

Research on the use of 3D modeling and motion capture technologies for making sports training easier

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Abstract

The essential purpose of this research study is to measure the study on the use of 3D modeling and motion capture technologies for making sports training easier. This research study was conducted in china for determines whether the research study used specific MCQs-based questions related to the research topic included and its variables. 3D modeling is an independent variable, and motion capture technologies are the independent variable for determining the sport training effects and how it's easier. This research study depends upon it became. To determine the research study used analytical software of smart PLS and generated specific results, including the smart PLS Algorithm model, segmentation analysis, indicator correlation, and significant analysis. This research study describes the econometric model between dependent and independent variables. A comprehensive research study found that there is a positive effect of 3d modeling and motion capture technologies on sports training. This quality feedback is very good for encouraging the players to play good sports. In the sports field, one major problem regarding the result and timing of various sports has been solved using electronic technology timers. These electronic timers automatically calculate the timing of an athlete during a sport, and the data then provides help in predicting the winner of any sport.

Keywords: 3D modeling (3DM), motion capture technologies (MCT), sports training (ST), Smart PLS

1. Introduction

In sports, the analysis of an athlete's posture and body movement is necessary for determining his performance in a particular sport. Therefore, the technology-based method is primarily used to assist athletes of various sports. The most common form of technology-based systems used in sports include virtual reality, augmented reality, artificial intelligence, and information technology (Tits et al., 2018). All the designs are modern technology-based software. The primary purpose of this software is to make the sports field advanced and developed worldwide. In the sports field, analyzing various sports-related factors is essential to determine the overall tactics of a particular sport (Sasaki et al., 2018). In addition, using a 3D technology-based modeling system in the sports field makes sports training easier for athletes.

3D simulation models are used in various sports fields to understand the posture of different body parts of athletes. The 3D model provides Information regarding the terms like kinetics analysis and video analysis of the player. This method upgrades the training methodology of sports training. Also, this method assists the athlete in understanding the primary sports mechanism. The 3D modeling system can also predict the nature of various sports. Therefore, athletes can improve their skills through well-appropriate and well-developed sports training methods. In the sports field, Information regarding multiple angles, visuals, and postures of sports athletes can be obtained through the 3D modeling technology-based system (Wu & Koike, 2019). The most crucial Information that the 3D technology modeling system provides is the value of the angle at which the rotation of joints should be made while playing a particular sport. The correct angle

values of joints through the 3D modeling system allows athlete of various sports to move their joints at a safe angle. The rotation of joints at a safe angle will save the athlete from severe joint injuries while playing sports (Shimada et al., 2021). Also, athlete behavior analysis, performance analysis, and training analysis can be made using the 3D technology-based system in the sports field.

Detecting the player's position and his movement with the ball is challenging. The function of the player and ball changes randomly during the game. The old technique used in the sports field cannot predict the position and movement of the player in the sports field. So, to predict such random activities of players during a particular sport, the 3D monitoring system is used in the computer monitoring system of the sports field. This system works by using 3D virtual reality techniques and provides a 3D model for analyzing the position of players in the sports field (Zhang et al., 2019). This technology-based reality system works by tracking the ball's position and player in tricket.in other sports, like football and soccer, virtual reality-based 3D techniques determine the tactics of players. A 3D modeling system aids the player and coaches of various sports by providing them with real-time data. The data is then used to predict other sports-related statistics to optimize the functioning of the sports field at a broader level.

One more example of 3D modeling system used in the sports field is the playfield extraction model. This detecting technology-based model analyzes sports videos. This detection model possesses two main features. The first is to identify the playing and non-playing filed and then separate these two fields. The focus of the playing field is the primary objects, and the rest of the things from the background are cut off. This

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process avoids the studying of any unrelated entity in the sports field. Then the image of the primary objects with high resolution and pixel is obtained. The image or video mainly obtained is three dimensional to get the overall view of the different sports fields. Various changes in the playing sports field are made to distinguish it from the non-playing field (Hwang et al., 2020). These changes include the change of color of the area of the playing field. Lightening and weather conditions are also changed according to various sports conditions. Angles of the sports field are also adjusted to obtain an accurate 3D video of the sports field. The second feature of field play extraction is to update the statistic of the game (Pokharel et al., 2021). The 3-dimensional image of game statistics is provided through the 3D modeling system used in the playing field extraction model. The playfield 3D image extraction model is significant in sports because of its outstanding features and uses.

The deep learning algorithm can also be used in the 3D modeling process of the sports field. This algorithm is technology-based and provides in-depth Information regarding all the objects under study. The use of deep learning algorithms in the sports field provides complete Information regarding the athlete's performance and abilities (Mohd Jelani et al., 2019). This algorithm works by collecting and processing all the data related to the athlete's performance using technology-based software. As this algorithm provides in-depth data, it uses virtual and other modern technology system to perform its functioning. The tremendous qualities and advantages of this deep learning algorithm make it suitable; to be used in the 3D modeling system of the sports field.

The old and traditional methods for determining sports-related Information are not used in the present age of science of technology. New and virtual reality-based methods to detect various sports statistics are widely used in the 21st century. Using the 3D modeling technology-based system in the sports field offers several benefits (Nakano et al., 2020). These benefits include high accuracy and improved efficiency of all the monitoring systems, the betterment in the performance of an athlete, providence of in-depth Information regarding every area of the sports field. All these benefits make the 3D modeling system excellent for maintaining the sports field (Moore et al., 2022). The use of virtual reality technology in 3D modeling systems enhances the working of these models to a great extent. The athlete's performance and ability to play various sports efficiently increase because of the use of virtual reality technology in his training sessions (Menolotto et al., 2020). The availability of the most advance and realistic environment in the sports field using 3D technology enables the sports player to improve his skills. The 3D technology-based software's use in sports provides complete data regarding sports-related objects (Lin et al., 2022).

2. Research objectives

The research paper explains using 3D modeling and motion capture technologies to make sports training easier.

Research questions

The basic research question is

How the use of 3D modeling and motion capture technologies for making sports training easier?

This research study investigates the study Research on the use of 3D modeling and motion capture technologies for making sports training easier. Research paper divided into five parts first portion detail explain related to the 3D modeling also that motion capture technology this section represent objective of research and question related to the research study. Second portion describe about overall literature review based on 3D modeling technologies and motion caption technologies this part represent hypothesis between variables. the third part presents methodology of research study and tools also methods of research this part present that variables econometric model and framework of theoretical model. The fourth section describes about results and interpretation and the last part summarized overall research study.

3. Literature review

With the development of science and technology, information technology has provided its significant application in almost every sector (Dou, 2021). Particularly in sport sector information technology has been providing various applications from recent many years (Wei et al., 2021). Many researchers have been investigating the research on the applications of information technology, motion capturing technologies as well as 3D modeling technology for improving sports performance and making training easier (Desmarais et al., 2021). Several researchers claimed that due to the fast innovation in the computer related applications and information technology, the field of artificial intelligence (AI) has progressed rapidly from the theoretical stage to the practical application (Rana & Mittal, 2020). it becomes a fundamental component of today's progressive cultures, which seems to have an expanding impact on every aspect of daily lives of people, such as the training of a particular sports has been impacted to great extent by the development of the modern technology (Lin et al., 2018). So, it was investigated that AI, 3D modeling, and motion capture technologies have become an important type of emerging technologies that can offers significant help to the sport education training of sportsmen through a variety of techniques, including the evaluation of data and the modeling of different training scenarios (Omowonuola et al., 2021). Thus researcher highlighted that it seems important to investigate how artificial intelligence (AI), 3D modeling and motion

capture technologies can be implemented in sports training to make it easier to the athletes in order to enhance performance of the athletes (Jiang, 2020). That's why, author of this research said that this developing technology has the potential to make sports training of players significantly easier (Klöpfer-Krämer et al., 2020). Furthermore, many researchers examines various applications of AI, 3D modeling as well as motion capture technology in sports training and discusses the key concepts, all of which was based on the fundamental principle of Intelligence, information technology, motion capture technologies as well as on the modeling techniques (Zhang & Mao, 2022). Apart from this, many scholars emphasized on examining the significant connection that exists among artificial intelligence (AI) technology, motion capturing technology, 3D modeling technology and information technology and its relation with sports training have been also investigated (Günen et al., 2022). It was described that these technologies have strong positive association between them and have significant influence on the players training of various sports (Wu, 2022). Moreover, it has also a great potential to provide ease to the sport training programs and improve athletes movement during play (Wang, 2022). In addition, author explored that implementation of various applications of information technology, 3D modeling, and on capture technology into sports training can result in significant improvements, as has already been observed in a variety of sports fields, including soccer, tennis, and football (Park et al., 2021). Researcher claimed that field and track training, especially for throwing sports, has still been performed in the traditional way, with simply the guidance of a trainer (Li, 2021). Due to which if the collected information did not be measured accurately, an athlete may not be able to continuously perform to the best of their skills (Wang et al., 2019). Researcher presented a method that utilizes virtual reality, motion capture and 3D modeling technology to assess and enhance the sports training of an athlete for throwing sports (Qiu et al., 2021). For this purpose, a questionnaire method was used to collect movement and rotational data of the athletes and then processed it by utilizing computer based technology including virtual reality, 3D modeling and movement capture technology (Ning, 2019). Moreover, the motion of the sport player was analyzed by using a headset of virtual reality in association with a chart that displays values including the athlete's acceleration, speed, as well as velocity (Ohashi et al., 2020). The findings of the experiment demonstrated a significant lag in the real-time caption, as well as a shift after a time period (Liu et al., 2021). In general, a video of the motion tracking and performance capturing proved to be helpful when evaluating the motion of an athlete (Fieraru et al., 2021). Many scholars investigated the research on the hybrid motion capturing techniques to provide ease to the training of sports (Colyer et al., 2018). The purpose of this study

was to develop a new 3D modeling and motion capturing techniques with the intention of facilitating tennis players in their training to perform effectively during match (Wan Idris et al., 2019). After investigation, it was studied that the development of the 3D modeling and motion capture techniques have remarkable influences on the improvement of the movements of the athletes and have significant advance to make sports training easier (Min, 2022). Whereas it was highlighted that non-optical inertial motion capture method as well as the optical passive maker based motion capture method have ability to provide ease to the development of the training techniques (Yang, 2018).

Therefore, both the players and coach seems able to precisely evaluate the level of consistency that has been achieved in the tennis techniques of players and collaborate to enhance those techniques by employing the various sports training methods (Ohashi et al., 2018). Thus various researches demonstrated that the hybrid motion capturing method, 3D modeling techniques and other innovative movement capturing techniques seems significantly suitable for the ease and development of the sports training which in turn significantly improves the performance of the players (Xu et al., 2019). Apart from this, it was claimed that motion capture is used in the field of sport performance to follow and record the human movement of athletes in real time in order to evaluate factors such as their physical condition, technical expertise, athletic performance, and injury mechanism, as well as prevention and recovery strategies (Gao et al., 2021). The purpose of this study was to provide a comprehensive overview of the most recent advancements in motion capture technology for the purpose of evaluating athletic performance and making sport training easier. Researcher examined that the use of 3D modeling technology and motion capturing technology provides remarkable benefits to making sport training easier which in turn also leads towards the improvement of the athlete's performance during play. In addition, motion capturing technology also helps to improve the posture and movement of the athletes by providing training in an effective way (Fitzgerald et al., 2007; Needham et al., 2021).

4. Research Methodology

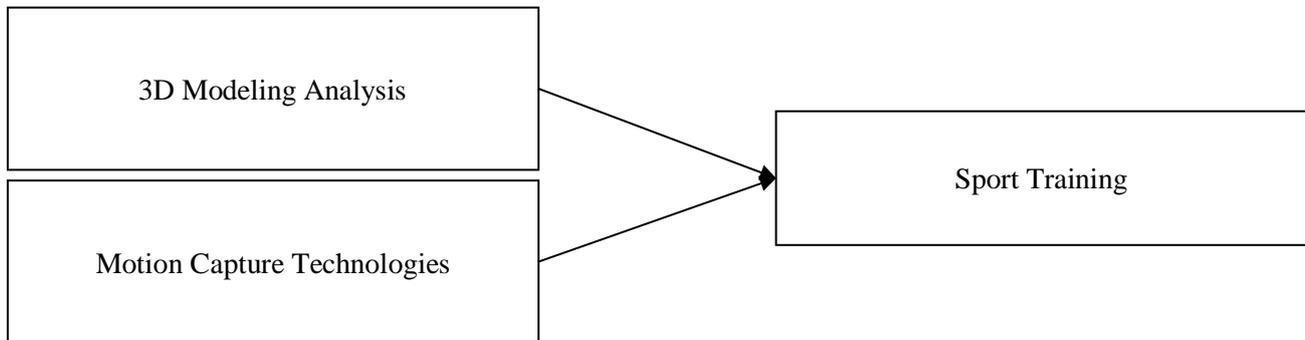
This research describes the study on the use of 3D modeling and motion capture technologies for making sports training easier. This research study depends overall analysis based related to the 3D modeling activities research depends on primary data analysis. For measuring the research study used smart PLS software and generate different results related to the 3D modeling and motion capture technologies in sport industries.

Research Tools and Techniques

This research study describes the 3D modeling and motion capture analysis for measuring the research used different tools and techniques related to the variables. the smart PLS Algorithm model, indicator correlation, the model fitness analysis, the significant analysis also that total effects in between 3D modeling and motion capture technologies for making the training of sport easier.

Econometric model

Research Design



3D modeling

The coordination-based system used for representing the objects in 3-dimensional form is called a 3D modeling system. This coordination system mostly uses mathematical operations to operate its functions. This system is used in a computer graphics program that uses 3D software to represent the surface of various objects under study. The 3D modeling systems that use the computer graphics program works by manipulating the image to give it a 3-dimensional form. In many sports-based areas, 3D modeling systems are used widely for improving the working mechanism of the sports field. Various types of 3D modeling systems are used to create a 3D image of objects. The three most common types of 3D modeling systems include; a solid 3D modelling system, a wireframe 3D modeling system, and the third one is surfaced 3D modeling system. These three types create a variety of 3D images by using different techniques. These techniques are so advanced that they provide various views of a single object. The front, back, top, and many other views of an object can be obtained using the 3D modeling system. Various software is used in 3D modeling systems to improve the 3D images of the object under study. This software includes Daz3d software, Poser software as well as blender software. These are all intelligence-based software that greatly advantages 3D modeling systems. One great benefit of this software is that it improves the quality of 3D images given by the 3D modeling system. Furthermore, the mechanism used by the 3D modeling system helps in visualizing the virtual objects in the real world using technology-based software. The 3D modeling system is mostly built on computer software that works by transferring the object image into the 3D form. In the field of sports, the

This model describes the overall effects in the form of equations such as:

$$ST = \alpha + 3dm\beta_1 + MCT\beta_2 + \varepsilon \quad (1)$$

Where:

ST= Sports Training

3DM= 3d modeling

MCT= Motion Capture technologies

use of 3D modeling systems holds great significance for the sports field as well as for sports athletes. The field of sports education benefits greatly due to the 3D modeling system. The 3D modeling system in the sports field also speeds up the process of sports research studies on the sports field. The conversation of the real sports world in a virtual sports environment helps the athlete to learn more about the sports field.

Motion capture technologies

The technology-based process for analyzing the posture and movement of various objects under study is known as motion capture technology. This technology is the most advanced form of the system used to observe an object's movement. This technology has broad applications in almost every field. In various control systems of computers, motion capture technology is used for visualizing objects. The two types of motion capture technology used in the present era include; inertial technology and optics technology. Optics motion capturing technology is expensive and provides detailed information regarding minor objects. The most significant quality of optics technology is that it provides the most detailed data regarding the animated object. On the other hand, inertial technology is cheaper and the newest form of motion-capturing technology. It is more convenient to use in contrast to the optics technology. Inertial technology is used in several fields, including gaming, sports therapy, and the healthcare sector. The generation of photorealistic images using inertial motion capturing technology allows for developing a better quality virtual environment. Motion capture technologies use digital models to provide 3D images of the real world. These movement-capturing technologies use software that provides animated images of the

object. These animated images then assist in understanding the given scenarios and situations. In many fields, the use of motion-capturing technologies plays a significant role. Like in the sports field, the use of motion-capturing technology helps determine athletes' posture and movement. Various motion-capturing wearable sensors are available for capturing the athlete's movement in the sports field. These wearable sensors use technology software to provide the exact movement statistics of the athlete during a particular

sport. The advantages offered by motion capture technologies make these technologies superior to other technologies. The most prominent advantage of motion-capturing technology is that it provides a 3D image of objects at various angles by using multiple cameras. These multiple cameras have a sensor that allows these cameras to move with the movement of an object. As a result of the camera's movement at various angles, different images of a single object from different views can be obtained.

5. Result and descriptions

Table-1

Significant Analysis

MATRIX	Original sample	Sample mean	Standard deviation	T statistic	P values
3D Modeling-> Motion capture technologies	0.255	0.243	0.109	2.347	0.019
3D Modeling -> Sport Training	-0.002	0.004	0.031	0.069	0.094
3D Modeling analysis-> 3D Modeling	0.078	0.082	0.151	0.517	0.605
3D modeling analysis-> Motion capture technologies	0.020	0.020	0.042	0.473	0.637
3D modeling analysis-> sport training	0.000	0.000	0.005	0.031	0.976
Motion capture technology-> 3D Modeling	0.029	0.027	0.059	0.484	0.628
Motion capture technology-> 3D Modeling analysis	0.369	0.395	0.138	2.685	0.007
Motion capture technology-> motion capture technology	0.007	0.006	0.017	0.436	0.663
Motion capture technology-> sport training	0.331	0.349	0.135	2.447	0.015
Motion capture technology-> sport training	0.008	0.013	0.117	0.072	0.943

The above result present that significant analysis Research on the use of 3D modeling and motion capture technologies for making sports training easier. This research study represents the original sample values, standard deviation; also describe the T statistic rates and P values of each matrix. The first matrix is 3D modeling->motion capture technologies its original sample value is 0.255 the sample mean rate of this matrix is 0.243. According to the research study its standard deviation value is 0.109 its T statistic value is 2.347 and P value is 0.019 shows that positive and significant effect on the use of 3D modeling and motion capture technologies for making sports training easier.

The second matrix describe that T statistic value is 0.069 its P values is 0.09 means that positive and 9% significant relation of 3D modeling and sport training. Similarly, another model in between motion capture technology->3D modeling analysis its original sample value is 0.369 the rate of sample mean is 0.395 shows that 39% average value. The standard deviation rate is 0.05 means that 5% deviate from mean its T statistic value shows that positive and significant effect between them. The sport training and motion capture technology represent that positive and significant effect between them its rate level is 0.072, 2.447 its significant level is 0.015 and 0.943 respectively.

Table-2

Total effect

VARIABLES	3D modeling	3D modeling analysis	Motion capture technologies	Motion capture	Sports training
3dm2	0.000	0.758	1.033	1.042	0.32
3dm3	0.000	0.295	0.321	0.444	0.999
3DM4	0.000	0.418	0.656	0.451	0.344
3DM5	0.000	0.330	0.322	0.224	0.562
3DM1	1.000	0.223	0.993	1.000	0.543
MCT1	0.432	0.611	0.301	0.123	0.556
MCT2	0.543	0.865	0.928	0.333	0.981
MCT3	0.123	0.651	1.342	0.423	0.037
ST1	0.567	2.342	1.54	1.544	0.929
ST2	0.333	1.045	0.677	0.555	0.346
ST3	0.211	0.522	0.833	1.322	0.888

The above result describe that total effect in between

all variables included independent and dependent for

measuring the research on the use of 3D modeling and motion capture technologies for making sports training easier. The 3D modeling shows that 43%, 54%, 12%, 56%, 33% and 21% positively related with each indicator. The 3d modeling analysis present that 75%, 29%, 41%,33% rate of total effect between each variable.

How to easier sports training through technologies

Using the right technology in the sports field greatly impacts the overall sports sector. Athletes' ability to improve their sports performance and productivity depends mainly on using good quality technological systems in the sports field. The use of the right technology offers several advantages to the athlete. These advantages include building confidence in an athlete, improving players' training sessions, and providing medical assistance to an athlete if any injury results during playing. All these advantages provided by the technology-based systems in the sports field help improve the athlete's way of playing a particular sport. Sports coaches use video-animated technologies for training their athletes with the best game tricks. Many sports leagues and professional sports teams use video technology-based animation systems for making decisions. The monitoring of potential players of sports teams is done mainly through technology-based software in the sports field. Many coaches of various sports fields use technology systems and software for pinpointing the minor mistakes of their players. The feedback quality improves through the technology-based system. In many sports like cycling, biking, skiing, as well as in bobsled, the athlete's timing is calculated through the electronic timers used by the computer programs of these sports. This technology-based system in the sports field also increases the chances of better communication between players and coaches. One more technology-based system used in sports fields

to make the training session of sports players easier is the camera-based analysis of athletes. This camera-based analysis uses a real-time environment for analyzing the athlete's movement. After analyzing the body posture of an athlete, these camera-based technological systems, provide him with the right way to adjust his body posture during a particular sport. The right posture then helps the athlete to avoid any chance of injury during the game. Also, this technology improves the athlete's overall performance and makes sports playing easier for the athlete.

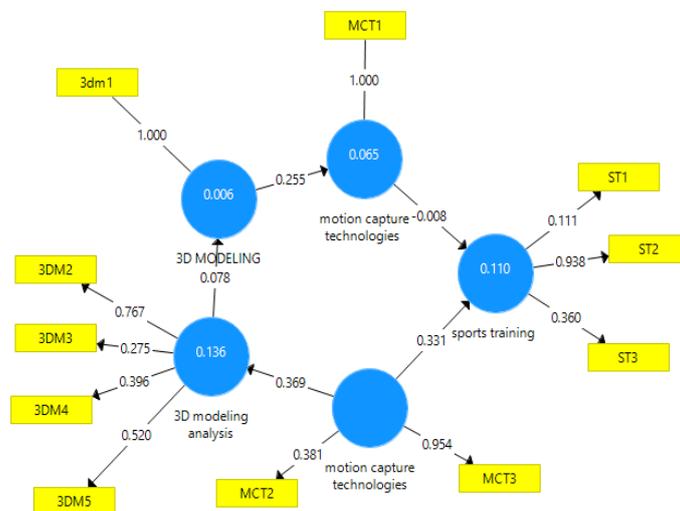
Table-3

Co-linearity statistical Analysis

Variables	VIF
3dm2	1.049
3dm3	1.005
3DM4	1.073
3DM5	1.090
3DM1	1.000
MCT1	1.000
MCT2	1.008
MCT3	1.008
ST1	1.010
ST2	1.009
ST3	1.002

The above result describes that co-linearity statistical analysis of each variable its result present that on the use of 3D modeling and motion capture technologies for making sports training easier. Result shows that VIF values of each variables rates are 1.049, 1.005, 1.073, 1.090, 1.000, 1.008, 1.010, 1.009 and 1.002 all of them represent that positive and significantly colinearity relation in between 3d modeling and motion capture technologies.

Smart PLS Algorithm Model



The above model describes that smart PLS Algorithm relationship and its effect on the use of

3D modeling and motion capture technologies for making sports training easier. The 3D modeling

analysis shows that positive values 0.520, 0.396, 0.275 and 0.767 its shows that 7% significant and positive relation with each other. the 3d modeling represent that 25% positive and significant relation with motion capture technologies the sport training represent the value effect with motion capture

technologies is -0.008 respectively. the sport training represents the algorithm result with motion capture technologies its rate level is 0.331 means that 33% significantly positive effect of motion capture training on sport training.

Table-4

Indicator correlation

variables	No.	Missing	Mean	Median	Min	Max	Standard Deviation	Excess Kurtosis	Skewness
3dm2	1	0	2.242	2.000	1.000	5.000	0.818	0.392	0.421
3dm3	2	0	1.626	2.000	1.000	3.000	0.579	-0.700	0.283
3DM4	3	0	1.586	2.000	1.000	4.000	0.804	1.366	1.372
3DM5	4	0	1.939	2.000	1.000	5.000	0.874	0.936	0.949
3DM1	5	0	2.242	2.000	1.000	5.000	1.006	-0.518	0.521
MCT1	6	0	1.939	2.000	1.000	5.000	0.874	0.936	0.949
MCT2	7	0	2.242	2.000	1.000	5.000	1.006	-0.518	0.512
MCT3	8	0	1.939	2.000	1.000	5.000	0.862	0.936	0.982
ST1	9	0	2.000	2.000	1.000	5.000	0.816	-0.518	0.791
ST2	10	0	2.232	2.000	1.000	5.000	0.983	1.119	0.422
ST3	11	0	2.081	2.000	1.000	4.000	0.849	1.068	0.648

The above result describe that indicator correlation result shows that skewness values, excess kurtosis values, result shows that standard deviation present that of each variables. the result shows that overall minimum values is 1.000 and the maximum values of each variable is 5.000 the result shows that standard deviation level is 0.392, 1.366, 0.936, -0.518 also that

1.119 and 1.068 present that some negative and some positive effect between them. The overall median rate is 2.000 its overall missing values is 0 respectively the skewness value is 0.421, 0.283, 1.372, 0.949 and 0.512 all of them are present that positive rate of skewness with each other.

Table-5

Segmentation Analysis

variables	Original sample R-Squares	Average Weighted R-squares	POS Segment 1	POS Segment 2
3D Modeling	0.006	0.397	0.513	0.315
3D Modeling analysis	0.136	0.165	0.040	0.254
Motion capture Technologies	0.065	0.077	0.137	0.034
Sports Training	0.110	0.251	0.160	0.315

The above result describe that segmentation analysis result shows that original sample R square, average weighted squares, POS segment 1 and POS segment 2 of each variable for measuring the research on the use of 3D modeling and motion capture technologies for making sports training easier. The 3d modeling shows that 6%, rate of original sample R square its average weighted R square value is 39% and its POS segment 1 rate is 51% and segment 2 rate is 31% respectively. Similarly, the motion capture technologies present that 6%, 7%, 13% and 3% rate of each factors. The sport training present that rate level is 11%, 25%, 16% and 31% respectively.

6. Conclusion

In conclusion, we studied that the rapid development of the world has towards the technological revolution. Almost every sector of the developing world is utilizing various applications of the emerging technologies in their sector in order to enhance the performance of their organization. Similar to many other sectors, sport sector also has been implementing various techniques to information technology, including virtual reality, 3D modeling techniques, motion capturing techniques, and artificial intelligence in order to improve the performance and trainings of the athletes. In the world of competitive athletics, it is necessary to

perform an evaluation of a player's position as well as the motion of their body in order to evaluate the athlete's performance during a specific sport. Therefore, the research on the applications of the motion capturing technologies has been increased many countries have been focusing on the development of these computer based technologies in order to make sport training easier and provide great advantages to the athletes during play. In this research paper, we studied the detail research on the use of 3D modeling and motion capture technologies for making sports training easier. For this purpose, we collected data through questionnaire survey from professional coaches and teams. We highlighted the two primary methods for the evaluation of the movement of the athletes including video based movement capturing techniques and 3D modeling techniques. These techniques have providing various benefit to the sports sector for making sport training easier. Apart from this, we reveal that both video analysis and kinetics analysis of the player are two examples of the types of information that can be obtained from the 3D model. This strategy improves the training strategies that are used in sporting activities. The 3D modeling technology has the ability to predict how various sports should be

played in order to enhance the performance. We concluded that it is possible for players to improve their talents by implementing 3D modeling and motion capture technologies as well as through well-developed techniques of sports training. Moreover, a computer technology-based method that employs 3D modeling can provide info regarding numerous angles, views, and positions of sports players. There are many advantages to utilizing a 3D modeling, motion capturing technologies, artificial intelligence and virtual reality in sport sector. These advantages include a high level of precision and greater efficiency across all surveillance systems, an elevation in an athlete's performance, as well as the provision of in-depth information concerning every aspect of a sports field. The integration of virtual reality, information technology, motion capturing technology with 3D modeling systems results in a significant performance improvement for the sport training. So, it is examined that the emerging technologies including wearable sensors, artificial intelligence, information technology, 3D modeling and movement capturing techniques have significant positive influence on the development of the sports sector and its application has been increased from recent many years to make sports training easier.

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