The rapid development of artificial intelligence technology has had a huge impact on the fields of computer vision, natural language processing, and geographic information applications. Semantic reasoning enables machines to perform tasks akin to human intelligence, thereby enhancing human–machine interactions and decision-making processes. This breakthrough spans various fields, including text classification [1], named entity recognition [2], machine translation [3], and machine reading comprehension [4]. As one of the important research tasks in the field of natural language processing, people have conducted extensive research on language models. Google’s BERT model [5] has achieved excellent performance in multiple downstream tasks such as machine reading comprehension. Subsequently, a large number of natural language processing models based on pre-trained models have been proposed. However, given the complexity of logical reasoning machine reading comprehension problems, the performance of pretrained language models in these tasks remains suboptimal.

Numerous studies have shown that modeling the logical structure of pretrained models is one of the most effective methods to enhance logical reasoning ability. These methods include introducing a symbolic logic into neural network models [6] and using graph structures for logical reasoning [4]. Article [7] proposed a discourse graph construction method that uses punctuation and explicit connectors for node segmentation and utilizes positional encoding. This article presents a discourse graph attention network based on a multi-head attention mechanism. This network adaptively gathers information from adjacent nodes using attention weight coefficients and simulates varying levels of attention to each condition during the inference process.

Another popular task in natural language processing is text classification. After Google proposed the BERT model in 2018, a large number of novel text feature extraction tasks were proposed. This includes disease diagnosis methods based on crop electronic medical records [8], pre-trained models using Chinese full-word masking strategies [9], the recognition of protein–protein interactions from biomedical texts [10], customer comment analysis models based on BERTopic [11–13], and Arabic satirical article classification using artificial intelligence methods [14,15]. Article [16] developed an event co-reference parsing system for Arabic and proposed a pattern for annotating Arabic event co-references, providing key support for developing advanced common reference parsing systems. In the article [17], the authors compiled a large Arabic news satirical article dataset and constructed a satirical work classification model using machine learning (ML), deep learning (DL), and transformer. In article [18], the author proposed the HTMC-PGT framework for the single-path hierarchical multi-label classification problem in poverty governance. This framework simplifies the HMTC problem into the training and combination problem of multi-class
classifiers in the classifier tree, providing new solutions for traditional methods. Article [19] utilized clustering algorithms and topic modeling techniques to automatically extract consumer intentions from comment data and compares their performance with traditional methods. This study helps us to more accurately understand consumer emotions.

Artificial intelligence tasks have been extensively integrated into computer vision tasks, with some key areas including object detection [20–23], image classification [24,25], and medical image processing [26–29]. Most existing object detection algorithms are based on the YOLO algorithm and have been applied in various fields, such as citrus orchards [30], driver distraction [31], ship detection [32], steel plate defect detection [33], etc. Article [34] introduces a lightweight mask detection algorithm called ECGYOLO based on improved YOLOv7tiny. This algorithm replaces the ELAN module with an ECG module and introduces an ECA mechanism in the neck section, which can meet the real-time and lightweight requirements of mask detection. Article [35] proposes an improved method based on YOLOv8 for accurate recognition of small targets in remote sensing images. The cross-row convolution module in YOLOv8s is replaced with the SPD Conv module, and the path aggregation network is replaced with the SPANet structure. The results show that the algorithm has significantly improved recognition accuracy.

In the field of image classification, article [36] proposes a new pooling operation that integrates it into attention blocks and applied extension operations and point convolution in the channel direction. This method significantly improved the accuracy of image classification on ImageNet. In the field of medical image processing, article [37] applied the ViT model to the recognition and localization of malignant tumors. The authors proposed an improved ViT architecture (ViT patch) by adding a shared MLP header to the output of each patch token. This method provided more task-related supervisory information, improved the generalization ability of the ViT model, and optimized feature learning at a deep level.

The field of sports also presents intriguing applications in computer vision tasks. In the article [38], the authors applied computer network graph theory to propose a passing network for evaluating football team performance. The author used the ratio of average clustering coefficient to average centrality as an overall network indicator to measure the coordination of football team performance, and their results show that this indicator helps to explain the team’s coordination level and has a certain reference value for evaluating the competitiveness of football teams.

This Special Issue also covers an article in the field of data security. There have been many studies on image steganography based on deep learning [39,40]. The article [41] proposed several ideas for implementing data hiding in WebP images, including format-based methods and data-based methods. In addition, the authors also proposed a container selection technique that benefits from the available WebP compression parameters. The authors tested three application programs based on these methods, demonstrating their effectiveness.

In summary, the emergence of artificial intelligence has profoundly impacted various industries such as computer vision and natural language processing. As researchers continue to delve deeper into artificial intelligence, new opportunities and applications will emerge, and the ability of intelligent systems to solve complex problems will be further enhanced.

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