## ABSTRACT

This paper presents a novel approach to automated document processing using machine learning techniques. We introduce a three-stage pipeline that achieves state-of-the-art performance on benchmark datasets.

## 1. INTRODUCTION

Document processing has become increasingly important in the digital age. Traditional methods rely on rule-based systems, but our approach leverages deep learning to extract meaningful information from complex documents. This work builds upon recent advances in transformer architectures.

## 2. METHODOLOGY

We propose a three-stage pipeline:

1. Text extraction using optical character recognition (OCR)
2. Structure analysis using convolutional neural networks
3. Content classification using transformer models

The methodology involves training a deep convolutional neural network on a dataset of 10,000 labeled documents. We use a ResNet-50 architecture with custom attention mechanisms for improved performance.

Our approach processes documents through the following algorithm:

- Algorithm 1: Document preprocessing
- Algorithm 2: Feature extraction
- Algorithm 3: Classification and ranking

## 3. RESULTS

Our approach achieved 95.2% accuracy on the test dataset, significantly outperforming baseline methods:

- Baseline SVM: 78.3%
- Random Forest: 82.1%
- BERT baseline: 91.4%
- Our method: 95.2%

The methodology was evaluated on three different document types: academic papers, technical reports, and legal documents.

## 4. DISCUSSION

The results demonstrate the effectiveness of our proposed methodology for automated document processing. The attention mechanism proves particularly useful for handling complex document layouts.

## 5. CONCLUSION

This work demonstrates the effectiveness of our proposed methodology for automated document processing. Future work will focus on extending the approach to multilingual documents and real-time processing.

## REFERENCES

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