, in practice when the arm must be fully extended, to develop a good habit, so that players in the W after exercise stress free, high competitive level. "Fast" is the. The Wushu practice often requires players to practice when shake the wrist, palm, left hook swing and other techniques, the purpose is to strike more swift and free. At present, the movements of Wushu show mainly the spirit, the fast, the living and the essence of the movements.

The lower limb movement is mainly reflected in the knee, foot and leg pressure, footwork. The requirement for the legs is straight". A lot of martial arts action are required, such as leg movements, when practicing kicking players are not able to straighten legs bent, as well as to sweep leg, leg, flexion and extension of various step type, are required to fork down the leg straight. The knee is the requirement of "very", but legs and knees are closely linked, closely pressure ring. If the knees are straight, the legs naturally straighten out. However, if no pressure on the knee of the soft needle at the beginning of training and on foot, is you think straight, will also give a slight curved feeling, W knee exercise is an indispensable link. Rhythm is a regular, continuous form of complete movement. Modern martial arts rules require a clear rhythm. Rhythm is the soul of martial arts, the routines appear to be full of vitality, full of infection, in the speed, the actual situation, flexible changes, ups and downs in the transition to show the vitality of life. Changquan rhythm is a comparison of various movements in speed, flexible, ups and downs, weight, length, cadence, structure elements, various elements are alternately combined into certain laws. Its rhythm is influenced by many factors, such as time, space, physical quality, basic skills, Wushu consciousness, essence of Qi, routine arrangement, etc.. The so-called relativity refers to only static action, fast slow, there are just soft, there is only a virtual reality, including the only exhibition, to have a clear reference, isolated side reflects the movement rhythm changes. Inverse refers to the first move to static, fast slow, just want to first soft, but first to empty, to contain first show, then quickly fast out fast, slow and slow also appears to be soft.



Figure 4. Wushu Changquan

The difficulty of kicking Changquan rules is not many, but the practice is not easy, not a few years of practice, it is difficult to achieve the requirements of the rules. Before the sweep the leg is usually left leg squatting, right leg sweep, squatting leg required clamping, heel lift, and turn leg must be De Nobunao, not from the soles of the feet, the legs turn to sweep is skillfully fastened, in turn must sweep straight trunk, neck and head, not crooked, waist, belt at the same time, sweep the leg to the shoulder also rotates, the W need to sweep the leg exercises before a good coordination, leg strength, and also the ability to control nuclear sites, to high quality finish leg difficulty. After the years of teaching and competition, the provincial competition, national competition even athletes in world competitions are generally not used for leg difficulty, unless to do. Because of the difficulty of leg points deduction is very easy to produce, that is sweeping in the process if the sweep turn leg soles of the feet off the ground is deducted, we think, in the process of sweeping round or semi clever half circles, if not feet off the ground, it is bound to friction between the foot and the ground will increase, and turn blocked, not easy and if you want to reduce the friction angle of the whip, will let the feet leave the ground, but it will be a loss, now the athletes in training and competition rarely choose leg difficulty, is to reduce the unnecessary points

4. CHANGQUAN COMPETITION RULES

At the same time, Changquan technology development conforms to the development direction of "difficult new", difficulty movement has become the development of modern technology of Changquan in a indispensable. Changquan technology will be the future development of adhering to the action specifications of high quality, difficulty of movement, exercise art, choreography and development direction of new development. However, excessive emphasis on the difficulty of movement, exercise reflects the beauty of art, routine choreography requires innovation. While ignoring the embodiment of Changquan technique features, which is unfavorable to the development of Changquan technology. There is a basic skill of specification error reduction action specifications other errors increase; pay attention to exercise routines of beauty, ignore the content arrangement; the pursuit of high coefficient of difficulty movement, increase the rate of injury of athletes. The development of solving these unfavorable factors and is closely related to the technology of changquan. We should recognize that the increased difficulty in the development of Changquan technology, promote exercise art, encourage choreography and innovation at the same time, we should highlight the characteristics of techniques so as to promote the development of Changquan, Changquan technology, the technology of Changquan toward the positive direction.

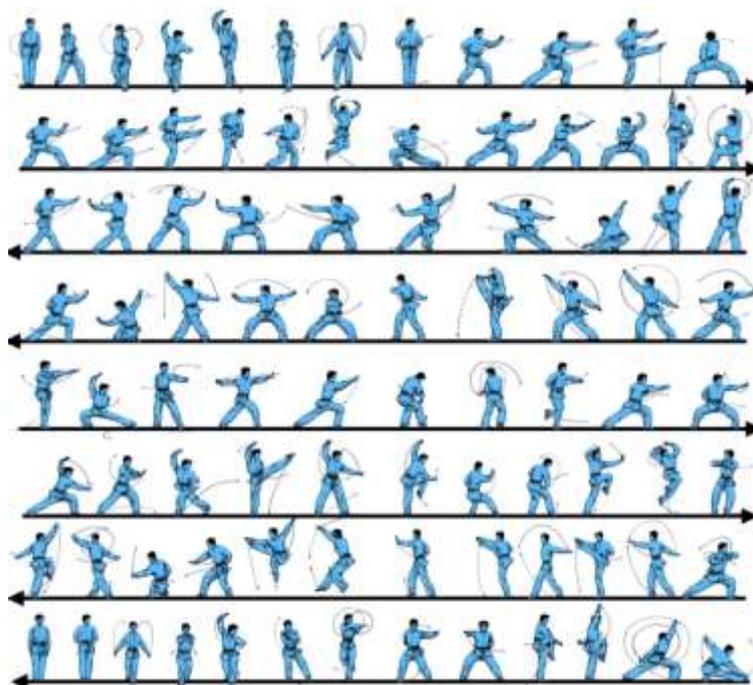


Figure 4. Changquan action

Strengthen physical fitness exercises, improve the quality of movement, with the implementation of the rules of martial arts competition in 2003, the difficulty of movement scores increased. With substantial difficulty in increasing number of changquan. The scores of difficult movements are high and the techniques are complex, especially depending on the physical fitness of the athletes. Because the athletes' physical quality can not reach the level of the high degree of difficulty coefficient movement, there will always be instability in the completion of difficult movements, leading to the emergence of errors. The so-called action specifications of other more errors occurred in the movement difficulty after the fall of the action set, such as: "the tornado foot 720 degrees by horse, because leg strength weak or inadequate control of body rotation leads to complete shake, roll, feet moving or bouncing, additional supports other action specifications after landing wrong points set". At the same time, it also affects the integrity of the whole set of movements. In order to avoid this phenomenon, affecting the development of Changquan technology. In a short period of time to improve the quality of action, the effective way is to improve physical fitness. Take the 720 foot whirlwind of the difficult action as an example. The action is completed according to the error analysis. The whirlwind foot 720 degrees can be divided into three steps, namely, foot jump, air lift and landing. Is the foot jump method is wrong or vacated when the body tilt, etc., after finding the problem, out of the corresponding training methods to solve.

Changquan practice function, with exercise and improve the physical quality of the efficacy. Often through the exercise can have a good impact on cardiac function, improve the cardiac reserve capacity, and enhance the overall quality of the body. However, in 2003 the State Sports General Administration of sports management center to develop the Wushu competition rules for new rules, comply with the "direction of the development of new technology difficult". Difficulty score is greatly improved, the Changquan competition is more intense, in

order to obtain the excellent sports performance difficulty action is widely concerned, the difficulty coefficient gradually rising. Athletes in the continuous pursuit of hard training difficult movements, due to various factors, athletes in training difficult movements in the injury probability increased greatly, causing harm to the body. In order to get the honor of Changquan must have difficulty movement arrangement. Therefore, the original has the function of body-building of Changquan, has risen by physical damage probability of practitioners. The reason is nothing more than the difficulty coefficient of difficulty is too high, and the complete difficulty Changquan, depends on the quality of athletes. The body is weak and does not undergo the ability to complete the action, resulting in training injuries. In order to avoid the probability of training injury, on the one hand, in training, according to the actual injury situation of athletes, strengthen the exercise of the local physical quality.

5. CONCLUSIONS

The rules of competition are the development of Wushu Changquan technology oriented, the implementation of the new rules has a greater impact on the technical content of changquan. Based on the development trend of Changquan technology video and questionnaire analysis, that in the action specifications. No matter how to modify the rules, the development trend in one direction, the movement specification has been Changquan eternal theme in the process of Changquan technology development. To prove this trend, the action of Changquan specifications in the future development of Changquan technology will also be immutable and frozen. In rehearsal. In order to improve the Changquan routine view, make the game more exciting Changquan, can attract more audience, Changquan drills and other movements tend to reflect the beauty, structural beauty, harmonious beauty and movement beauty artistic charm. The pursuit of artistic beauty will be the development trend of exercises. In order to make the Changquan competition more comparable to increase the difficulty, difficulty movement technology is more complex, there is always a complete athlete instability. So that the outcome of the game is unpredictable, as fierce competition to cast a veil of mystery, prompting more attention to Changquan events, create the opportunity to promote development.

REFERENCES

- C.Krstev, and A.Trtovac, (2014). "Teaching Multimedia Documents to LIS Students", *The Journal of Academic Librarianship*, 40 (2), 152-162.
- S.Jian-hua, L.hong, (2012). "Explore the Effective Use of Multimedia Technology in College Physics Teaching", *Energy Procedia*, 17, 1897-1900.
- R.A.Sabella, (2010). "School counselors perceived importance of counseling technology competencies", *Computers in Human Behavior*, 26, 609-617.
- N.R.Mastroleo, R.Turrisi, (2010). "Examination of posttraining supervision of peer counselors in a motivational enhancement intervention to reduce drinking in a sample of heavy-drinking college students", *Journal of Substance Abuse Treatment*, 39, 289-297.
- Z.Huang and M.Benyoucef, (2013). "From e-commerce to social commerce: A close look at design features", *Electronic Commerce Research and Applications*, 12(4), 246-259.
- C.Zhang, X.Chen, (2012). "Use of Multimedia in Gross Infective Pathogen Experimental Teaching", *Procedia Engineering*, 37, 64-67.
- W.Dai, L.Fan, (2012). "Discussion about the Pros and Cons and Recommendations for Multimedia Teaching in Local Vocational Schools", *Physics Procedia*, 33, 1144-1148.
- R.Khansa, (2015). "Teachers' Perceptions toward School Counselors in Selected Private Schools in Lebanon", *Procedia - Social and Behavioral Sciences*, 185, 381-387.