INSPIREE:
INDONESIAN SPORT INNOVATION REVIEW
ISSN 2746-6965 (Online), 2774-2520 (Print)
Journal Homepage: https://inspiree.review/index.php/inspiree

REVIEW

OPEN ACCESS

Artificial intelligence and analysis of body position to determine the speed of the strike in Karate

https://doi.org/10.53905/inspiree.v4i02.100

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A B S T R A C T

The purpose of the study. The techniques of artificial intelligence in educational hardware and software are able to deduce knowledge and skills, and the importance of the study is due to the use of artificial intelligence techniques in analyzing the situation of skill performance, the use of artificial intelligence techniques in the system of skill analysis of the skills under study, the link of artificial intelligence with kinetic variables For the skills under study and the study aimed to apply artificial intelligence techniques in skill analysis, building an artificial intelligence system from motor variables and motor performance.

Materials and methods. The study samples The researcher determined the study population of karate players by choosing the study sample in a random way from karate players in Kafr El-Sheikh Sports Club.

Results. Performance through data and recommendations came to use artificial intelligence techniques in various games and areas of physical education.

Conclusions. Artificial intelligence techniques work on skill analysis through programming neurons. Deep learning gives indications of improving performance through data. The use of artificial intelligence techniques in various games and areas of physical education

Keywords: *: artificial intelligence; analysis in scientific research; Karate*

A R T I C L E I N F O

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Article History:
Received: March 28, 2022
Accepted: January 31, 2023
Published: May 27, 2023

INTRODUCTION

Artificial intelligence techniques in educational hardware and software are able to deduce the required knowledge and skills at a specific time, and thus update the required automatically and present it to the student in a manner that suits his needs and abilities. (Al-Saqri, 2020, pp. 580-604). Artificial intelligence is changing the way we exercise and how people communicate with it. This is largely a result of the fact that sports is a growing industry as a result of an increased focus on analytical activities. Artificial intelligence has been at the heart of sports because of the role that competition plays in the game and its ability to create talent. Strategic innovation and artificial intelligence are important in the sports industry. It is an activity that includes

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abcde Authors'Contribution: a-Study design; b-Data collection; c-Statistical analysis; d-Manuscript preparation; e-Funds collection.

a set of interactions between groups of parties. There is a sense of social engagement among these goal-based entities. (Zaharia, 2020, pp. 10-18).

The sports field witnessed a new stage of development that included all its scientific, applied and theoretical fields, in which the innovations of the digital revolution, information and communication technology and tremendous scientific innovations were mixed. These recent innovations in various fields of knowledge have cast an applied shadow on the sports field, and have revolutionized all its aspects, as they have intervened in every aspect of the mathematical field, from kinetic, skill, technical and linear analyzes to reaching higher levels, and increased interest in them and their scientific applications. With its theoretical and technological dimensions, which led to the continuous smashing of world and Olympic records, improving performance and developing the level of sporting achievement.

Artificial intelligence: Artificial intelligence is a part of computer science that aims to design intelligent systems that give the same characteristics that we know as intelligence in human behavior. (Asim, 2019, p. 18) Analysis in scientific research: studies phenomena, variables, and information; By interpreting, explaining and fragmenting them, researching their causes and criticizing them and presenting a comprehensive vision characterized by clarity and accuracy, trying to reach logical results and solutions. (Ghazi, 2021, p. 201).

MATERIALS AND METHODS

Study participants

The researcher determined the study population of karate players by choosing the study sample by random method of karate players in Kafr El-Sheikh Sports Club.

Methods

Where their number was (8) karate practitioners, onditions for choosing a course of study to be a karate player in Kafr El-Sheikh Club, a karate participant and registered with the Egyptian Karate Federation. The study was conducted according to three stages: The first stage, "Preparation": Determining the general framework of the study,

its fields and objectives, and the basic variables to be analyzed, as well as defining the study steps and appropriate tools and means of data collection.

Testing procedure

Agreement with the authorities concerned with the study (Kafr El-Sheikh Sports Club) in order to see the number of players to conduct the study and the regulations Preparing the required tools and devices and ensuring their validity and accuracy. The second stage, "Exploratory Studies": The first survey: The researcher conducted it on a sample of (5) students on 1/5/2020, and the aim of it was: Ensuring the validity of the study and approvals from the administrative authority to conduct the study.The third stage, "Basic Study": The researcher made measurements on the study sample from the age and the age of the actual practice on the practice

RESULTS And DISCUSSION

A table showing the homogeneity among the sample members:

Table 1. Tabular T value at a significant level of (0.05) and degree of freedom 4 = 4.5

Statistical variables	mean	arithmetic	standard deviation	skew	flatness
Age	12.3	12	1.15	-0.908	0.711
Duration of practice	3.1	3.00	0.12	0.554	-0.463

It is clear from Table (1) that the values of the flattening coefficient are limited to (0.463-0.711), and that all of them lie between + 1, which indicates the similarity of the data about the axis of the curve, as it is clear from the table that all the values of the torsion coefficient for the study sample ranged between (0.554) , -0.908) and that these values were limited to +3, which indicates that all sample members fall under the moderation curve in the variables of age and duration of practice, which indicates the homogeneity of the study sample in the selected variables.

Study questions: 1- What is artificial intelligence in analyzing the position of the body in analyzing the speed of the strike?

Artificial Neural Networks and Deep Learning, as the name suggests, Artificial Neural Networks (ANN) are inspired by the functions of electrochemical neural networks found in human (and animal) brains.

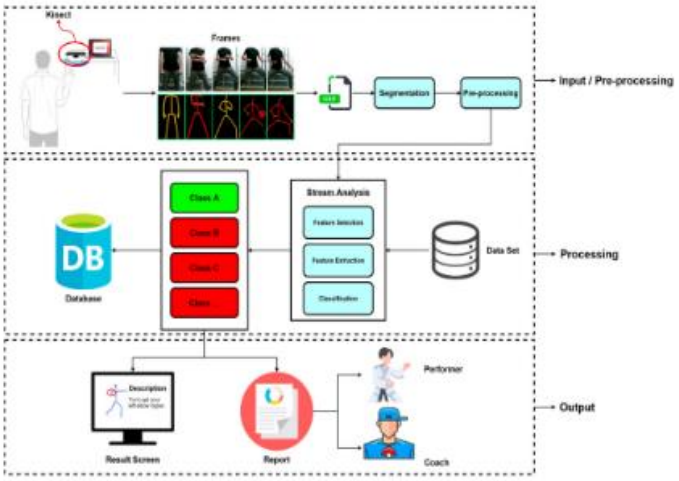


Fig. 3: System Overview

Figure 1. Machine learning and data-driven artificial intelligence

The work of the brain remains somewhat mysterious, although it has long been known that signals are transmitted through a complex network of neurons, and in doing so, both the signal and the structure of the network are transformed. In artificial neural networks, the inputs are translated into signals that are passed through a network coil of artificial neurons to generate outputs that can be interpreted as responses to the original input. Learning refers to transforming the network so that these outputs are useful - or intelligent - responses to inputs (Boucher, 2020, pp. 547-641).

Machine learning (ML) refers to a wide range of techniques that automate the learning process of algorithms. This differs from the first wave approach where performance improvement is only achieved by modifying humans or adding to expertise encoded directly in the algorithm. While the concepts behind these methods are as old as symbolic AI, they have not been widely applied

Alberto Casas-Ortiz and Olga C. Santos (2020) proposed a framework called mCMAR2 (Motion Capture, Modeling, Analysis, Response, Report) that consists of five interrelated phases: 1) motion capture, 2) captured motion modeling, and 3) the models and raw information are analyzed Captured, 4) information extracted from the analysis is used to provide personalized feedback, and 5) information about implementation from the learner to create an animated report that the teacher and learners can use to reinforce learning. Information flow in the mCMAR2 framework is shown in Figure 1 (Santos, 2020, p. 13)

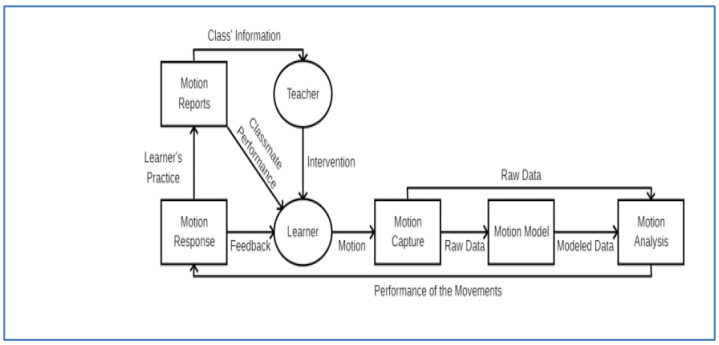


Figure 2. Different Phases of The mCMAR² Fromework

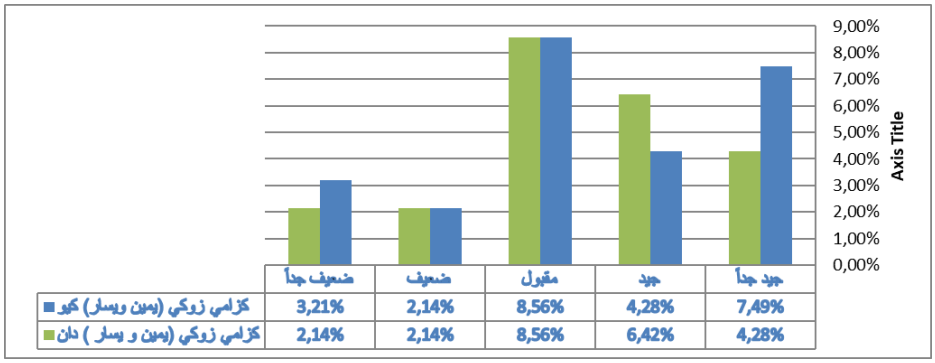
Using innovative electronic device techniques through the strategy of artificial intelligence (machine manufacturing, optical flashes)

Kazami Zuki's skill:

The player stands in front of the electronic device. Turn on the electronic device when the green light is lit. Performs a blow by Kazami Zuki on the sensor position No. (4), taking into account the correct posture of the skill, and this appears later in the process of kinetic analysis and temporal analysis of the skill through the electronic program (KarateDo) standing in the position of Zenkotsu Dachi Putting hands and feet

- Rating: When the green light is lit, the player starts hitting skills using the hand, such as Kazami Zuki, and Kiyagi Zuki, and when he sees the red light, the player starts hitting the man like Mai Jerry, Jerry's cattle, and Arumwashi. The sensor on the electronic device begins to receive blows, whether by hand or by the man. The time through the database on the computer begins calculating the reaction time, and the speed of the strike through the equation provided and gives the students repeated attempts from 1 to 3 times in the following figure shows the graph of the standard levels.

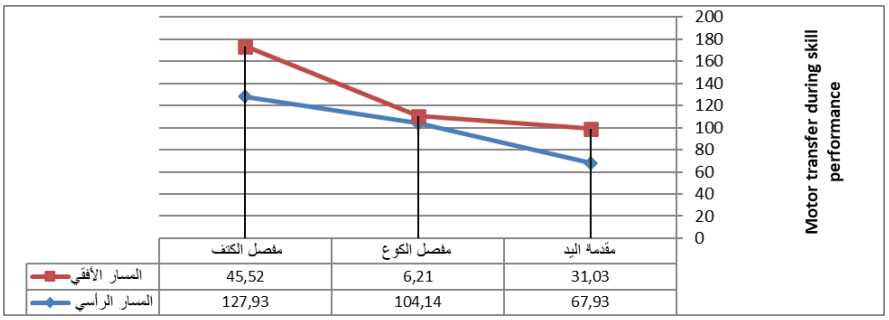
Standard skill levels (Kazami Zuki)



Graph 1. Standard skill levels (Kazami Zuki)

The motor transfer during the skill performance of the Kazame Zuki skill shows the following figure

Figure No. (3)



Graph 2. The motor transfer during the skill performance of the Kazame Zuki skill

In Figure No. (2) and Figure (3), the following becomes clear: The results of both the second degree (Q) are between (3.21%: 4.47%) and the first degree (Dan) is between (2.14%: 4.28%), which is a percentage that indicates a normal distribution In its various forms (twisting and flattening) in the graph also indicates the kinetic transfer of skill in its sequential form, and agrees with Nahid Muhammad Ali (2008): that kinetic flow represents one of the important manifestations of kinetic compatibility during the kinetic learning process and its impact on reaction speed during performance, which Lead Ali improve skill (Muhammad, 2008, p. 14) (51), (80) (Suwarganda, 2015, p. 5)

Through the use of the technology on the electronic device in the ability to record the time to be developed, which is (reaction speed) by displaying the development and improvement of the level of skill performance of the skills in question

Radomir Mudrić emphasizes (2016: (2016) it is known that the effect of reaction speed on the length of the body that is enabling it, the ability to achieve reaction speed, etc., is measured by the operating distance per unit of time, while the force depends The number of muscle groups involved in the kick

Analysis of the position of the body on the speed of the blow (Kazami Zuki)

The results of the total body posture analysis sample data on the stroke speed can be seen in the following table:

Table No. (2)

SKILL		Body weight	body length	arm length	forearm length	force of the blow	time of the blow	speed of the blow	reaction time	performance level	achievement time	classification
		kg	cm	cm	cm	kg	m/s	m/s	m/s	m/s	m/s	
Kazami Zuki	A	50	167	86	40	158.66	0.371	0.119	0.252	0.371	0.49	middle
	B	52	187	87	41	158.90	1.01	0.52	0.49	1.01	1.53	beginner
	C	44	155	86	39	174.54	1.108	0.618	0.49	.018	0.233	excellent
	D	51	163	88	37	125.14	0.074	0.416	0.342	0.758	0.369	middle
	E	45	172	78	40	188.14	0.942	0.452	0.49	0.942	1.394	beginner
	F	53	164	82	39	165.33	0.371	0.104	0.267	0.371	0.59	middle
	G	56	168	83	41	145.22	1.01	0.152	0.858	1.01	0.54	middle
	H	60	177	84	42	174.22	0.108	0.622	0.557	1.179	1.89	beginner
	averages	51.13	196.1	84.2	39.8	161.2	0.624	0.375	0.468	0.832	0.941	middle

Through Table No. (2) the following becomes clear based on the discussion of the value of the effect of body position on the speed of the strike from 8 samples, it can be seen from the results of this study that there are 3 samples from 8 samples, each of which has two aspects of the effect of the position of the body on the speed of the strike from Perspective of height and leg length. Influence of aspects of body weight in this analytical study. While the remaining (5) samples do not show any effect, although the results seem to be a good speed value, but it is not supported by good posture. We find the player (H, weight (60 kg) and height (1.77 cm) and the performance time and reaction time were simple And less than others, through this, the body and the position of the body have a direct impact on the skillful performance of the movements, and this is evident through the neurons programmed to the electronic device that exists to measure that results, and this is consistent with (Hasnain, 2021), where it is indicated that the body mass factor It has an impact on the skill performance in the evaluation. We find that player C has body weight (44 kg) and player height (155 cm), and he has achieved a time of completion (0.233 s/2), and this is consistent with (Suwarganda, 2015) Santos, 2020) (Al-Saqri, 2020) (Hasnain, 2021)

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CONCLUSION

Artificial intelligence techniques work on skill analysis through programming neurons. Deep learning gives indications of improving performance through data.

The use of artificial intelligence techniques in various games and areas of physical education.

REFERENCES

Hanan Ali Hassanein. (2021). Using the systems method between kinetic energy, body mass and response speed in evaluating the skill performance of some karate skills. Al Munthama Sports Journal, 201-2013.

Samiha Ali Salem Al-Saqri. (2020). Artificial intelligence techniques as an input to assess skill performance in systems analysis and some karate skills. Journal of Sports Arts, Faculty of Physical Education, Assiut University, 580-604.

Mazen Al-Tai, Muhammad Assem. (2019). Artificial intelligence in physical education sciences book. Dar Safaa for publishing and distribution.

Muhammad Asim Ghazi. (2021). Digital techniques in the development of physical education. Jordan: Dar Al-Hamid for Publishing and Distribution.

Nahid Ali Mohammed. (2008). Kinetic rhythm between theory and practice. Zagazig: Journal of the Faculty of Physical Education for Girls.

English references

Boucher, P. (2020, 6 5). Panel for the Future of Science and Technology. Scientific Foresight Unit (STOA).

Santos, A. C.-O. (2020). An AI Application to learn Martial. Computer Science School, UNED. Madrid, Spain.

Suwarganda, E. K. (2015). ANALYSIS OF PERFORMANCE OF THE KARATE PUNCH . Malaysia: Center for Biomechanics, National Sport Institute.

Zaharia, N. K. (2020). Sport management programs in business schools: Trends and key issues', Sport Management Education Journal, Sports innovation management Anagnostopoulos.

APPENDIX

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