

SYSTEM AND METHOD FOR NATURAL LANGUAGE PROCESSING USING DEEP LEARNING

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ABSTRACT

A novel Natural Language Processing (NLP) system utilizing deep learning techniques for semantic analysis of textual data. The system comprises a Convolutional Neural Network (CNN) architecture combined with Long Short-Term Memory (LSTM) networks for enhanced context understanding. The invention includes an Application Programming Interface (API) for integration with existing software platforms. The system achieves 95% accuracy in sentiment analysis and Named Entity Recognition (NER) tasks. Applications include automated customer service, chatbot development, and document classification using Machine Learning (ML) algorithms.

BACKGROUND OF THE INVENTION

Natural Language Processing (NLP) has become increasingly important in the field of Artificial Intelligence (AI). Traditional NLP systems rely on rule-based approaches which lack the flexibility needed for modern applications. Recent advances in Deep Learning (DL) have shown promise, particularly with Recurrent Neural Networks (RNN) and Transformer architectures. However, existing systems suffer from limitations in processing speed and accuracy when dealing with domain-specific terminology. Prior art includes systems for basic text classification (see US 9,876,543) and sentiment analysis using Support Vector Machines (SVM) (see US 9,123,456). However, these approaches do not adequately address the challenges of real-time processing and multilingual support.

SUMMARY OF THE INVENTION

The present invention provides a comprehensive NLP system that combines CNN and LSTM architectures for superior text understanding. The system includes modules for tokenization, Part-of-Speech (POS) tagging, and semantic parsing. A key innovation is the hybrid attention mechanism that improves performance on long documents. The system utilizes Transfer Learning from pre-trained models, reducing training time by 60% compared to traditional approaches. Integration with cloud computing platforms via RESTful API enables scalable deployment. The User Interface (UI) provides intuitive visualization of analysis results.

REFERENCES CITED

U.S. Patent Documents:

US 9,876,543 - Text classification system (2020)

US 9,123,456 - Sentiment analysis using SVM (2019)
US 8,765,432 - Neural network for language processing (2018)
US 8,234,567 - Machine learning for NLP (2017)

Other References:

EP 3456789 - European patent on text analysis (2021)
WO 2020/123456 - International patent on deep learning (2020)