

Retraction

Retracted: Enhancing Orthopedic Surgery and Treatment Using Artificial Intelligence and Its Application in Health and Dietary Welfare

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Manipulated or compromised peer review

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

In addition, our investigation has also shown that one or more of the following human-subject reporting requirements has not been met in this article: ethical approval by an Institutional Review Board (IRB) committee or equivalent, patient/participant consent to participate, and/or agreement to publish patient/participant details (where relevant).

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

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- [1] D. Rubidha Devi, S. K. UmaMaheswaran, S. Tarar et al., "Enhancing Orthopedic Surgery and Treatment Using Artificial Intelligence and Its Application in Health and Dietary Welfare," *Journal of Food Quality*, vol. 2022, Article ID 7734650, 7 pages, 2022.

Research Article

Enhancing Orthopedic Surgery and Treatment Using Artificial Intelligence and Its Application in Health and Dietary Welfare

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The current decade has seen an increased usage of high-end digital technologies like machine learning in the field of health care services which enable in supporting and performing different functions with less or no human interventions. The application of machine learning tools in the orthopedic area is gaining more popularity as it can support in analyzing the issues in a more comprehensive manner, provide accurate data, support in forecasting the pattern. It enables offering critical information for taking quick decisions by the medical practitioners in order to enhance the health and dietary care service delivery. The ML tools can support in collecting patient centric data related to orthopedic surgery and also estimate the postoperative complications, level of treatment modalities to be provided, and guide the medical practitioners in taking effective clinical device decisions. The ML approach also supports in providing prediction methods of implementing the ortho surgical outcomes. Furthermore, it can also guide in making better treatment procedures, forecast the patterns, and stream the health care management services for better patient recovery. This study implements a quantitative research approach which will support in sourcing the data from the respondents who are currently working as medical practitioners, orthopedic experts, and radiologists who use ML-based models in making critical decisions related to orthopedic surgery. The researchers chose nearly 149 respondents, and the information was analysed using the IBM SPSS package for gaining critical interpretation. The major analyses cover descriptive analysis, regression analysis, and analysis of variances.

1. Introduction

The application of machine learning (ML) related models has been interwoven in individuals' lives in an effective manner. The adoption of ML-based approaches has seen tremendous importance in the medical industry and there has been a recent surge in usage of these tools for effective diagnostics, treatment,

and rendering enhanced health care services to the patients [1]. The implementation of ML has been applied in different areas of health care such as cardiology, neurology, brain diseases, orthopedics, radiology, and other areas. The ML is gaining more interest based on the success in the medical field with some aspects able to enhance the overall diagnosis and better medical service delivery with minimal human efforts.

The relationship between orthopedics and diet has long been pondered upon and discovered, showing that a certain type of restricted diet can modulate bone strength, its microstructure, and density that results in its varying mechanical properties [2, 3]. The absence of a certain nutrient could be detrimental to one's musculoskeleton, and on the other hand, a controlled diet postsurgery would help improve quality of care and carry out effective surgeries [4, 5].

In medical terms, the OCD disorder is stated as the overall pattern of unwanted thoughts which will lead the individual to do repetitive behaviors or actions, and this will become a compulsion. It has also been mentioned that the brain abnormalities and overall environment tend to impact the behavior of the individuals, and this will lead to OCD.

The ML model applies various high-end algorithms and performs various analyses in order to understand and analyse the complex patterns based on the data collected. The ML can enable in application of learning patterns from the information and forecast models which can link to target variables and support in rendering better services [6]. The ML-based approaches tend to compile the information from the imaging and lab test, which will support in formulating enhanced decision making. The ML possess major potential in enhancing the overall quality of life for the individuals in the area of medical health covering orthopedics, mental health, and other areas. The ML-based algorithm tend to identify the clinical aspects of the OCD disorders, but the application of MRI tends to render only with 70% accuracy. On the other hand with the application of novel ML tools the accuracy can be enhanced [7]. Furthermore, in another study, many of the medical practitioners have stated that ML supported in enhancing the colour related analysis, support in better detection to product forecasting models for depression screening.

The application of ML models tends to influence critical decision making for performing the surgery. Furthermore, the usage of ML models enables in analysing the complications involved and take preventive actions so as to render enhanced medical services to the individuals. Moreover, the postop treatment modalities can be planned so that the individuals get good care after the surgery and enable them to perform their activities more effectively.

Also, it has been noted that the major areas where ML approaches has been widely applied in radiology, the ML models tend to perform better for orthopedic surgeries as they tend to locate and detect the area of fracture in various parts of the body. The ML-based models also enable integration with the imaging system, making more intelligent analysis of the patterns and also forecasting using sophisticated models [8].

It has also been observed that in key areas where LM methods have been widely used in radiology, ML models generally perform better in orthopedic surgery as they tend to locate and detect fracture zones in different parts of the body. ML-based models also allow integration with the image processing system to perform smarter model analyses and make predictions using sophisticated models. This can be achieved by integrating the use of critical data from a patient's previous medical records, which helps to establish appropriate images and an effective examination of

extremities. It also helps in detecting temporary findings and helps doctors suggest better treatments for patients.

These can be made through the integration of the usage of critical data from the patient's previous medical records, support in determining the appropriate imaging, and examination of the limbs effectively. Moreover, it also supports in detecting the incidental findings thereby supporting the medical practitioners in suggesting better treatment modalities to the patients [9]. The usage of ML does not focus in replacing the role of radiologist, rather it supports them in enhancing the accuracy level of diagnostics, providing better imaging, and in offering better workflow and support to all the stakeholders in the medical field. ML can also help in monitoring the nutritional status of the patient, which would be instrumental in successful surgical outcomes.

The application of ML enables offering better and creative personalized diets oriented through AI and also focuses on creating ethnic foods. Due to the emergence of sophisticated technologies and biotechnologies, the usage of diet and eating habits enables it to continue to play a crucial role in enhancing the health of the individual.

Surgery for different aspects including orthopedics, which is the most technological enhanced field in the area of medicine. The ML adoption in the area of orthopedics though in initial stage, it enables in offering better individual related predicted rate in pre- and postoperative complication. It supports the medical practitioners in forecasting the industries related to risk patterns and guides in enhancing clinical decision making [10].

The most advanced technical field of medicine is surgery in many aspects, including orthopedics. The introduction of LM in orthopedics, albeit at an early stage, will enable individuals to offer a more predictable frequency of pre- and postoperative complications, support industrial physicians in predicting risk models and guide the improvement of clinical decisions-design.

The ML-based algorithm supports the rendering of multiple tasks with less or no human intervention and aids in enhancing the imaging analysis, which is the most critical aspect in the case of health care analytics covering detection of the fracture in orthopedics, classification, and segmentation of the pattern in an effective manner [11, 12]. The image detection tends to address the spatial and related analysis in an effective manner, for example, the detection of algorithm to localise the anatomic applications using MRI of femur bone..

The use of ML is not intended to replace the role of the radiologist, but to help improve the level of diagnostic accuracy, provide better images, a better workflow, and support medical stakeholders. ML can also help monitor a patient's nutritional status, which helps ensure successful surgical outcomes.

The image classification through ML approaches tends to assign the category to specific images. Since, the input is a key aspect for the medical analysis, the output tends to be more positive and supportive in addressing the needs of the patients effectively. Researchers have used the ML approaches to focus on enhancing the medical imaging, supporting in forecasting the pattern, and enabling analyzing the high risk of diseases effectively along with the effect of different dietary components that could benefit

presurgical, during surgery, and postsurgical quality of care. The use of robots in surgery is also one interesting application of remote healthcare [13].

The major limitations of using Machine learning (ML) is that it needs specialized training, moreover the cost of implementation and maintaining the equipment is costly, the learning must be generally supervised effectively, require large volume of data, all the systems and IT infrastructure needs to be tagged in so that all information can be analysed and processed, which may be cumbersome.

The study is involved in analyzing the critical factors influencing the application of machine learning technologies for enhancing orthopedic surgery and treatment. The major factors considered by the study is forecasting the severity of the diseases through ML approaches, augmented medical imaging for making critical analysis, determining the type of nutritional care, and providing better health care services to the patients who are in the high-risk category.

2. Literature Review

Many researchers have stated that the application of ML is mainly used to assess the risk of bias and should be identified as low risk, medium risk, high risk of bias, selection bias, force bias, detection bias, friction bias, reference bias, and so on [14]. The researchers address ten areas related to the risk of bias in nonrandomized intervention studies. The tool assesses observational studies and quasi-randomized studies. Seven areas are used for risk assessment, including confounding, participant selection bias, classification bias, bias, incomplete data bias, performance measurement bias, and sample bias. Studies are not classified as low, medium, serious, or critical based on information or risk of bias. Randomized forests (RF) are used to classify healthy individuals with osteoarthritis and interpret the results clinically, giving a continuous regression result that the authors say best mimics the progressive nature of osteoarthritis. Pathology compared with a clear classification result. The authors collected kinematic data from patients that also included parameters for ground reaction forces [15].

Another aspect that was treated with SCI was related to knee injuries. In this article, sagittal plane MRI volumes of the human knee were manually digitized and labelled for ACL. These ACLs were not partially and completely damaged according to the written diagnostics. A ROI was then selected from the images to extract the descriptive voxel [16]. Object recognition techniques such as directional classification histograms (HOG) and spatial map descriptions of the scene (critical descriptor) were used to limit the number of potentially representative properties for each ROI [17].

Various nutritional categories affect different aspects of orthopedic surgery at different stages. Reduced levels of protein, albumin, iron, hemoglobin, high body-mass index (BMI) could cause complications during the surgery affecting its outcomes, while carbohydrates, proteins, amino acids, β -hydroxy β -methylbutyrate, or vitamin D can positively fasten and enhance patient recovery [18].

Since the diagnosis and treatment of orthopedic surgery is largely based on radiological methods (p. computed

tomography (CT), magnetic resonance imaging (MRI), and conventional X-rays), the vast majority of research based on artificial intelligence and ML has been applied to imaging. Recent advances in artificial intelligence and ML have shown remarkable results, and some studies have shown that computers have outperformed humans in certain image interpretation tasks [19]. In the field of movement medicine, LD has proven to be useful in both text analysis and image analysis. ML-and DL-based technicians can assess the status of previous diseases and are currently in focus for extensive orthopedic research, especially in the following subareas: spine, joint inflammation, traumatology, and oncology.

Another important scientific application where ML has shown promise is portable technology. With the advent of portable and portable technology, the general public as well as professional athletes can monitor basic human physical and physiological functions that can be combined with health records for analysis [20]. While ML applications are emerging in orthopedic imaging, it is worth considering the many benefits associated with ML over current imaging strategies. Perhaps most important of all is that ML can recognize traits that may not be detectable by the human eye. Likewise, ML can recognize efficient functions that seem to offer limited value to the reviewer but offers a strong predictive value for sorting input data.

Another aspect that is treated with CKD is related to knee injuries. In this article, human MRI scans were manually digitized and labelled for ACL. These ACLs were not completely or partially damaged by the written diagnosis. Then we select the ROI for the images to extract the descriptive voxel. Object recognition techniques such as directional histogram (HOG) and spatial scene mapping (critical descriptor) have been used to limit the potential representative properties of each ROI.

3. Methodology

The basic aspect of the study is to enable analysis of the critical factors influencing the machine learning approaches in supporting orthopedics surgery for better health and nutritional care. The research is more involved in using primary data sources, which are collected through closed-ended questions. The researchers has used a 5-point Likert scale for preparing the questions and the respondents are chosen using a convenience sampling method due to time constraints and other limitations [21]. The secondary data are also used in order to apprehend the application of the ML algorithm in the orthopedic surgery and treatment modalities. The major secondary sources covered are: EBSCO, Google scholar, and other published Scopus indexed journals.

3.1. Hypothesis of the Study. There is no major impact of forecasting the severity of the diseases and ML-based approaches in orthopedic surgery.

There is no major impact of augmented medical imaging for making critical analysis and ML-based approaches in orthopedic surgery.

There is no major impact of better health and dietary care services to the patients and ML-based approaches in orthopedic surgery.

4. Analysis and Discussion

The next part of the analysis is involved in understanding the analysis of the data collected by the researchers. Nearly 154 respondents were chosen using convenience sampling. The major analysis used is percentage analysis, correlation analysis, and analysis of variance test.

From the above analysis in Table 1, it is noted that 37% of the respondents stated that effective medical support is rendered through machine learning approaches. 31.2% have stated that they strongly agree to this statement, whereas 17.5% are neutral and others disagree to this statement. Figure 1 below shows the effective medical support graphically.

The next percentage analysis is to understand whether the ML can easily identify patterns and its impact in enhancing health and nutritional care services.

From the above analysis in Table 2, it is noted that 34.4% of the respondents stated that the machine learning approaches support in easily identifying the patterns related to orthopedics surgery. 33.8% of the respondents have stated that they strongly agree to the statement, 16.9% of the respondents are neutral, and the remaining are disagreeing to the statement. The above analysis is shown graphically in Figure 2.

4.1. Correlation Analysis. The correlation analysis in the research study support in analysing the overall strength between the variables, the independent variables are considered as: Forecasting the severity of diseases; Augmented medical imaging and better health and nutritional care services, whereas the dependent variable is ML-based orthopedics surgery.

Based on the analysis in Table 3, it is noted that the highest correlation lies between forecasting the severity of diseases and ML-based orthopedics which is +0.837, whereas correlation between augmented medical imaging and ML-based orthopedics is +0.836 and between better health and nutrition care services and ML- based orthopedics is +0.750. Hence, all the variables possess highest positive correlation analysis between the independent variables and dependent variables.

4.2. Test of Hypothesis. The analysis of variance (ANOVA) is considered as a critical statistic model which enables in understanding the nature of a significant association between the variables. It enables in identifying whether the data are significantly significant.

4.2.1. Hypothesis 1. There is no major impact of forecasting the severity of the diseases and ML-based approaches in orthopedic surgery.

TABLE 1: Effective medical support.

| Effective medical support | Frequency | Percent |
|---------------------------|-----------|---------|
| Strongly disagree | 8 | 5.2 |
| Disagree | 14 | 9.1 |
| Neutral | 27 | 17.5 |
| Agree | 57 | 37 |
| Strongly agree | 48 | 31.2 |
| Total | 154 | 100 |

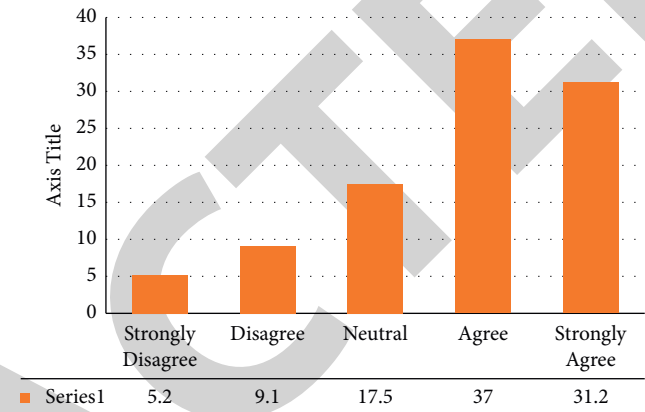


FIGURE 1: Effective medical support.

TABLE 2: ML can easily identify patterns.

| ML can easily identify patterns | Frequency | Percent |
|---------------------------------|-----------|---------|
| Strongly disagree | 10 | 6.5 |
| Disagree | 13 | 8.4 |
| Neutral | 26 | 16.9 |
| Agree | 53 | 34.4 |
| Strongly agree | 52 | 33.8 |
| Total | 154 | 100 |

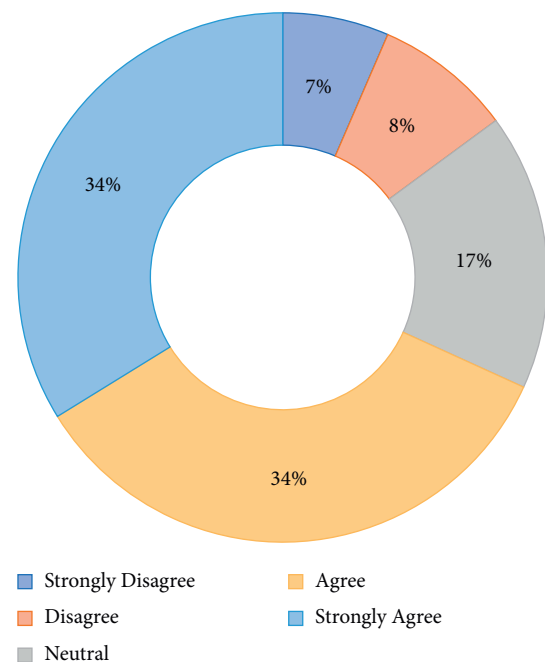


FIGURE 2: ML can easily identify patterns.

TABLE 3: Correlation analysis.

| Karl Pearson's | Forecasting the severity of diseases | Augmented medical imaging | Better health and nutritional care services | ML-based orthopedics |
|--------------------------------------|--------------------------------------|---------------------------|---|----------------------|
| Forecasting the severity of diseases | 1 | 0.889 | 0.829 | 0.837 |
| Augmented medical imaging | 0.889 | 1 | 0.856 | 0.836 |
| Better health care services | 0.829 | 0.856 | 1 | 0.750 |
| ML-based orthopedics | 0.837 | 0.836 | 0.750 | 1 |

TABLE 4: ANOVA analysis between forecasting the severity of the diseases and ML-based approaches in orthopedic surgery.

| Forecasting the severity of diseases | SS | Df | MS | F | P Values |
|--------------------------------------|---------|-----|--------|---------|----------|
| Between groups | 150.831 | 4 | 37.708 | 135.618 | 0.001 |
| Within groups | 41.429 | 149 | 0.278 | | |
| Total | 192.26 | 153 | | | |

Based on the analysis in Table 4, it is identified that the P value is 0.001 which is very low than the agreed significance value. Hence it is stated that there is a major impact of forecasting the severity of the diseases and ML-based approaches in orthopedic surgery.

4.2.2. Hypothesis 2. There is no major impact of augmented medical imaging for making critical analysis and ML-based approaches in orthopedic surgery.

Based on the analysis in Table 5, it is identified that the P value is 0.001 which is very low than the agreed significance value. Hence it is stated that there is a major impact of augmented medical imaging for making critical analysis and ML-based approaches in orthopedic surgery.

4.2.3. Hypothesis 3. There is no major impact of better health and nutritional care services to the patients and ML-based approaches in orthopedic surgery.

Based on the analysis in Table 6, it is identified that the P value is 0.001 which is very low than the agreed significant value. Hence it is stated that there is a major impact of better health and nutritional care services to the patients and ML-based approaches in orthopedic surgery.

During the current decade, the latest digital technologies such as machine learning in healthcare have been increasingly used to support and perform various functions with little or no human intervention. The use of machine learning tools in the field of orthopedics is becoming more and more popular as they can help with more complete problem analysis, provide accurate data, help predict quality, provide important information for a physician's quick decisions, and improve the provision of health and dietary services [22]. The use of ML is used in various health areas such as heart disease, neurology, brain diseases, orthopedics, radiology, and other areas. ML is more concerned about successes in the medical field especially certain aspects that can improve the overall diagnosis and better the delivery of medical services with minimal human effort.

ML tools can help collect patient-centered data in orthopedic surgery, as well as assess postoperative complications, the

TABLE 5: ANOVA analysis between augmented medical imaging for making critical analysis and ML-based approaches in orthopedic surgery.

| Augmented medical imaging | SS | Df | MS | F | P Values |
|---------------------------|---------|-----|--------|---------|----------|
| Between groups | 181.962 | 4 | 45.491 | 157.041 | 0.001 |
| Within groups | 43.161 | 149 | 0.29 | | |
| Total | 225.123 | 153 | | | |

TABLE 6: ANOVA analysis between better health and nutritional care services and ML-based approaches in orthopedic surgery.

| Better health care services | SS | Df | MS | F | P Values |
|-----------------------------|---------|-----|--------|--------|----------|
| Between groups | 133.851 | 4 | 33.463 | 73.191 | 0.001 |
| Within groups | 68.123 | 149 | 0.457 | | |
| Total | 201.974 | 153 | | | |

level of treatments to be performed, and provide guidance to PR practitioners to create effective clinical tools [20]. ML methods also provide predictive methods for achieving orthosurgical results and can guide the development of better treatment procedures, predict quality, and publish health and nutrition management services for better patient recovery. ML-based methods often collect information from imaging and laboratory studies to help shape better decision making. ML has a great potential to improve the overall quality of life for individuals in the areas of medical health, orthopedics, mental health, and more. The ML-based algorithm strives to detect the clinical aspects of OCD disorders, with MRI applications typically providing only 70% accuracy and new ML tools can improve accuracy. In addition, in another study, many physicians reported that ML helped improve colour-related resolution by improving the perception of predictive patterns in depression treatment products.

5. Conclusion

ML-based models also allow integration with the imaging system to perform smarter model analyses and predictions using sophisticated models. This can be achieved by

integrating the use of critical data from a patient's previous medical records, helping to establish appropriate images, and effectively examine the extremities. It also helps detect temporary findings and help physicians suggest better treatments for patients. The use of ML is not intended to replace the role of the radiologist, but to help improve the level of diagnostic accuracy, provide better images, a better workflow, and support medical stakeholders. It supports ML-based multitasking algorithms with little or no human intervention and helps improve image resolution, which is the most critical aspect of health analysis that includes the detection and modulation of orthopedic fractures for anatomical applications with the MRI of femur. It can also be used to devise a custom made dietary plan for the patients based on the individual needs and medical history that would help enhance the surgical outcome. Image classification with ML methods tends to categorize certain images, input is a key aspect in medical analysis, the result is often more positive and helps to effectively meet patients' needs. The researchers use ML methods to improve medical imaging, predict patterns, and analyse high-risk diseases.

Data Availability

The data shall be made available on request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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