Academic Journal of Science and Technology
ISSN: 2771-3032 | Vol. 9, No. 2, 2024

Clinical Medical Detection and Diagnosis Technology Based on the AlexNet Network Model

Wenpin Qian[1, *], Yixu Wang[2], Jianfeng Chen[3], Hong Zhou[4], Le Yang[5]

[1]Information Science, Trine University, Phoenix, Arizona, USA
[2]Computer Technology, Peking University, Beijing, CN
[3]Statistics, Independent Researcher, Fairfax, Va, USA
[4]Computer Technology, Peking University, Beijing, CN
[5]Master Science in Computer Information Science, Sam Houston State University, Huntsville, TX, USA
[*]Corresponding author: Wenpin Qian (E-mail: shellquery@gmail.com)

Abstract: With the rapid development of deep learning technology, its application in the medical field is more and more extensive. This paper mainly discusses the clinical medical detection and diagnosis technology based on AlexNet network model. This paper first introduces the basic principle and characteristics of AlexNet network model, then summarizes its application in the medical field, and then elaborates the implementation process of the technology, including data preprocessing, model training and optimization. Finally, the effectiveness and reliability of this technique are verified by experiments, and its future development is prospected.

Keywords: Medical Field; AlexNet;Clinical Medical; Applications.

1. Introduction

The proposal of AlexNet marks a breakthrough in the field of deep learning in computer vision, significantly enhancing the accuracy of image recognition." Clinical medical detection and diagnosis technology based on AlexNet network model mainly uses AlexNet's powerful image recognition ability to analyze medical images to assist doctors in disease diagnosis. There are some common applications in medical image analysis where AlexNet can be used to analyze medical images such as X-rays, MRI and CT scans. It aids in the detection of diseases like lung cancer, breast cancer, and heart disease through image identification and analysis. Pathology diagnosis is a very important part of the medical field, but because pathology diagnosis requires a lot of professional knowledge and experience, it is difficult for some basic hospitals to make an accurate diagnosis. The Alexnet-based network model can help doctors make fast and accurate diagnoses by analyzing pathological tissue slices. The network model based on AlexNet can find similar cases through the extraction and comparison of case characteristics, and provide a reference for doctors[1]. This can help doctors better understand the occurrence and progression of diseases and improve the accuracy of diagnosis. In addition, it can also assist surgical navigation, and the network model based on AlexNet can provide navigation information for surgery through the analysis of medical images. For example, before surgery, the doctor can input the patient's medical image into the system, and the system will automatically identify the lesion site and the surrounding structure, and provide the doctor with navigation information during the surgery, improving the accuracy and safety of the surgery[2].

In general, clinical medical detection and diagnosis technology based on AlexNet network model has become an indispensable part of the modern medical field. It can improve the efficiency and quality of medical services and help doctors better understand and treat various diseases.

2. Related Work

2.1. The AlexNet Network Model

AlexNet is a deep convolutional neural network model proposed by Hinton's student Alex Krizhevsky in 2012. It is a deeper and wider version of LeNet that for the first time brings together deep convolutional neural networks (CNNS), Gpus, and huge Internet-sourced data sets (Imagenets).

AlexNet contains 630 million connections, 60 million parameters, and 650,000 neurons, with five convolutional layers, three of which are followed by the maximum pooled layer, and finally three fully connected layers. At CNN, AlexNet successfully applied tricks like ReLU, Dropout, and LRN. In addition, the model uses local response normalization techniques to further optimize the model.

Parameter configuration of each layer of AlexNet. The first layer is the convolution layer, which uses the convolution kernel of 11×11 for convolution operation. The step size is 4, the fill is 0, and the size of the output feature map is 55×55.

This layer uses ReLU activation functions and local response normalization techniques. The second layer is the maximum pooling layer, the pooling step is 2, which can halve the size of the feature map. The third layer is the convolution layer, which uses 256 convolution check inputs for convolution operations, and the output feature map size is 27×27. The fourth layer is the maximum pooling layer with a step length of 2, which can halve the size of the feature map. The fifth layer is the convolution layer, which uses 384 convolution check inputs for convolution operations[3-4]. The sixth layer is the convolution layer, which uses 384 convolution check inputs for convolution operations. The seventh layer is the convolution layer, which uses 256 convolution check inputs for convolution operations. The eighth layer is the fully connected layer, which connects 256 neurons and 1000 neurons of the previous layer, and outputs 1000 classification results.

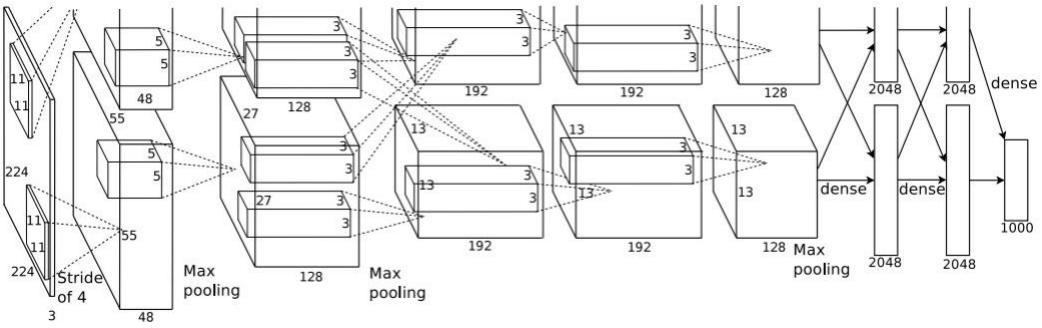

Figure 1. AlexNet model architecture diagram

Here are some of the core formulas of AlexNet's model:

The output size of the convolution layer is calculated by the formula: $O = \frac{I-F+2P}{S+1}$, where I is the input size, F is the convolution kernel size, P is the padding size, and S is the step size.

The formula for the ReLU activation function is $f(x) = max(0, x)$

Cross entropy loss function formula: $L = -\sum i = 1Nyi \log(\widehat{YI}) + (1 - yi) \log(1 - \hat{y}i)$, where N is the sample number, y is real labels, y ^ is predicted labels.

The SGD optimizer's formula is: $\theta = \theta - \eta \nabla L(\theta)$, where θ is the parameter, η is the learning rate, and ∇L(θ) is the gradient of the loss function.

Through the above parameter configuration and structural design, AlexNet can achieve better performance in image classification tasks.

2.2. Applications in Clinical Medical Detection

Clinical medical detection and diagnosis technology based on AlexNet network model has been widely used in clinical medical detection. AlexNet is a deep convolutional neural network with good feature extraction and classification performance, which is widely used in image recognition and computer vision. In clinical medical testing, Alexnet-based medical diagnostic technology enables fast, accurate and objective diagnosis, helping to improve the quality and efficiency of diagnosis and treatment.

Medical image diagnosis is taken as an example to illustrate the application of clinical medical detection and diagnosis technology based on AlexNet network model. In terms of image data preprocessing, medical image data preprocessing is a necessary step, including image denoising, enhancement and standardization, so as to improve image quality and recognition rate[5-7]. AlexNet and other deep learning models are used for feature extraction of medical images to extract disease-related feature information. These characteristics may include the size, shape, density and texture of the lesion area. In the classification of diseases, based on the extracted features, the classifier is used to classify the diseases. Common classifiers include support vector machines, neural networks, and decision trees. Alexnet-based classifiers can automatically learn and identify disease features to achieve accurate classification. It can also assist in diagnosis, and doctors can use Alexnet-based medical diagnostic technology as an auxiliary tool to help analyze diseased areas and provide preliminary diagnostic results. This helps improve the accuracy and efficiency of doctors' diagnoses. Finally, the diagnostic outcome evaluation evaluates the performance and accuracy of Alexnet-based medical diagnostic technologies through testing and validation of a large number of cases. This helps to continuously improve and optimize the model and improve the diagnostic effect.

In addition to medical imaging diagnosis, Alexnet-based clinical medical detection and diagnosis technology can also be applied to other fields, such as electronic medical record analysis, genomic analysis, pathology analysis, etc. Through deep learning technology, key features in patient information can be automatically extracted to assist doctors in making fast and accurate diagnosis and treatment plans.

It is important to note that Alexnet-based clinical medical detection and diagnosis technology is only an auxiliary tool and cannot replace the judgment of the doctor. Doctors should conduct a comprehensive analysis and evaluation of the diagnosis results in combination with their own professional knowledge and experience to ensure the quality and safety of diagnosis and treatment.

2.3. Diagnosis Technology with AlexNet

The use of AlexNet for diagnostic technology involves the following steps and methods, the first of which is data collection and the preparation of sufficient medical image data sets, including X-rays, MRI, CT scans, etc. These data need to be labeled with the corresponding lesion, disease, or other area of interest.

Model training: Use a pre-trained AlexNet model or train a new model from scratch to adapt to a specific medical diagnostic task. In the training process, medical image data needs to be input into the AlexNet model, so that the model can learn the features and patterns in the medical image[9]. Then the model is tuned and optimized to improve the performance and accuracy of the model on medical image data. This may involve adjusting the network structure, hyperparameter optimization, and adopting techniques such as data enhancement.

Through model validation The trained model is evaluated and validated using an independent validation data set to ensure the generalization ability and accuracy of the model. This can be achieved by calculating the classification accuracy, recall rate, accuracy rate and other indicators of the model on the verification set. Applied to clinical practice, the trained AlexNet model is applied to the actual clinical practice[10]. By inputting medical images into the model, the model can automatically classify, detect and diagnose the images, providing auxiliary decision making and diagnostic support for doctors. Finally, continuous improvement and update, new medical image data is continuously collected, and this data is used to further train and improve the model to adapt to changing clinical needs and case characteristics.

In general, the use of AlexNet's diagnostic technology can help doctors to analyze and diagnose medical images more

quickly and accurately, improve the efficiency and quality of diagnosis, and provide better medical services to patients.

3. Challenges and Limitations

Although the clinical medical detection and diagnosis technology based on AlexNet network model has made remarkable progress, it still faces some challenges and limitations.

When it comes to data quality, the acquisition and labeling of medical images is a complex and time-consuming task. Because data annotation requires a lot of manpower, material resources and time, it is difficult to obtain large-scale and high-texture annotation data sets. This may limit the generalization ability of the model and affect the accuracy of diagnosis. There are also limitations in computing resources, AlexNet is a deep neural network that requires a lot of computing resources for training and reasoning. For many healthcare organizations, having high-performance computing equipment and a dedicated team of data scientists to train and deploy deep learning models is a challenge[11]. Privacy and security The privacy and security of medical data is of Paramount importance. When using deep learning models for medical detection and diagnosis, data needs to be used and analyzed under the premise of data security and privacy protection. This requires a series of security measures and technical means to protect the data from being leaked or misused.

Deep learning models are often considered to be "black box" models, whose decision-making processes are difficult to explain. In the medical field, interpretability is critical for doctors to understand and trust the model's diagnostic findings. At present, how to improve the interpretability of deep learning models is an important research direction in this field. At present, there is no unified standard and specification for clinical medical detection and diagnosis technology based on deep learning, and there is also a lack of relevant regulatory policies and regulations. This can lead to incompatibilities and inconsistencies between different systems, affecting the wide application and promotion of the technology. Although deep learning has achieved remarkable results in medical image analysis, there are still difficulties in the diagnosis of some complex cases and lesion types. In addition, deep learning models have high requirements for image size, resolution and quality, which limits their application on some low-quality images[12-14]. Cross-validation and transfer learning, different medical institutions and data sets may be different, how to use different data sets for cross-validation while ensuring the generalization ability of the model is a challenge. In addition, in order to adapt to different data sets and tasks, transfer learning is an effective solution, but how to choose the appropriate pre-trained model and transfer strategy remains to be discussed.

These challenges and limitations can be overcome in a variety of ways. First of all, in order to improve the generalization ability of the model, a larger scale of annotated data sets can be collected and strategies such as semi-supervised learning and self-supervised learning can be adopted to reduce the dependence on large amounts of annotated data. Second, medical institutions can work with professional technical teams to use cloud computing resources for model training and reasoning to solve the problem of computing resource limitations. At the same time, measures to strengthen data security and privacy protection are essential[14-17]. In addition, studying interpretable deep learning models and methods can help doctors better understand the model's decision-making process. Standardization and regulatory policy development are also important links to promote the wide application of the technology[18]. Finally, combining other medical image analysis techniques, traditional medical methods, and deep learning models can more fully reveal disease characteristics and treatment options.

4. Future Directions

The first is more efficient data processing and analysis, and with the rapid growth of medical data, how to process and analyze this data efficiently becomes critical. In the future, medical diagnosis technologies based on deep learning may pay more attention to the optimization of data processing processes to improve the training efficiency and accuracy of models. Because of the special nature of the medical field, doctors need to be able to understand the decision-making process of the model. In the future, more research may focus on developing deep learning models with high interpretability to increase doctors' trust in the models. In the development of personalized medicine, with the popularity of the concept of precision medicine, medical diagnosis technology based on deep learning may be more applied to the formulation of personalized treatment plans[19]. Through the analysis of patients' genome, lifestyle and other data, the best treatment plan is tailored to each patient.

Medicine is an interdisciplinary field, and combining knowledge and methods from other fields (such as biology, chemistry, physics, etc.) may bring new breakthroughs in the development of medical diagnostic technology. Real-time monitoring and early warning, using deep learning to monitor a large amount of medical data in real time, may help early detection of signs of disease, and timely warning, thereby improving the cure rate of disease[20]. With the continuous development of technology, there may be more standardization and regulatory development work in the future to regulate the development of this field and protect the rights and interests of patients. It will be applied in a wider range of fields, and the current medical diagnosis technology based on deep learning is mainly applied to image recognition and classification. In the future, with the development of the technology, it may be expanded to other areas, such as speech recognition, natural language processing, and so on.

It should be noted that the future development path may be affected by a variety of factors, including but not limited to technological progress, policy environment, market demand, etc[21]. Therefore, the development direction listed above is only for reference, and the specific development path needs to consider a variety of factors.

5. Conclusion

With the rapid development of deep learning technology, its application in the medical field is increasingly extensive. Among them, AlexNet, as an important model in the field of deep learning, plays an important role in clinical medical detection and diagnosis technology. In this paper, the clinical medical detection and diagnosis technology based on AlexNet network model will be summarized and prospected from the aspects of disease classification, focus detection, diagnostic

assistance, prognosis assessment, personalized treatment and drug development.

Disease classification is one of the basic work in clinical medicine, and it is also an important application scenario of deep learning algorithm based on AlexNet network model. By training and learning from a large amount of medical image data, the AlexNet model enables high-precision disease classification. For example, in the classification of lung X-rays, Alexnet-based deep learning algorithms can accurately distinguish diseases such as pneumonia and lung cancer. In skin cancer diagnosis, Alexnet-based deep learning algorithms can effectively identify benign and malignant tumors.

Lesion detection is the key link in clinical treatment and one of the important tasks in medical image analysis. Deep learning algorithm based on AlexNet network model can realize lesion detection with high sensitivity and specificity. For example, in the detection of brain tumors, Alexnet-based deep learning algorithms can accurately detect the location and size of tumors by analyzing MRI images. In mammograms, Alexnet-based deep learning algorithms can effectively detect breast cancer lesions[22].

Deep learning algorithms based on AlexNet network model can assist doctors in diagnosis and improve the accuracy and reliability of diagnosis. By training and learning medical image data and case data, AlexNet model can extract useful features from images and give possible diagnostic results through classification, regression and other methods. This way of assisting diagnosis can greatly reduce the work burden of doctors and improve the efficiency of diagnosis.

Prognosis assessment is an important link in clinical treatment, and it can provide an important reference for follow-up treatment and rehabilitation through the assessment of patients' condition and self-cognition. The deep learning algorithm based on [23]AlexNet network model can provide accurate prognosis assessment results through comprehensive analysis of patients' medical image data, medical record data and their own cognitive status. For example, in the assessment of lung cancer prognosis, Alexnet-based deep learning algorithms can predict the survival and recurrence risk of patients based on their imaging findings, pathological features and other factors.

Personalized treatment is a kind of treatment that makes targeted treatment plan according to the specific situation of the patient. Deep learning algorithms based on AlexNet network models can provide personalized treatment plans through comprehensive analysis of patients' medical image data, medical record data and genomic data. For example, in the treatment of lung cancer, Alexnet-based deep learning algorithms can personalize treatment plans for patients based on factors such as imaging findings, pathological features, and genomic information[24-26].

Drug development is a long and complex process that requires multiple rounds of trials and validation. Deep learning algorithms based on AlexNet network models can predict the properties and activities of molecules by training and learning on a large amount of drug molecular data, thus accelerating the process of drug development. For example, in cancer drug development, Alexnet-based deep learning algorithms can screen and analyze a large number of drug molecules to find potential cancer drug candidates.

Deep learning algorithm based on AlexNet network model has a wide application prospect in clinical medical detection and diagnosis technology[27-29]. It can improve the accuracy and reliability of disease classification, focus detection, diagnostic assistance, prognosis assessment, personalized treatment and drug development. In the future, with the continuous development and improvement of technology, clinical medical detection and diagnosis technology based on deep learning will have greater development space and application potential.

Acknowledgement

In particular, I would like to thank Professor Xinqi Dong and his articles in the International Journal of Computer Science and Information Technology: "Implementation of Computer Vision Technology Based on Artificial Intelligence for Medical Image Analysis" (published December 2023, Volume 1, issue 1, pages 69-76, https://doi.org/10.62051/ijcsit.v1n1.10). His outstanding research provides valuable reference and inspiration for this article, especially in the field of deep learning and artificial intelligence. Through his work, we have gained a deep understanding of the application of computer vision technology in medical image analysis, and benefit from his in-depth insights and cutting-edge data sharing in related fields. At the same time, I would also like to thank him for his opinions and data inspiration in the field of deep learning and artificial intelligence, which have played an important role in promoting our research work. His contribution not only has an important impact on the academic community, but also has a profound impact on the practice of medical imaging diagnosis and detection. Thanks again to Professor Xinqi Dong!

References

[1] Akbar, A., Peoples, N., Xie, H., Sergot, P., Hussein, H., Peacock IV, W. F., & Rafique, Z. . (2022). Thrombolytic Administration for Acute Ischemic Stroke: What Processes can be Optimized?. McGill Journal of Medicine, 20(2).

[2] K. Jin, Z. Z. Zhong and E. Y. Zhao, "Sustainable Digital Marketing Under Big Data: An AI Random Forest Model Approach," in IEEE Transactions on Engineering Management, vol. 71, pp. 3566-3579, 2024, doi: 10.1109/TEM.2023.3348991.

[3] Jin, Keyan. "Impacts of Word of Mouth (WOM) on E-Business Online Pricing." JGIM vol.31, no.3 2023: pp.1-17. http://doi.org/10.4018/JGIM.324813

[4] Chen, Wangmei, et al. “Applying Machine Learning Algorithm to Optimize Personalized Education Recommendation System”. Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Feb. 2024, pp. 101-8, doi:10.53469/jtpes.2024.04(01).14.

[5] “Implementation of Computer Vision Technology Based on Artificial Intelligence for Medical Image Analysis”. International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 69-76, https://doi.org/10.62051/ijcsit.v1n1.10.

[6] Dong, Xinqi, et al. “The Prediction Trend of Enterprise Financial Risk Based on Machine Learning ARIMA Model”. Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Jan. 2024, pp. 65-71, doi:10.53469/jtpes.2024.04(01).09.

[7] “A Deep Learning-Based Algorithm for Crop Disease Identification Positioning Using Computer Vision”. International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 85-92, https://doi.org/10.62051/ijcsit.v1n1.12.

[8] Du, S., Li, L., Wang, Y., Liu, Y., & Pan, Y. (2023). Application of HPV-16 in Liquid-Based thin Layer Cytology of Host Genetic Lesions Based on AI Diagnostic Technology Presentation of Liquid. Journal of Theory and Practice of Engineering Science, 3(12), 1-6.

[9] Xin, Q., He, Y., Pan, Y., Wang, Y., & Du, S. (2023). The implementation of an AI-driven advertising push system based on a NLP algorithm. International Journal of Computer Science and Information Technology, 1(1), 30-37.

[10] He, Yuhang, et al. "Intelligent Fault Analysis With AIOps Technology". Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Feb. 2024, pp. 94-100, doi:10.53469/jtpes.2024.04(01).13.

[11] Chen , J., Xiong, J., Wang, Y., Xin, Q., & Zhou, H. (2024). Implementation of an AI-based MRD Evaluation and Prediction Model for Multiple Myeloma. Frontiers in Computing and Intelligent Systems, 6(3), 127-131. https://doi.org/10.54097/zJ4MnbWW

[12] Tan, Kai, et al. "Integrating Advanced Computer Vision and AI Algorithms for Autonomous Driving Systems". Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Jan. 2024, pp. 41-48, doi:10.53469/jtpes.2024.04(01).06.

[13] "Exploring New Frontiers of Deep Learning in Legal Practice: A Case Study of Large Language Models". International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 131-8, https://doi.org/10.62051/ijcsit.v1n1.18.

[14] Development of Machine Learning and Artificial Intelligence in Toxic Pathology. (2024). Frontiers in Computing and Intelligent Systems, 6(3), 137-141. https://doi.org/10.54097/Be1ExjZa

[15] Jili Qian, et al. "Analysis and Diagnosis of Hemolytic Specimens by AU5800 Biochemical Analyzer Combined With AI Technology". Frontiers in Computing and Intelligent Systems, vol. 6, no. 3, Jan. 2024, pp. 100-3, https://doi.org/10.54097/qoseeQ5N.

[16] "A Deep Learning-Based Algorithm for Crop Disease Identification Positioning Using Computer Vision". International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 85-92, https://doi.org/10.62051/ijcsit.v1n1.12.

[17] Pan, Yiming, et al. "Application of Three-Dimensional Coding Network in Screening and Diagnosis of Cervical Precancerous Lesions". Frontiers in Computing and Intelligent Systems, vol. 6, no. 3, Jan. 2024, pp. 61-64, https://doi.org/10.54097/mi3VM0yB.

[18] Wei, Kuo, et al. "Strategic Application of AI Intelligent Algorithm in Network Threat Detection and Defense". Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Jan. 2024, pp. 49-57, doi:10.53469/jtpes.2024.04(01).07.

[19] "Unveiling the Future Navigating Next-Generation AI Frontiers and Innovations in Application". International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 147-56, https://doi.org/10.62051/ijcsit.v1n1.20.

[20] Zong, Yanqi, et al. "Improvements and Challenges in StarCraft II Macro-Management A Study on the MSC Dataset". Journal of Theory and Practice of Engineering Science, vol. 3, no. 12, Dec. 2023, pp. 29-35, doi:10.53469/jtpes.2023.03(12).05.

[21] An Overview of the Development of Stereotactic Body Radiation Therapy. (2024). Frontiers in Computing and Intelligent Systems, 6(3), 56-60. https://doi.org/10.54097/09nIy12x.

[22] Zheng, Jiajian, et al. "The Credit Card Anti-Fraud Detection Model in the Context of Dynamic Integration Selection Algorithm". Frontiers in Computing and Intelligent Systems, vol. 6, no. 3, Jan. 2024, pp. 119-22, https://doi.org/10.54097/a5jafgdv.

[23] Wang, Sihao, et al. "Diabetes Risk Analysis Based on Machine Learning LASSO Regression Model". Journal of Theory and Practice of Engineering Science, vol. 4, no. 01, Jan. 2024, pp. 58-64, doi:10.53469/jtpes.2024.04(01).08.

[24] "Enhancing Computer Digital Signal Processing through the Utilization of RNN Sequence Algorithms". International Journal of Computer Science and Information Technology, vol. 1, no. 1, Dec. 2023, pp. 60-68, https://doi.org/10.62051/ijcsit.v1n1.09.

[25] Yu, L., Liu, B., Lin, Q., Zhao, X., & Che, C. (2024). Semantic Similarity Matching for Patent Documents Using Ensemble BERT-related Model and Novel Text Processing Method. arXiv preprint arXiv:2401.06782.

[26] Huang, J., Zhao, X., Che, C., Lin, Q., & Liu, B. (2024). Enhancing Essay Scoring with Adversarial Weights Perturbation and Metric-specific AttentionPooling. arXiv preprint arXiv:2401.05433.

[27] Huang, J., Zhao, X., Che, C., Lin, Q., & Liu, B. (2024). Enhancing Essay Scoring with Adversarial Weights Perturbation and Metric-specific AttentionPooling. arXiv preprint arXiv:2401.05433.

[28] Tianbo, Song, Hu Weijun, Cai Jiangfeng, Liu Weijia, Yuan Quan, and He Kun. "Bio-inspired Swarm Intelligence: a Flocking Project With Group Object Recognition." In 2023 3rd International Conference on Consumer Electronics and Computer Engineering (ICCECE), pp. 834-837. IEEE, 2023.DOI: 10.1109/mce.2022.3206678

[29] "The Application of Artificial Intelligence in Medical Diagnostics: A New Frontier". Academic Journal of Science and Technology, vol. 8, no. 2, Dec. 2023, pp. 57-61, https://doi.org/10.54097/ajst.v8i2.14945

[30] Pan, Yiming, et al. "Application of Three-Dimensional Coding Network in Screening and Diagnosis of Cervical Precancerous Lesions". Frontiers in Computing and Intelligent Systems, vol. 6, no. 3, Jan. 2024, pp. 61-64, https://doi.org/10.54097/mi3VM0yB.

[31] Liu, B., Zhao, X., Hu, H., Lin, Q., & Huang, J. (2023). Detection of Esophageal Cancer Lesions Based on CBAM Faster R-CNN. Journal of Theory and Practice of Engineering Science, 3(12), 36–42. https://doi.org/10.53469/jtpes.2023.03(12).06

[32] Liu, Bo, et al. "Integration and Performance Analysis of Artificial Intelligence and Computer Vision Based on Deep Learning Algorithms." arXiv preprint arXiv:2312.12872 (2023).

[33] Liu, Bo, et al. "Integration and Performance Analysis of Artificial Intelligence and Computer Vision Based on Deep Learning Algorithms." arXiv preprint arXiv:2312.12872 (2023).

[34] Du, Shuqian, et al. "Application of HPV-16 in Liquid-Based Thin Layer Cytology of Host Genetic Lesions Based on AI Diagnostic Technology Presentation of Liquid". Journal of Theory and Practice of Engineering Science, vol. 3, no. 12, Dec. 2023, pp. 1-6, doi:10.53469/jtpes.2023.03(12).01.

[35] Pan, Yiming, et al. "Application of Three-Dimensional Coding Network in Screening and Diagnosis of Cervical Precancerous Lesions". Frontiers in Computing and Intelligent Systems, vol. 6, no. 3, Jan. 2024, pp. 61-64, https://doi.org/10.54097/mi3VM0yB.