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The Effect of the Artificial Intelligence Techniques Towards Psychomotor Performance Modelling to Improve Sports Performance in Karate

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Abstract: The study aims to: Recognize how artificial intelligence techniques affect psychomotor performance modeling to improve sports performance in karate and it is important to help the practitioner improve the implementation of the specific technique, such as performance, energy consumed, skill strength, acceleration and correct posture. Improving psychokinetic modelling, in quantitative, where research is currently focused on detecting posture or shocking movements, but not on the implementation of techniques, improving interactive design to make virtual reality more realistic environment and building smart environments that provide multiple senses with reactions. The researcher used the descriptive method. The sample of the study was chosen in a random way, represented by karate players in Kafr El-Sheikh region, where they numbered (10) player. Especially with the skill of Ura mawashi grei, the recommendations were to provide those techniques in various sports field Conclusions Through the study, it is necessary to provide customized smart support in karate training so that we can create kinetic self-modeling and this was demonstrated through the techniques that were used in the analysis for modeling work, and this helps the coaches to improve sports performance through the analysis of that sport and the special skill of the study URA MAWASHI GERI), and the modeling of the skill of URA MAWASHI GERI came to give a kind of ideal for that skill and to be an example for others, we provide a deep learning computer vision algorithm (Open Pose) to predict the opponent's movement in the counterattack, an analysis of the player's psycho-kinetic state through the emotional state of his face Discount during performance.

Keywords: Artificial Intelligence Techniques, Kinaesthetic Modelling, Improving Athletic

1. Introduction

In the context of digitization, techniques for identifying human activity (motor performance) spread and focused on identifying and categorizing machine learning techniques from inputs through sensory signals, images or video and used to determine the type of activity performed by the person subject to motor analysis and skill follow-up. The outputs are prepared [6], Bloom identified the educational objectives of the motor behavior leading through motor skills to (cognitive, emotional, psychomotor). Recent research has shown that computer support systems in the educational process can be extended with sensors to provide formative assessment in these three areas, with particular attention to their use as feedback criteria [5], Karate is one of sports that help to build smart, multi-media learning systems in a psycho-kinetic target due to the nature of the movements involved to learn the motor skills from the kinetic sequence in them when performing combat skills (Kumite) and performing offensive and defensive skills without an opponent (Kata), which are pre-defined and controlled Laws of Movement and Physical Performance [1, 8] praised Karate as a popular martial art, invited in Tokyo Olympics and thus there are efforts to apply new techniques to modeling it from a computing perspective to improve psychological performance. In this sense, [Hariri et al. 2018] reviewed the techniques used in twelve articles to analyze Jerry's (side kick) technology, finding many types of input, such as a 3D video image, inertial sensors (accelerometers, gyroscopes, Magnetic [7] sensors can be used to study the speed, position, movements of body parts and working

muscles, etc. There are also studies of " Mae geri " movement (forward kick) using the Vicon optical system (with twelve MX-13) cameras to create the pattern charts and a statistical comparison between the five Karate experts who conducted this technique [10] The sensors are also used to analyze Karate movements. [4] indicated that the sensory and the modeling method represent the three senses (visual, auditory and kinesthetic) are preferences that the individual can use in the field of learning and work.

2. Methods

2.1. Study Approach

The researcher used the descriptive applied survey method, due to its relevance to the nature of the study Study population and sample: The researcher chose the study sample in a random way, represented by the karate players of the KafrEl-Sheikh Karate, where their number was (10) player.

A table showing the homogeneity among the sample members.

Table 1. *Statistical variables.*

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

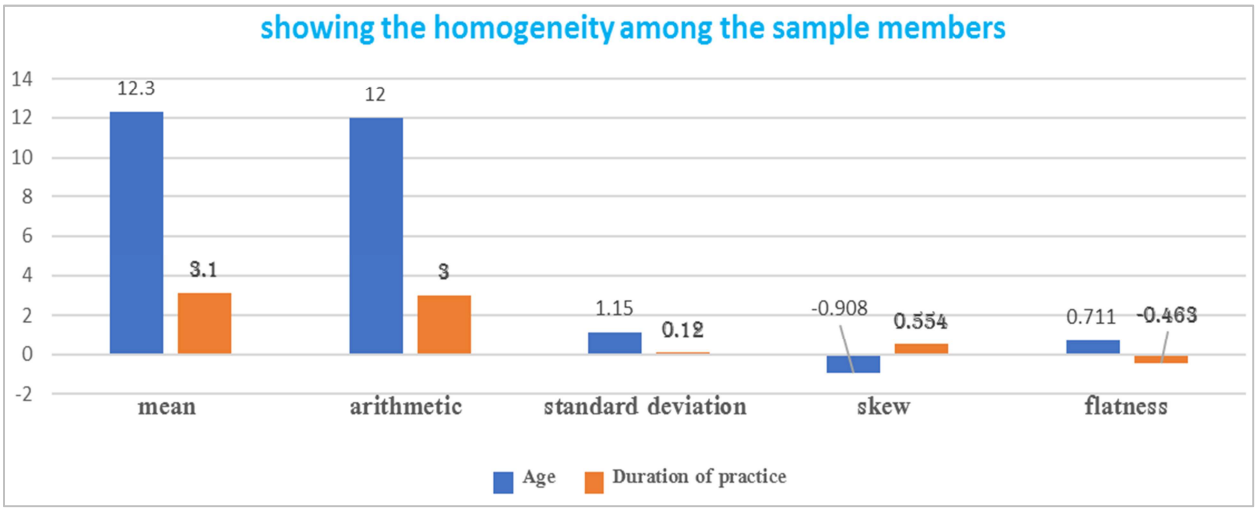

Figure 1. *Homogeneity among the sample members.*

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

It is clear from Table 1 and Figure 1 that the values of the oblateness coefficient are limited to (0.463-0.711) and that all of them lie between + 1 and -1, which indicates the similarity of the data about the curve axis, as it is clear from the table that all the values of the skew coefficient of the sample ranged between (0.554, -0.908) and that these values were limited between +3 and -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.

2.2. Data Collection Tools

The researcher used the necessary means and tools to achieve the objectives of the study:

1. The researcher used content and results analysis as a tool for data collection.
2. Big data analysis techniques that deal with volume, variety, speed, variance and honesty.
3. 3D modeling of living physical objects by developing a mathematical representation of their three-dimensional surface.
4. 3D printing of exoskeletons to rehabilitate motor control and enhanced sensory production with artificial intelligence.

What are the techniques of artificial intelligence in the work of psychokinetic modelling?

Lavarez, N., et al. (2021) [1] points out in AI modeling, it is a complex modeling process with layers of information. To be able to explain the algorithm's decision-making process, start with its input data. When machine learning models provide problematic results, it can often happen in ways that humans cannot understand and this becomes dangerous when there are no limitations to the model, especially for high-stakes decisions. Without straightforward and simple techniques to achieve interpretable AI, organizations will continue to struggle to implement machine learning. [11]

2.3. First Question Procedures

To design the system, methods were applied to be about the age group used. The design of the system took into consideration the information received from expert users (karate trainers) and players. In this way, perspectives of the training needs of both those who will receive instruction to practice kumite and those who will teach it were collected through a questionnaire.

Stages for building smart kinetic systems towards

modeling psychomotor performance to improve athletic performance in karate:

The idea of building systems in dealing with body language in the sense of dealing with facial cues between players during practice in karate through the ability for players to read the language of the other during the competition and the ability of players to hit the target or take a point or hit the target to be achieved, the player's position Karate in court in front of building the smart system and modeling self-kinetic performance through the designs to be achieved.

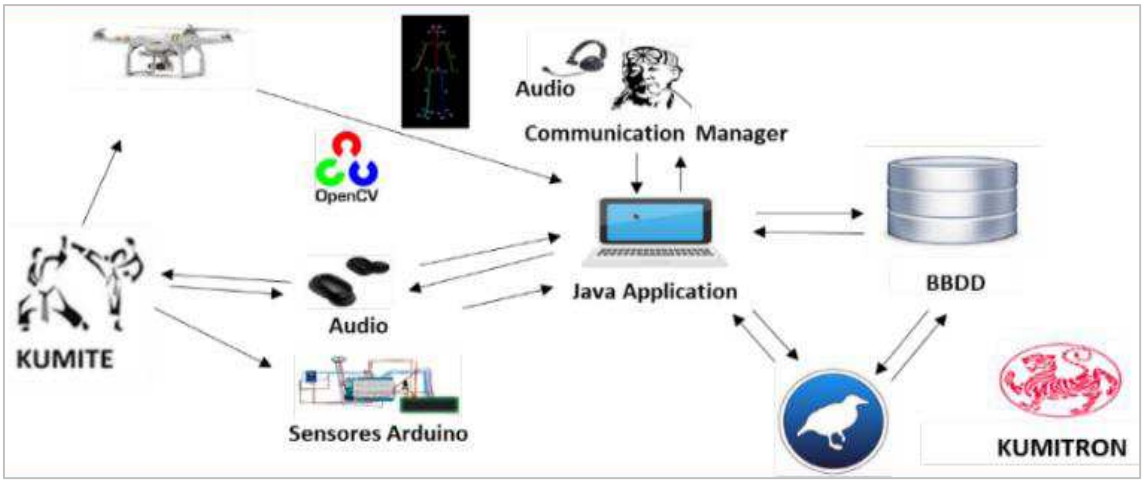

Figure 2. *Description of the smart systems and the supporting program for it.*

2.4. Description of the Smart Systems and the Supporting Program for It

(A) Electronic Description of the Smart Program

The program was created in a basic language VBA and the purpose is ease of use to suit the workers (researcher, trainer, teacher) through data access programming.

Create a database system that includes the following:

1. Data of trainees and students, including personal data, skills and training age.
2. Adding the data for each trainee (student) during the level measurement process through the stereoscopic connection to the computer.
3. Performing analyzes of this data based on arithmetic equations and scale algorithms, big data techniques and deep learning (Open Pose).
4. Printing the reports after performing the statistical treatments from the program through the graphs.
5. The data received from the stereo is linked to the player based on a special code for each player that is read by the barcode connected to the computer unit.
6. When adding data, the program prepares a card for the trainee (student) that includes his own barcode, which he uses when making variables related to self-kinetics and building modeling.

(B) Electronic description of building smart building systems and psychokinetic modeling

1) A stereoscopic idea was created to build smart systems and model the psycho-kinetic to identify the level of performance in the skills of the trainees and students in the sport of karate, and to complete this idea, an electronic control circuit was added (Arduino - Software) to measure the strikes on the stereo and physiological changes (pulse) bodily movements, personal reactions (visual and auditory), inertial collection (accelerometer using gyroscope) and data transmission to a computer.
2) Establishment of a micro-controller system (Arduino - Software)), which includes the following: -
   1. Placing and adding the stereoscopic (the person) with the sensors needed to measure beat, pulse, breathing and gestures (7) sensors.
   2. Arduino (Software) control circuit to collect data and send it to the computer.
   3. The time of the blow directed from the player (the student) to the stereo (the player) is measured and its data is sent to the computer.

What is the model used in psychokinetic modeling?

The skill performance of the skills under study is carried out from the skill (URA MAWASHI GERI).

a) Standing in front of the device and taking the picture and taking the features of the face and then displaying it to the most effective program for data processing and artificial intelligence systems (deep learning) or using the (Open Pose) program.
b) Through the solution of the (Open Pose) program and with the participation with the databases on the electronic system of the electronic device and processing matters, the data related to those skills are extracted to be used in the work of the model and the special (psychomotor modeling) through the sensors used on the electronic device that serve the processors in Artificial intelligence systems in the following figure show the stages of modeling in psychokinetic modeling.

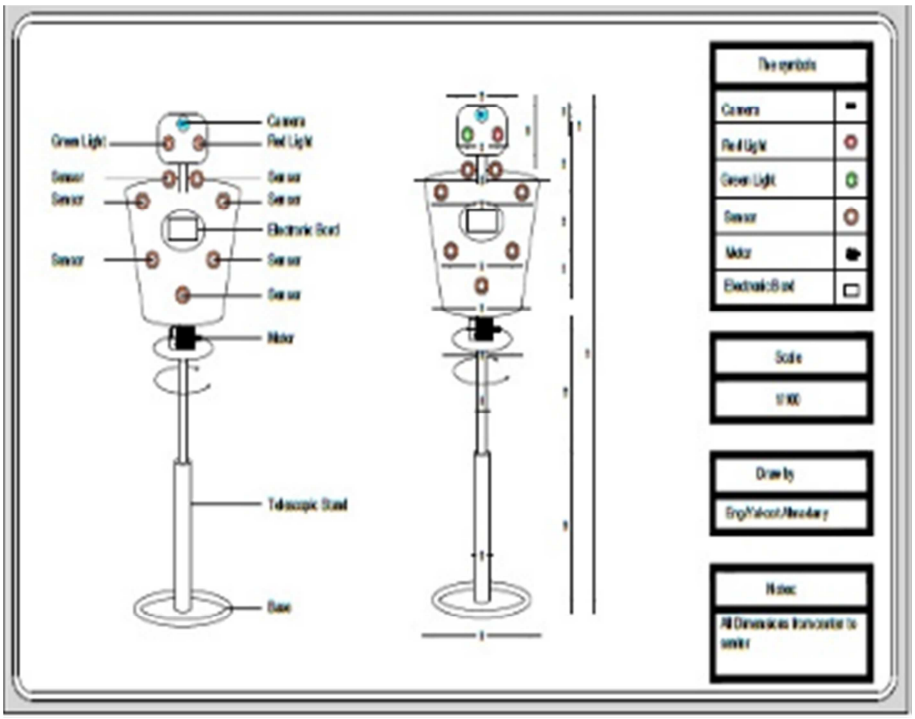

Figure 3. *Electronic systems.*

2.5. URA MAWASHI GERI Skill

Performance Specifications:

The student stopped in front of the electronic device. Turn on the electronic device when the red light lights up.

The student (URA MAWASHI GERI) hit sensor No. (2) taking into account the correct position 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) standing in the kokotsu dashi position with hands and feet (Figure below).

Outputs through processors and the use of artificial intelligence systems to model the self-kinetic.

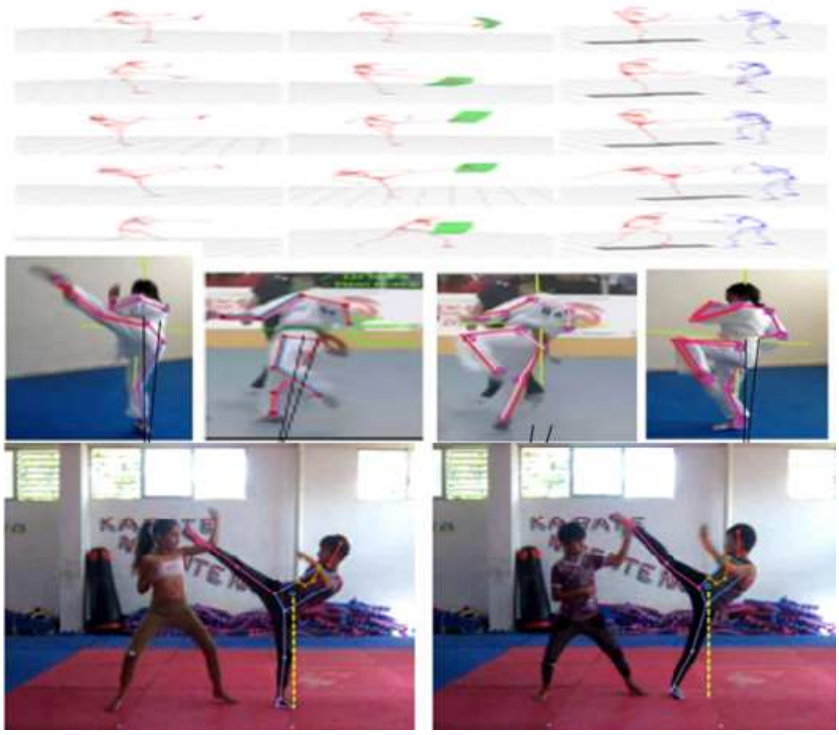

Figure 4. *Ura mawashi geri skill.*

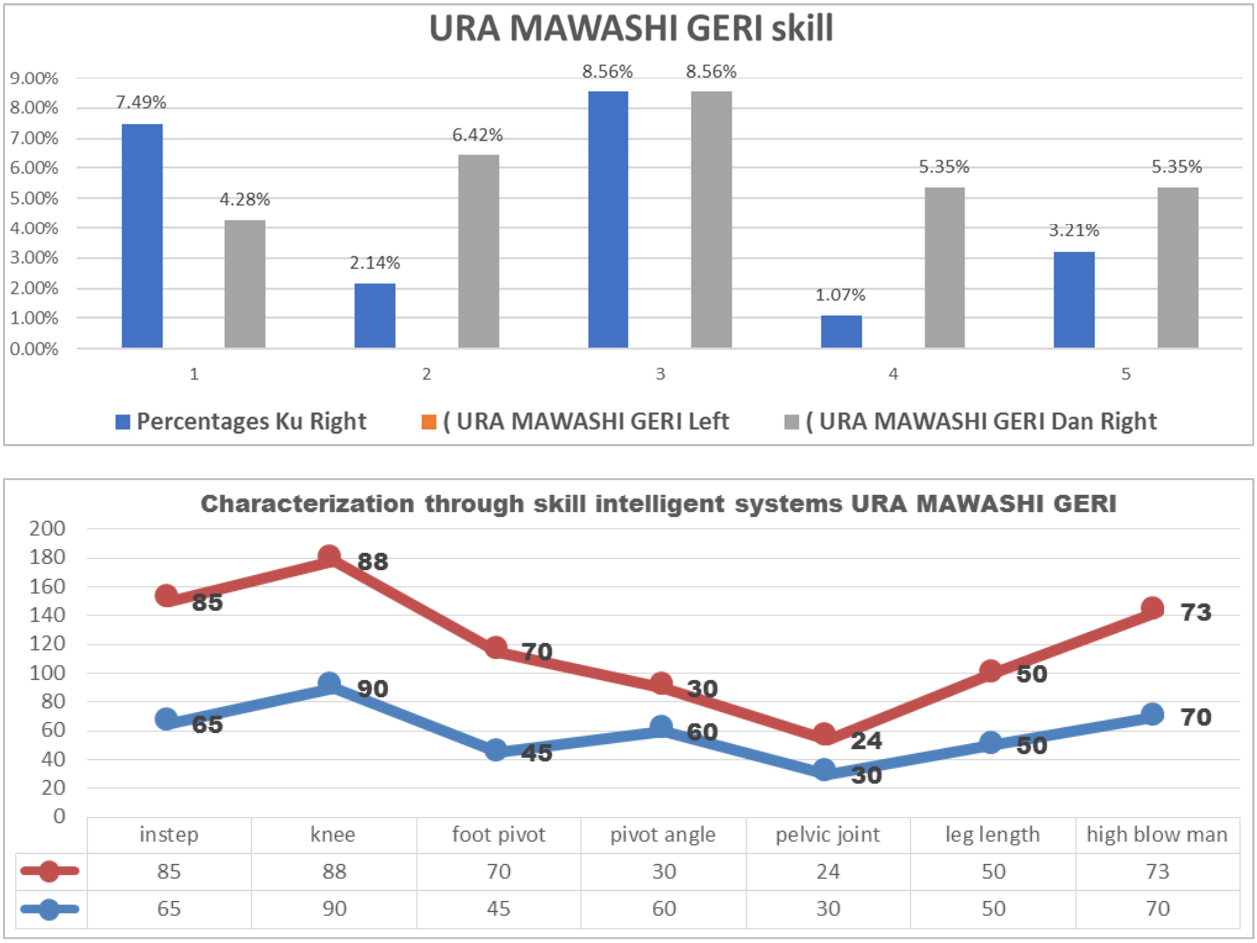

Figure 5. *Characterization through skill intelligent systems ura mawashi geri.*

Indicators during the skill performance of the skill URA MAWASHI GERI.

3. Discussion

In Figure 2 and Figure 3, the following becomes clear: The results are between (3.21%: 7.49%) and between (5.35%: 4.28%), which is a percentage that indicates a normal distribution. Cao Zhi-chao emphasized that identifying the Key poses (KPR) are widely used in sports analysis, which provides powerful tools for coaches, athletes, and other professionals to perform game analysis and additional training. KPR video streams can be divided into single router and group router. The previous method is based on segmentation and tracking of each target and the characteristics of the individual are used to study the events in the group. The latter is the processing and sampling of the global image, obtaining comprehensive information and then processing the collected data to classify abnormal and normal mode. Our algorithm determines the key position frame with high image quality, which is important for athletic training [12, 9, 3] indicates that motor transfer during skill performance is both in the horizontal path. The scores were as follows: metatarsal (85), knee joint (88-90), pivot foot (70-45), pivot angle (30-60), pelvic joint position (24-30), striking leg height (50-50), the height of the joint during kicking (73-70) and this confirms the idealism in sports training and this is due to the progress in the means used by both modern and special techniques in sports training and especially for their use in the work of psychokinetic modeling, confirms [1], that the convergence of these results to me indicates the normal distribution of skill performance through the motor path and the motor direction of the skill in question.

4. Conclusions

Through the study, it is necessary to provide customized smart support in karate training so that we can create kinetic self-modeling and this was demonstrated through the techniques that were used in the analysis for modeling work, and this helps the coaches to improve sports performance through the analysis of that sport and the special skill of the study URA MAWASHI GERI), and the modeling of the skill of URA MAWASHI GERI came to give a kind of ideal for that skill and to be an example for others, we provide a deep learning computer vision algorithm (Open Pose) to predict the opponent's movement in the counterattack, an analysis of the player's psycho-kinetic state through the emotional state of his face Discount during performance.

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