
An Analytical Method for Evaluating the Performance of the URA MAWASHI GERI Skill Using Time Series and Artificial Intelligence Techniques

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Abstract: Artificial intelligence has changed the way we consume and analyze sports. The role of artificial intelligence in improving decision-making and prediction in sports is expanding, due to the specific changes in the performance of athletes, a performance prediction model based on a machine learning algorithm has been proposed. The current research state of athlete performance modelling and prediction is analyze and the current athlete performance prediction model is found. The shortcomings of the model are analyze. The reason for the low prediction accuracy of the model was analyze. Then chaos theory is used to process the historical data of the athletes, within the range of data used in this study is the average data from the total reaction time ((RT, movement time (MT), response time) through the skill performance of the skill of URA MAWASHI GERI and about By using the electronic device to measure the reaction speed and approved by the Ministry of Higher Education and the Patent Office No. (217050754), and it was collected and used through a sample of (210) karate players who are registered on the database of the Egyptian Karate Federation, classified (age, height, Weight, training age). ata collected for time series analysis were categorized by year and time (RT, MT, reaction time), and organized using Microsoft Excel Office 365 and IBM And SPSS 20.0 was used, and the results came to determine the correct training status of the player's condition and how to legalize the player's training loads and work the training programs for the player throughout the training season and over the training periods during the training season or a For the training course, how to plan and implement the training content and evaluate the training periods, the conclusions came by standing on the skill level and forming predictions by making scientific predictions based on time-stamped historical data. It includes building predictive models through time series and artificial intelligence techniques.

Keywords: Reaction Time (RT), Motion Time (MT), Time Series, Artificial Intelligence

1. Introduction

Artificial intelligence has changed the way we consume and analyze sports. The role of artificial intelligence in improving decision-making and prediction in sports, among many other advantages, is rapidly expanding and receiving more attention in both the academic and sports sector. [4] The adoption of artificial intelligence, time series and statistical modeling in sports has become more prevalent in recent years as new technologies and research applications are affecting professional sports at different levels of development. The widespread application of

machine learning algorithms, along with increased computing processing power as well as access to more new data sources in recent years, has made sports organizations hungry for new applications and strategies. [9], The field of artificial intelligence, especially [ML] has introduced new methodologies that have proven useful in facing challenges in assessing skills and predicting sports performance, and providing trainers of various sports and karate coaches, policy makers and owners of sports institutions with an overview of the set of artificial intelligence methods used to analyze sports performance and the problems that center around the world. On

Mathematical Analysis Topics [8].

2. Study Procedures

2.1. Study Background

In view of the specific changes to the performance of athletes, a performance prediction model based on a machine learning algorithm has been proposed. The current research state of athlete performance modeling and prediction is analyzed and the current athlete performance prediction model is found. The shortcomings of the model are analyzed. The reason for the low prediction accuracy of the model was analyzed. Chaos theory is then used to manipulate the historical data of the athletes, and the hidden rules are found. Finally, a machine learning algorithm that supports a vector machine is adopted to design a mathematical performance prediction model, the algorithm speeds up and improves the training of the model. The results on the test set show that compared with the current athlete performance prediction model, the designed model's athlete performance prediction results are more reliable, and the athlete's prediction accuracy is higher, which can be applied to the development of sports practical training plan, and along with determining the performance of athletes, concerns have become Predictive research is a topic of great interest in the mathematical field. In particular, it is a very important ability for sports leaders who

make various efforts to improve their performance through accurate predictions about players' performance.

2.2. Research Methodology

The subject of research and data collection: Within the range of data used in this study is the average of data from the total reaction time [[RT, movement time [MT], response time] through the skill performance of the skill of the skill of URA MAWASHI GERI and by using the electronic device to measure Reaction speed and approved by the Ministry of Higher Education and the Patent Office No. [217050754], and was collected and used by a sample of [210] karate players registered on the database of the Egyptian Karate Federation classified [age, height, weight, training age] The data collected for time series analysis were classified by year and [RT, MT, reaction time] and organized using Microsoft Excel Office 365 and IBM.

Table 1. Classification of variables according to anthropometric measurements SPSS 20.0.

| Variables | mean | standard deviation | median | skew |
|--------------|------|--------------------|--------|--------|
| Age | 9.00 | 2.16 | 9.10 | -0.111 |
| Height | 1.11 | 0.222 | 1.20 | 0.125 |
| Weight | 37 | 2.03 | 36.1 | 0.279 |
| Training age | 3.00 | 1.06 | 3.14 | 0.853 |

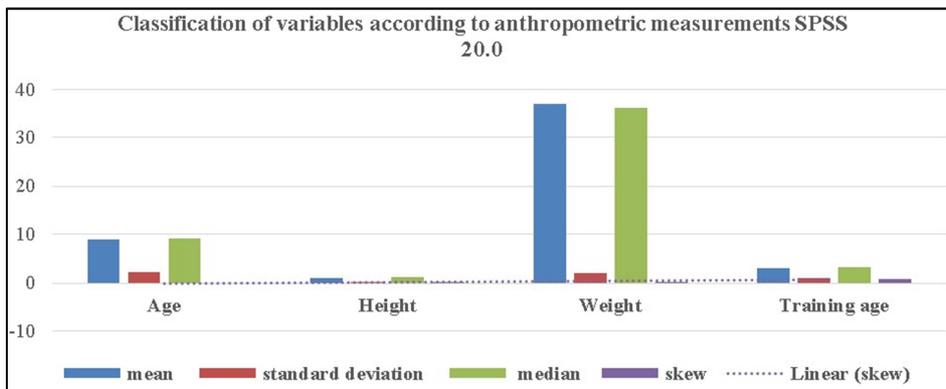


Figure 1. Classification of variables according to anthropometric measurements SPSS 20.0.

In Table 1 that the values of the skew coefficient are limited to [0.111-, 0.853] and that they all revolve around zero, which indicates the similarity of the data about the axis of the curve, which indicates that all members of the sample fall under the mean curve in the variables of age, length, weight. And the training age, which indicates the homogeneity of the research sample in the selected variables.

2.3. Skill Analysis Through Skill Performance URA MAWASHI GERI [Round Kick]

In this case the athletes a long distance in between. Ura Mawashi [Figure 5] is a very complex technology that is able to develop in several ways [pseudo-directional changes - leg changes, etc.]. Initially, the technique is expressed identically as both Mae Geri [forward kick] and Mawashi Geri [round

kick]. Figure 2 Ura Mawashi, always comes with a thigh line on the pelvis. The muscles working in this procedure are primarily in rotation, from the pelvic muscle, and the quadriceps muscle [right front]. At this point, it was decided to perform one of the three types of kicks mentioned above, and as a continuation Figure 2 of the Ura MawashiGeri analysis, this is performed with the pelvis open, additional rotation of the supporting leg and tightly sprinting towards the target direction towards the target that comes out slightly again in the striking leg impact point. Path of movement: Take for testing the example of jerry cattle with the variable that it will not affect the Haisoku ["bottom of the foot"] but under the toes [Koshi]. As mentioned earlier, the importance of the technique is given by the speed of the upload itself. The muscles working in the pelvic extension are localized in

the hip thrust opening, in the quadriceps muscles.

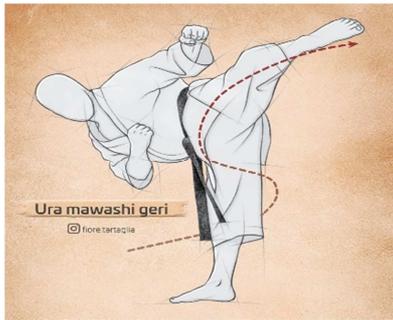
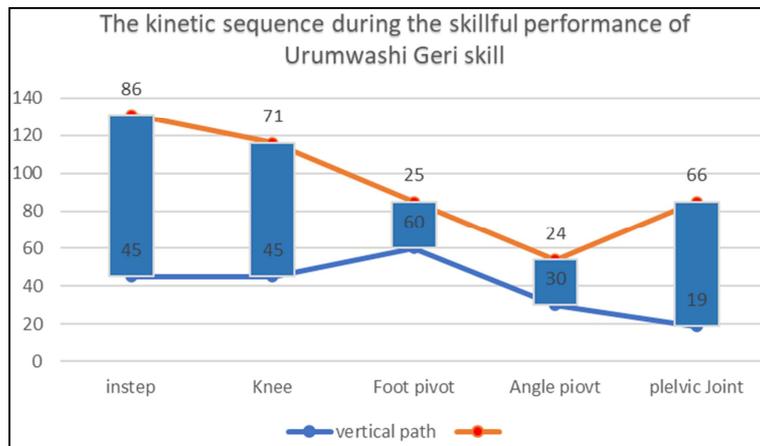


Figure 2. Demonstrates the Kinetic Sequence During the Skillful Performance of Urumwashi Geri skill.

2.4. Skill Analysis Through Chronology [Urumwashi Geri]

The objective is to measure the reaction speed. The measurement was made through the electronic device and its contents. The motor path of the blow was: In the face area [jodan] the test is done by stopping the pupil in front of the electronic device. Turning on the electronic device when the red light is lit. Performs an Urumwashi Geri blow on the sensor position No. [2], taking into account the stance The correct skill of the skill and this appears later in the process of kinetic analysis and temporal analysis of the skill through the electronic program [Karate Do].



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Figure 3. Kinetic Sequence Diagram Skill. Urumwashi Geri.



Figure 4. Illustration skill Urumwashi Geri.

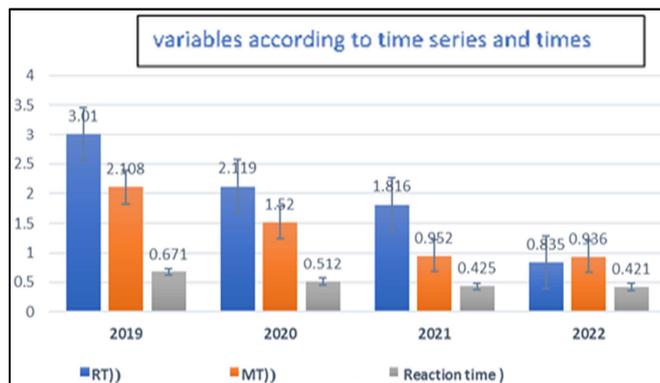


Figure 5. Graph classifying variables according to time series and times.

Table 2. Classification of variables according to time series and times.

| Variables | training year | | | |
|--------------------|---------------------|---------|----------|---------|
| | 2019 | 2020 | 2021 | 2022 |
| | Arithmetic averages | | | |
| reaction time [RT] | 3.01 | 2.119 | 1.816 | 0.835 |
| Motion time [MT] | 2.108 | 1.52 | 0.952 | 0.936 |
| response time | 0.671 | 0.518 | 0.425 | 0.421 |
| average times | 3ث/1.92 | 3ث/1.38 | 3ث/1.064 | 3ث/0.73 |

Through Table 2 and Chart No. (1), Through Table and Chart No. (5), the circular strike analysis (jerry cattle) through time-series models and in the sports movement analysis research, we find that the performance of the skill in the year (2019) we find through the time analysis of the skill, we find Reaction time (RT) (3.01), movement time (MT) 2.108, response time (0.671) and skill performance. T. [2] indicated that artificial intelligence techniques as an input to assess skill performance in systems analysis and some sports skills Karate works to reduce the time used during skillful performance, and this is consistent with [1] in the impact of kinetic energy on developing the level of skillful performance on some karate skills in the year (2020). (2.19) Movement time (MT) 1.52 Response time (Reaction time 0.518) and skill performance. Agreed with [4] through artificial intelligence techniques and its future in motor learning for sports skills in the year (21), we find through the time analysis of the skill, we find that the response time Action (RT) 1.816 Movement Time (MT) 0.952 g From the response (Reaction time) 0.425 and the performance of the skill in 2022, we find through the time analysis of the skill, the reaction time (RT) 0.835, the movement time (MT) 0.936, the response time (Reaction time) 0.421, and this agrees with both Sareeh Abdul Karim. (2013). Biomechanics applications in sports training and motor performance., [6]. iomechanics Theoretical and Applied Foundations, [5]. Engineering the planning of training loads and training periods in physical education sciences through the evaluation of times through the statistical application of time series for the skill evaluation of the skill (Urumwashi geri) and this is due to the large data that was made through the compilation of the standard times of skill and this is the feature of artificial intelligence techniques from Through performance analysis through (Data science), the process of analyzing time-series data using statistics and modeling to make predictions and inform strategic decision-making. It is not always an accurate prediction, and communication has been made to determine the correct training status for the player's condition, how to legalize the player's training loads, the player's training programs throughout the training season and over the training periods during the training season or course, and how to plan and implement the training content and evaluate. This is in agreement with [3, 4, 7-11]. The effect of reaction speed on the length of the training is known. The body that is empowered, has the ability to achieve reaction speed, etc., and is measured by running distance per unit of time, while strength depends on the number of muscle groups involved in the kick or hit (Urumwashi geri) [10]. How to perform and improve the skill performance of the Urumwashi Geri skill through time series and artificial intelligence techniques.

3. Conclusion

Standing at the skill level and forming predictions by making scientific predictions based on time-stamped historical data. Includes building predictive models.

4. Results

Through the conclusions made through time series since the beginning of the time period, we find the change in the times of the strike, this is due to the ability to plan related to the time series of the skill from dividing training units, dividing the sports season by time periods, we have the ability to link the time of skill between training periods and competition Predicting the skill progression and competitiveness of the skill under study.

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