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Taekwondo player's physical quality evaluation mode research based on fuzzy theory

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Abstract

South Korea is the origin of Taekwondo, now the event has been organized among more than 100 countries, due to it can alternate hands with legs, refine internally and externally as well as flexible and practical features, it is well received by many countries in the world, with taekwondo widely spreading in international, more and more scholars carry out research on taekwondo players' special physical quality. Just under previous influences, the paper applies fuzzy mathematical method to make research on taekwondo multiple training methods that decide their physical qualities, meanwhile it also establishes every kind of method corresponding parameters equations, finally, input fuzzy mathematical quality evaluation model into concrete examples, so that it solves overall quality evaluation mode problems affected by multiple factors.

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INTRODUCTION

With social development, more and more attentions are paid to personal safety problems, so every people want to learn a kind of self-defense methods, taekwondo has been praised, moreover, Olympic Games taekwondo development also advances rapidly, which cannot do without scholars' researches on taekwondo player's overall quality evaluation mode, the quality includes special physical quality and general physical quality, from which special physical quality is every taekwondo player technical applying basis.

To taekwondo overall quality evaluation mode's researches, lots of people have made efforts, and got achievements, which provides beneficial conditions for scholars from all circles of society researching and impetus for taekwondo development. Such as: Bai Yun-Feng, Li Yan two people proposed that if two athletes special physical qualities were very approximately, then big strength one would have more advantages, therefore they should focus on strength intensifying at ordinary time training; Li Xiao-Hui presented that taekwondo player's strength training should possess periodical speed strength training features; Shang Ying-Qiu and Zhang Qi-Hua as well as others based on previous research, they further made researches and concluded body flexibility, sensitivity, strength, speed and endurance as well as others physical quality training that play main roles in special level.

The paper based on previous research results, it

KEYWORDS

Taekwondo player; Quality evaluation; Fuzzy mathematics; Factor analysis.

(4)

analyzes taekwondo player's overall quality influence factors, discusses fuzzy mathematical algorithms, and provided theoretical basis for it, and meanwhile it uses practical experiences to verify the model rationality and efficiency.

FUZZY MATHEMATICAL COMPREHEN-SIVE EVALUATION MODELS

Taekwondo overall quality evaluation suffers many kinds of factors influences, but these factors have fuzzy and uncertainty, apply previous method is difficult to make evaluation, we present fuzzy mathematical comprehensive evaluation model to more reasonable establish students' physical qualities comprehensive evaluation system. The model relative theory is a method that makes use of maximum membership (remark) and fuzzy linear transformation principle to construct fuzzy comprehensive evaluation basic thought, on the condition of extreme fuzzy, we consider evaluated things related multiple factors influences, so that realize some purpose of making relative reasonable comprehensive evaluation on another kind of things. By using fuzzy mathematics, it carries out comprehensive evaluation methods and steps:

At first, it should define evaluated objects that are individual variable affected by n pieces of factors, and its factor set is u, definition is:

$$\mathbf{u} = (\mathbf{u}_{1,}\mathbf{u}_{2},\mathbf{u}_{3},\cdots,\mathbf{u}_{n}) \ \mathbf{u}_{i}(i=1,2,3,\cdots,n)$$
 (1)

Due to each variable weight is different, influences degrees are different to defined judgment grade, we assume its weight allocation is a_i , and:

$$a_i = (a_{1,i}a_{2,i}a_{3,i} \cdot a_n), a_i (i = 1, 2, 3, \cdots, n)$$
 (2)

know $a_i \ge 0$ and $\sum_{i=1}^n a_i = 1$.

If every factor a_i includes m pieces of sub factors, its factor set is:

$$\mathbf{u}_{i} = (\mathbf{u}_{i,1}, \mathbf{u}_{i,2}, \mathbf{u}_{i,3}, \cdots, \mathbf{u}_{i,m})$$
 (3)

Then corresponding weight value is: $a_i = (a_{i,1}, a_{i,2}, a_{i,3}, \dots a_{i,m})$

To $u_{i,j}$ weight value a_i , according to common

sense, it is clear
$$a_{i,j} \ge 0$$
 and $\sum_{j=1}^{m} a_{i,j} = 1$

Establish an evaluation indicator set:

$$\mathbf{v} = (\mathbf{v}_{1}, \mathbf{v}_{2}, \mathbf{v}_{3}, \cdots, \mathbf{v}_{s})$$

Corresponding evaluation objects can be divided into *s* pieces of different grades, here, we let $v_1, v_2, ..., v_s$ to be each merits evaluation degree from high to low, such as excellent, good, qualified, and unqualified so on.

Let evaluation indicator to be $r_i = (a_{i,1}, a_{i,2}, a_{i,3}, \dots a_{i,m}) * (r_{i,1})^T$, $i = 1, 2, 3, \dots n$, get expected comprehensive evaluation result by fuzzy matrix compositional operation that is:

$$\mathbf{b} = \mathbf{a} * \mathbf{r} = (\mathbf{a}_{1,1}, \mathbf{a}_{2,2}, \mathbf{a}_{3,2}, \cdots, \mathbf{a}_{n}) * (\mathbf{r}_{1,1}, \mathbf{r}_{2,2}, \mathbf{r}_{3,2}, \cdots, \mathbf{r}_{n})$$

$$^{\mathrm{T}} = (\mathbf{b}_{1,1}, \mathbf{b}_{2,2}, \mathbf{b}_{3,2}, \cdots, \mathbf{b}_{n})$$
(5)

Judgment on fuzzy comprehensive evaluation, by $B_k = \{B_I\}$, and then B_K final evaluation result about grade is k.

TAEKWONDO PLAYER OVERALL QUALITY EVALUATION MODEL BASED ON FUZZY MATHEMATICS

Fuzzy parameters fizzing

Due to taekwondo overall quality evaluation is controlled by multiple factors, we adopt fuzzy comprehensive theoretical evaluation method that includes evaluation ordering, comprehensive evaluation, single factor evaluation, evaluation set, and factor set these five steps. Corresponding relative steps are as following:

At first, we define constructed set relative factors that we let standing long jump, sprinting, long-distance running, lung capacity, height and weight, double kick, speed, strength, coordination, sense of space and hitting effects, aggressive attack, defense and fight back, tactics application, fighting efficiency, actual combat style

are successive $u_1, u_2, u_3 \cdots u_{15}$, then constructed factor set is:

$$\mathbf{u} = \{\mathbf{u}_1, \mathbf{u}_2, \mathbf{u}_3 \cdots \mathbf{u}_{15}\} \ (6)$$

According to taekwondo overall quality evaluation

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theory, establish evaluation indicator set

 $v = (v_1, v_2, v_3, v_4) = \{excellent, good, qualified, unqualified\}$ (7) Single factor judgment

Assume u_i is tackwordo overall quality's evalua-

tion degrees indicator, and then to athlete c_j , $u(c_i, u_j)$ is influence factor.

(1) When membership is 0, and then standing long jump less than 2.3m represents bad; if distance is between 2.3 and 2.5, then real value divides by 5.0, it represents qualified now; if distance is between 2.5 and 2.7, then real value divides by 2.7, it represents good now; if distance is above 2.7m, then membership is 1 that represents excellent. Among them, we use membership to represent taekwondo standing long jump performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{1}) = \begin{cases} 1, \mathbf{u}_{1} \ge 2.7; \\ \frac{\mathbf{u}_{1}}{2.7}, 2.5 \le \mathbf{u}_{1} \le 2.7; \\ \frac{\mathbf{u}_{1}}{5.0}, 2.3 \le \mathbf{u}_{1} < 2.5 \\ 0, \mathbf{u}_{1} < 2.3 \end{cases}$$
(8)

(2) When membership is 0, then sprinting time above 14_s represents bad; if time is between 13and 14, then real value divides by 28, it represents qualified now; if time is between 12and 13, then real value divides by 13, it represents good now; if time is less than 12_s , then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo sprinting performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{2}) = \begin{cases} 1, \mathbf{u}_{2} \leq 2.7; \\ \frac{\mathbf{u}_{2}}{13}, 12 < \mathbf{u}_{2} \leq 13; \\ \frac{\mathbf{u}_{2}}{28}, 13 < \mathbf{u}_{2} \leq 14 \\ 0, \mathbf{u}_{2} > 14 \end{cases}$$
(9)

(3) When membership is 0, then long-distance running less than 4_{min} represents bad; if the time is between $3_{\text{min}} 40_s$ and 4_{min} , then real value divides by 8, it represents qualified now; if the time is between $3_{\text{min}} 20_s$ and $3_{\text{min}} 40_s$, then real value

divides by 11/3, it represents good now; if the time is less than $3\min 20_s$, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo long-distance running performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{3}) = \begin{cases} 1, \mathbf{u}_{3} \leq 10/3; \\ \frac{3 * \mathbf{u}_{3}}{11}, 10/3 < \mathbf{u}_{3} \leq 11/3; \\ \frac{\mathbf{u}_{3}}{8}, 11/3 < \mathbf{u}_{3} \leq 4 \\ 0, \mathbf{u}_{3} > 14 \end{cases}$$
(10)

(4) When membership is 0, then lung capacity less than 3700 represents bad; if lung capacity is between 3700 and 4200, then real value divides by 8400, it represents qualified now; if lung capacity is between 4200 and 5000, then real value divides by 5000, it represents good now; if lung capacity is above 5000, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo lung capacity performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{4}) = \begin{cases} 1, \mathbf{u}_{4} > 5000; \\ \frac{\mathbf{u}_{4}}{5000}, 4200 \le \mathbf{u}_{4} < 5000; \\ \frac{\mathbf{u}_{4}}{8400}, 3700 \le \mathbf{u}_{4} \le 4200; \\ 0, \mathbf{u}_{4} < 3700; \end{cases}$$
(11)

(5) We know to taekwondo player, it would be not better if weight gets heavier and height gets taller, so balance the two relations by a neutral indicator, that:

$$BMI = \frac{\omega}{h^2}$$
(12)

In above formula, height is using h to represent, weight is using ω to represent. So when membership is 0, then *BMI* which is above 30 or less than 18.5 represents physical quality is bad; if *BMI* is between 25 and 30, then real value divides by 60, it represents qualified now; if *BMI* is between 18.5 and 24, then real value divides by 24, it represents good now; if *BMI* is between 24 and 25, then membership as 1 that represents excellent. Among them, we use membership

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to represent taekwondo BMI performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{5}) = \begin{cases} 1,24 \le \mathbf{u}_{5} \le 25; \\ \frac{\mathbf{u}_{5}}{2.7}, 18.5 \le \mathbf{u}_{5} \le 24; \\ \frac{\mathbf{u}_{5}}{60}, 25 \le \mathbf{u}_{5} < 30 \boxtimes \\ 0, \mathbf{u}_{5} > 30 \& \mathbf{u}_{5} < 18.5 \end{cases}$$
(13)

(6) When membership is 0, then double kick number less than 40 represents bad; if the number is between 40 and 60, then real value divides by 120, it represents qualified now; if the number is between 60 and 72, then real value divides by 72, it represents good now; if the number is above 72, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo double kick number performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{4}) = \begin{cases} 1, x > 72; \\ \frac{\mathbf{u}_{6}}{72}, 60 \le x < 72; \\ \frac{\mathbf{u}_{6}}{120}, 40 \le x < 60; \\ 0, x < 40; \end{cases}$$
(14)

By consulting relative information, we refer to TABLE 1 sports test taekwondo testing and scoring criterion:

(7) When membership is 0, then speed scoring less than 1.4 represents bad; if speed scoring is between 1.4 and 3.5, then real value divides by 7.0, it represents qualified now; if speed scoring is between 3.5 and 4.5, then real value divides by 4.5, it represents good now; if speed scoring is above 4.5, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo speed scoring performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{7}) = \begin{cases} 1, \mathbf{u}_{7} \ge 4.5; \\ \frac{\mathbf{u}_{7}}{4.5}, 3.5 \le \mathbf{u}_{7} < 4.5; \\ \frac{\mathbf{u}_{7}}{7.0}, 1.4 \le \mathbf{u}_{7} < 3.5 \\ 0, \mathbf{u}_{7} < 1.4 \end{cases}$$
(15)

By consulting relative information, we refer to sports test taekwondo testing and scoring criterion:

I Bad: Below 1.4 score;

II Medium: 1.5score-3.4score;

III Good: 3.5score—4.5score

IV Excellent: Above 4.5score;

(8) When membership is 0, then strength score less than 1.4 represents bad; if strength score is between 1.4 and 3.5, then real value divides by 7.0,

Score	Number	Score	Number	Score	Number	Score	Number
30	80	24	70	24	59	7	49
28.5	79	23.5	69	23.5	58	6	48
28	78	23	68	23	57	5	47
27.5	77	22	66	22	56	4	46
27	76	21.5	65	21.5	55		
26.5	75	21	64	21	54		
26	74	20.5	63	20.5	53		
25.5	73	20	62	20	52		
25	72	19	61	19	51		
24.5	71	18	60	18	50		

TABLE 1 : Double kick standard performance check list

it represents qualified now; if strength score is between 3.5 and 4.5, then real value divides by 4.5, it represents good now; if strength score is above 4.5, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo strength score performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{8}) = \begin{cases} 1, \mathbf{u}_{8} \ge 4.5; \\ \frac{\mathbf{u}_{8}}{4.5}, 3.5 \le \mathbf{u}_{8} < 4.5; \\ \frac{\mathbf{u}_{8}}{7.0}, 1.4 \le \mathbf{u}_{8} < 3.5 \\ 0, \mathbf{u}_{8} < 1.4 \end{cases}$$
(16)

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(9) When membership is 0, then coordination score less than 1.1 represents bad; if coordination score is between 1.1 and 2.1, then real value divides by 4.2, it represents qualified now; if coordination score is between 2.1 and 2.6, then real value divides by 2.6, it represents good now; if coordination score is above 2.6, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo coordination score performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{9}) = \begin{cases} 1, \mathbf{u}_{9} \ge 4.5; \\ \frac{\mathbf{u}_{9}}{4.5}, 3.5 \le \mathbf{u}_{9} < 4.5; \\ \frac{\mathbf{u}_{9}}{7.0}, 1.4 \le \mathbf{u}_{9} < 3.5 \\ 0, \mathbf{u}_{9} < 1.4 \end{cases}$$
(17)

(10)When membership is 0, then space hitting effects score less than 1.1 represents bad; if space hitting effects score is between 1.1 and 2.1, then real value divides by 4.2, it represents qualified now; if space hitting effects score is between 2.1 and 2.6, then real value divides by 2.6, it represents good now; if space hitting effects score is above 2.6, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo space hitting effects score

performance:

$$\mathbf{u}(\mathbf{c}_{1},\mathbf{u}_{10}) = \begin{cases} 1, \mathbf{u}_{10} \ge 2.6; \\ \frac{\mathbf{u}_{160}}{2}, 2.1 \le \mathbf{u}_{10} < 2.6; \\ \frac{\mathbf{u}_{10}}{4.2}, 1. \le \mathbf{u}_{10} < 2.1 \\ 0, \mathbf{u}_{10} < 1.1 \end{cases}$$
(18)

By consulting relative information, we refer to sports test taekwondo coordination, space hitting effects testing and scoring criterion:

- I Bad: Below1.1score;
- II Medium: 1.1score-2score;
- III Good: 2.1score—2.6score
- IV Excellent: Above 2.6score;

(11) When membership is 0, then aggressive attack

score less than 6.1 represents bad; if aggressive attack score is between 6.1 and 8.1, then real value divides by 4.2, it represents qualified now; if aggressive attack score is between 8.1 and 9.0, then real value divides by 2.6, it represents good now; If aggressive attack score is above 9.0, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo aggressive attack score performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{11}) = \begin{cases} 1, \mathbf{u}_{11} \ge 9.0; \\ \frac{\mathbf{u}_{11}}{9.0}, 8.1 \le \mathbf{u}_{11} < 9.0; \\ \frac{\mathbf{u}_{11}}{16.2}, 6.1 \le \mathbf{u}_{11} < 8.1 \\ 0, \mathbf{u}_{11} < 6.1 \end{cases}$$
(19)

(12) When membership is 0, then defense and fight back score less than 6.1 represents bad; if defense and fight back score is between 6.1 and 8.1, then real value divides by 4.2, it represents qualified now; if defense and fight back score is between 8.1 and 9.0, then real value divides by 2.6, it represents good now; if defense and fight back score is above 9.0, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo defense and fight back score performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{12}) = \begin{cases} 1, \mathbf{u}_{12} \ge 9.0; \\ \frac{\mathbf{u}_{12}}{9.0}, 8.1 \le \mathbf{u}_{12} < 9.0; \\ \frac{\mathbf{u}_{12}}{16.2}, 6.1 \le \mathbf{u}_{12} < 8.1 \\ 0, \mathbf{u}_{12} < 6.1 \end{cases}$$
(20)

(13) When membership is 0, then tactics score less than 2.1 represents bad; if tactics score is between 2.1 and 3.1, then real value divides by 6.2, it represents qualified now; if tactics score is between 3.1 and 4.5, then real value divides by 4.5, it represents good now; if tactics score is above 4.5, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo tactics score performance:

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$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{13}) = \begin{cases} 1, \mathbf{u}_{13} \ge 4.5; \\ \frac{\mathbf{u}_{13}}{4.5}, 3.1 \le \mathbf{u}_{13} < 4.5; \\ \frac{\mathbf{u}_{3}}{7.0}, 2.1 \le \mathbf{u}_{13} < 3.1 \\ 0, \mathbf{u}_{13} < 2.1 \end{cases}$$
(21)

(14) When membership is 0, then fighting efficiency score less than 6.1 represents bad; if fighting efficiency score is between 6.1 and 8.1, then real value divides by 4.2, it represents qualified now; if fighting efficiency score is between 8.1 and 9.0, then real value divides by 2.6, it represents good now; if fighting efficiency score is above 9.0, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo fighting efficiency score performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{14}) = \begin{cases} 1, \mathbf{u}_{14} \ge 9.0; \\ \frac{\mathbf{u}_{14}}{9.0}, 8.1 \le \mathbf{u}_{14} < 9.0; \\ \frac{\mathbf{u}_{14}}{16.2}, 6.1 \le \mathbf{u}_{14} < 8.1 \\ 0, \mathbf{u}_{14} < 6.1 \end{cases}$$
(22)

By consulting relative information, we refer to sports test taekwondo aggressive attack, defense, fighting testing and scoring criterion:

- I Bad: Below 6 score;
- II Medium: 6.1score-8score;
- III Good: 8.1score—9score
- IV Excellent: Above 9score;
- (15) When membership is 0, then actual combat style score less than 2.1 represents bad; if actual combat style score is between 2.1 and 3.1, then real value divides by 6.2, it represents qualified now; if actual combat style score is between 3.1 and 4.5, then real value divides by 4.5, it represents good now; if actual combat style score is above 4.5, then membership as 1 that represents excellent. Among them, we use membership to represent taekwondo actual combat style score performance:

$$\mathbf{u}(\mathbf{c}_{i},\mathbf{u}_{15}) = \begin{cases} 1, \mathbf{u}_{15} \ge 4.5; \\ \frac{\mathbf{u}_{15}}{9.0.}, 3.1 \le \mathbf{u}_{15} < 4.5; \\ \frac{\mathbf{u}_{15}}{16.2}, 2.1 \le \mathbf{u}_{15} < 3.1 \\ 0, \mathbf{u}_{15} < 2.1 \end{cases}$$
(23)

By consulting relative information, we refer to sports test taekwondo tactics and actual combat style testing and scoring criterion:

- I Bad: Below 2.1 score;
- II Medium: 2.1score-3.1score;
- III Good: 3.1score—4.5score
- IV Excellent: Above 4.5score;

Athlete *i* to evaluation factor v_i influence degree is us-

ing E_{ii} to express, then its computing equation is:

$$E_{ij} = \frac{b_{ij}}{\sum_{j=1}^{j=4} b_{ij}}$$
(24)

INFLUENCE DEGREE EVALUATION RE-SULT

For influence degree evaluation result, it can be divided into:

A: If E_{ik} is $\{E_{i1}, E_{i2}, E_{i3}, E_{i4}\}$ unique maximum value, then its corresponding evaluation result is v_k .

B: If E_{ik} is $\{E_{i1}, E_{i2}, E_{i3}, E_{i4}\}$ non-unique maximum value, and then its construction way has two kinds:

a, if it firstly find out maximum value is E_{ik} then the athlete evaluation result is v_k , condition is carrying out the process of scanning from left to right $\{E_{i1}, E_{i2}, E_{i3}, E_{i4}\}$, the way is called conservative estimation.

b, if it firstly find out maximum value is E_{ik} then the athlete evaluation result is v_k , condition is carrying out the process of scanning from right to left $\{E_{i1}, E_{i2}, E_{i3}, E_{i4}\}$, the way is called optimistic estimation.

According to evaluation result to order, but athlete should follow the rule as $v_4 < v_3 < v_2 < v_1$.

We carry out fuzzing on athlete information according to fuzzy information base, from which one athlete processing result is as TABLE 2 show:

By applying relative software to handle, we get that

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TABLE 2 : Athlete fuzzy information base table

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Athlete	1	1	1	1	2	2	2	3	3	4
<i>u</i> ₁	Excellent(1.0)	Excellent(1.0)	Excellent(1.0)	Good(0.7)	Excellent(1.0)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)
<i>u</i> ₂	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Good(0.7)	Good(0.7)	Qualified(0.3)	Bad(0.1)	Bad(0.1)
<i>u</i> ₃	Good(0.7)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Excellent(1.0)	Qualified(0.3)	Bad(0.1)	Qualified(0.3)	Qualified(0.3)
u_4	Qualified(0.3)	Good(0.7)	Qualified(0.3)							
<i>u</i> ₅	Excellent(1.0)	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)
<i>u</i> ₆	Good(0.7)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)	Qualified(0.3)
<i>u</i> ₇	Qualified(0.3)	Qualified(0.3)	Excellent(1.0)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)	Qualified(0.3)	Bad(0.1)
u_8	Excellent(1.0)	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Bad(0.1)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Good(0.7)	Qualified(0.3)
<i>u</i> ₉	Excellent(1.0)	Good(0.7)	Good(0.7)	Excellent(1.0)	Good(0.7)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)	Bad(0.1)
u_{10}	Qualified(0.3)	Excellent(1.0)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Excellent(1.0)	Qualified(0.3)	Bad(0.1)	Qualified(0.3)	Bad(0.1)
<i>u</i> ₁₁	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Good(0.7)	Bad(0.1)
<i>u</i> ₁₂	Excellent(1.0)	Good(0.7)	Good(0.7)	Excellent(1.0)	Good(0.7)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)	Qualified(0.3)
<i>u</i> ₁₃	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Good(0.7)	Bad(0.1)	Good(0.7)	Excellent(1.0)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)
u_{14}	Qualified(0.3)	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Bad(0.1)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Qualified(0.3)	Bad(0.1)
<i>u</i> ₁₅	Excellent(1.0)	Excellent(1.0)	Good(0.7)	Excellent(1.0)	Excellent(1.0)	Qualified(0.3)	Qualified(0.3)	Good(0.7)	Qualified(0.3)	Bad(0.1)

TABLE 3: Athlete overall	uality evaluat	tion result table
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TABLE 4	: Athlete overa	ll quality ev	aluation fina	al result table
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Athlete	Bad	Qualified	Good	Excellent
1	0.054054	0.486486	0.552632	0.578125
2	0.054054	0.372093	0.101762	0.363636
3	0.054054	0.157895	0.172414	0.172414
4	0.052632	0.078947	0.078947	0.069767
				-

taekwondo player's evaluation result is as TABLE 3:

By normalization and sorting, we can get athlete overall quality evaluation result as TABLE 4 shows:

No.	Athlete No.	The athlete evaluation result
1	1	Excellent
2	2	Good
3	3	Good
4	4	Qualified

CONCLUSIONS

(1)	By	establishing	fuzzy	mathematics-based
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taekwondo overall quality evaluation model, it realizes taekwondo overall quality each indicator evaluation and analyses that provides scientific and comprehensive methods for taekwondo development.

- (2) By establishing taekwondo players' fuzzy information base, it will provide development for future taekwondo health developing in China.
- (3) On above, we know to taekwondo players, they should form into good living habits, keep a positive optimistic frame of mind, the next is that from the aspect of training, strengthen athlete special qualities researches can improve overall qualities.

REFERENCES

- Guo Yuan, shi Junfen, Chen Weiyi; Advances in Biomechanics related with artificial knee replacement[J].Advances in Mechanics, 37(3), 465-471 (2007).
- [2] Zhixiu Hao, Huijie Leng, Chuanyong Qu, Chao Wan; Biomechanics of the bone and the knee joint[J]. Acta.Mechnica.Solida.Sinica., 31(6), 603-612 (2010).

- [3] Hu Zong-xiang, Liu Xue-zhen; The Biomechanics Analysis on Trunk Sport at Horizontal-Kicking of Taekwondo[J]. Journal of Beijing Sport University, 31(1), 64-66 (2008).
- [4] Zhou Chang-tao, Yu Dai-feng; Biomechanical characteristic analysis on elite men's Taekwondo horizontal-kicking techniques[J]. Journal of Shandong Physical Education Institute, 26(9), (2010).
- [5] Fu Chao, Qian Chen-xiang; The Kinematic Analysis on the Double Kicks of Taekwondo[J]. Journal of Pla Institute of Physical Education, 29(2), 61-64 (2010).
- [6] Hu Zong-xiang, Chen Xiao-guang; Biomechanics Analysis on Trunk Sport at Horizontal Kicking of Taekwondo[J]. Sports Sciences Researches, 10(3), 58-61 (2006).
- [7] Li Shi-ming; Arithmetics od some kinetics indexes in motive video analysis[J]. Journal of Wuhan Institute of Physical Education, **41**(1), 55-57, 64 (**2007**).
- [8] Hu Zong-xiang; The Biomechanics Analysis on Lower Limbs Sport at Horizontal-Kicking of Taekwondo[J]. Journal of Hebei Institute of Physical Education, 20(3), 63-65 (2006).

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